Tobacco-Associated Cancers in Texas, 2013–2017

Prepared by the Texas Cancer Registry
Texas Department of State Health Services

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Background

- Tobacco use is associated with increased risk of at least 12 different types of cancer: oral cavity and pharynx (mouth and throat); esophagus; stomach; colon and rectum; liver; pancreas; larynx (voice box); lung, bronchus, and trachea; kidney and renal pelvis; urinary bladder; cervix; and acute myeloid leukemia.

- This statistical report describes the burden of tobacco-related cancers in Texas and compares cancer rates and trends to national data.

- Because cancer registries do not routinely collect information about tobacco use, data for tobacco-associated cancers are based on cancer type, and not cases directly attributable to tobacco use.

Implications for Public Health Practice

- The burden of tobacco-associated cancers can be reduced through efforts to prevent tobacco use among youth and young adults, to reduce exposure to secondhand smoke through compliance and support of tobacco laws, and to support smoking cessation in current smokers.

- Comprehensive cancer control strategies could help decrease the incidence of these cancers in Texas.
Texas Overview
Texas Population Estimates

- The estimated population of Texas for 2019 was 28,995,881.¹
- The population of Texas is 1/12th of total US population.

**Population by Age Group, Texas, 2018²**

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Younger than 18</td>
<td>26%</td>
</tr>
<tr>
<td>18-24 Years Old</td>
<td>10%</td>
</tr>
<tr>
<td>25-39 Years Old</td>
<td>21%</td>
</tr>
<tr>
<td>40-49 Years Old</td>
<td>13%</td>
</tr>
<tr>
<td>50-59 Years Old</td>
<td>12%</td>
</tr>
<tr>
<td>60-69 Years Old</td>
<td>10%</td>
</tr>
<tr>
<td>70-79 Years Old</td>
<td>6%</td>
</tr>
<tr>
<td>80 and Older</td>
<td>3%</td>
</tr>
</tbody>
</table>

**Population by Race/Ethnicity, Texas, 2018²**

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>NH White</td>
<td>42%</td>
</tr>
<tr>
<td>NH Black</td>
<td>12%</td>
</tr>
<tr>
<td>NH Asian</td>
<td>5%</td>
</tr>
<tr>
<td>NH Other</td>
<td>2%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>39%</td>
</tr>
</tbody>
</table>

¹ United States Census Bureau QuickFacts, census.gov/quickfacts/fact/table/TX,US/PST045219
² Texas Demographic Center, demographics.texas.gov/Data/TPEPP/Estimates/
NH = Non-Hispanic
Key Population Demographics for Texas

- Six Texas counties have a population over 1,000,000 people — Harris, Dallas, Tarrant, Bexar, Travis and Collin. About 47% of Texans live in one of these counties.\(^1\)

- 33 counties have a population between 100,000–1,000,000 people.\(^1\)

- 181 counties each have a population less than the number of Texans expected to die from cancer in 2020, which is 45,858.\(^1\)

<table>
<thead>
<tr>
<th></th>
<th>Texas(^2)</th>
<th>United States(^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>29 Million</td>
<td>328.2 Million</td>
</tr>
<tr>
<td>Hispanic</td>
<td>39.6%</td>
<td>18.3%</td>
</tr>
<tr>
<td>Persons living in poverty</td>
<td>14.9%</td>
<td>11.8%</td>
</tr>
<tr>
<td>Persons without health insurance (ages 0–64)</td>
<td>20.0%</td>
<td>10.0%</td>
</tr>
<tr>
<td>Persons who speak a language other than English spoken at home (ages 5 years and older)</td>
<td>35.5%</td>
<td>21.5%</td>
</tr>
<tr>
<td>Adults ages 25 and older with a high school diploma</td>
<td>83.2%</td>
<td>87.7%</td>
</tr>
</tbody>
</table>

\(^1\) Texas Demographic Center, demographics.texas.gov/Data/TPEPP/Estimates/
\(^2\) United States Census Bureau QuickFacts, census.gov/quickfacts/fact/table/TX,US/PST045219
In this report, Texas counties are classified using the 2013 Urban-Rural Classification Scheme for Counties.¹

<table>
<thead>
<tr>
<th>Metropolitan</th>
<th>Nonmetropolitan</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Large central metro</strong></td>
<td><strong>Micropolitan</strong></td>
</tr>
<tr>
<td>Counties in metropolitan statistical areas of 1,000,000 or more population that: contain the entire population of the largest principal city of the MSA, or have their entire population contained in the largest principal city, or contain at least 250,000 inhabitants of any principal city</td>
<td>Counties with an urban cluster population of 10,000–49,999</td>
</tr>
<tr>
<td><strong>Large fringe metro</strong></td>
<td></td>
</tr>
<tr>
<td>Counties in MSAs of 1,000,000 or more population that do not qualify as large central metro counties</td>
<td>Nonmetro counties that do not qualify as micropolitan</td>
</tr>
<tr>
<td><strong>Medium metro</strong></td>
<td></td>
</tr>
<tr>
<td>Counties in MSAs with populations of 250,000–999,999</td>
<td></td>
</tr>
<tr>
<td><strong>Small metro</strong></td>
<td></td>
</tr>
<tr>
<td>Counties in MSAs with populations less than 250,000</td>
<td></td>
</tr>
</tbody>
</table>

¹ 2013 Urban-Rural Classification Scheme for Counties, National Center for Health Statistics, Centers for Disease control and Prevention (CDC). cdc.gov/nchs/data_access/urban_rural.htm

Texas Cancer Registry Tobacco-Associated Cancers in Texas, September 2020
In this report, “border counties” are defined as the 32 counties designated by the La Paz Agreement.

Some of the key differences in demographics between the border and non-border counties are presented in the table below.

<table>
<thead>
<tr>
<th></th>
<th>Border Counties¹</th>
<th>Non-Border Counties¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>3.0 Million</td>
<td>25.7 Million</td>
</tr>
<tr>
<td>Hispanic</td>
<td>88.4%</td>
<td>35.5%</td>
</tr>
<tr>
<td>Below poverty level</td>
<td>29.3%</td>
<td>15.9%</td>
</tr>
<tr>
<td>Adults ages 18–64 without health insurance</td>
<td>46.1%</td>
<td>28.3%</td>
</tr>
<tr>
<td>Do not speak English very well</td>
<td>31.7%</td>
<td>12.2%</td>
</tr>
<tr>
<td>Adults ages 25 and older without a high school diploma</td>
<td>32.8%</td>
<td>16.5%</td>
</tr>
</tbody>
</table>

¹ Office of Border Public Health, Texas Department of State Health Services, [dshs.texas.gov/borderhealth/](http://dshs.texas.gov/borderhealth/). Based on 2015 Census projections from DSHS Center for Health Statistics.
Texas Public Health Regions

- The Texas Department of State Health Service divides the state into 11 administrative Public Health Regions (also sometimes called health service regions).

- This report presents some information by public health region to show the variation of cancer statistics across the state.

- TCR’s Web Query Tool can display cancer incidence and mortality rates by health service region, as well as county, at cancer-rates.info/tx/.
Burden of Cancer in Texas

- In 2020, an estimated 127,131 new Texas cancer cases will be diagnosed.

- An estimated 45,858 Texans will die from cancer in 2020.

- As of January 1, 2017, 824,631 Texans who were diagnosed with cancer in the last 22 years were alive.

- Overall, cancer is the second leading cause of death in Texas, but the first in some areas of the state.¹

- Cost of cancer in Texas for 2018 is estimated to be over $40.3 billion.²

¹ Texas Department of State Health Services, Center for Health Statistics, Vital Statistics Annual Reports, Leading Causes of Death for Selected Years Texas Residents.
² An Economic Assessment of the Cost of Cancer in Texas and the Benefits of the Cancer Prevention and Research Institute of Texas and its Programs: 2018 Update
Tobacco Use and Cancer

*Tobacco-Associated Cancers in Texas*
Tobacco Use Among Adults

• Nationally, prevalence of tobacco use has decreased since 1965, but decline has slowed in recent years.\(^1\)

• In Texas, 14% of adults reported they were current smokers in 2018.\(^2\)
  
  • This included 18% of men and 11% of women.

  • Prevalence was highest among ages 45–54 years. 21% reported they were current smokers.

14% of adults smoked cigarettes in 2018 in Texas

28,000 adults die from smoking related illnesses each year in Texas\(^3\)

$8.9B was spent on health care costs due to smoking in 2009 in Texas\(^3\)

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\(^2\) BRFSS Trends & Prevalence Data, CDC. [cdc.gov/brfss/brfssprevalence/](https://cdc.gov/brfss/brfssprevalence/)
\(^3\) Extinguishing the Tobacco Epidemic in Texas, CDC. [cdc.gov/tobacco/about/osh/state-fact-sheets/texas/](https://cdc.gov/tobacco/about/osh/state-fact-sheets/texas/)
In the U.S., tobacco product use significantly increased among high school and middle school students from 2017 to 2018.¹ This increase:

- Erased the decline in tobacco product use among youths that occurred in previous years.
- Was driven by the increase in e-cigarette use.

² Centers for Disease Control and Prevention, Tobacco Use by Youth Is Rising, cdc.gov/vitalsigns/youth-tobacco-use/index.html.
In 2019, 22% of high school youth in Texas reported currently using* any tobacco product, including e-cigarettes and smokeless tobacco.¹

- This includes 23% of males and 21% of females.
- 5% reported currently smoking cigarettes.
- 19% reported current use of an e-vapor product (e.g., e-cigarettes, vaping pens, e-hookahs).

### Self-Reported Tobacco Use Among Youth in Texas, 2019

*Current use is defined as using the product at least 1 day during the 30 days before the survey.*

¹ High School Youth Risk Behavior Report, CDC. [nccd.cdc.gov/youthonline/](http://nccd.cdc.gov/youthonline/).
Health Effects of Tobacco Use

• Tobacco use is the leading cause of preventable disease, disability, and death in United States, including cancer, heart disease, stroke, lung disease, diabetes, and chronic obstructive pulmonary disease.¹

• Tobacco use includes smoking cigarettes and cigars as well as using smokeless products like snuff and chewing tobacco. All of these tobacco products that have been shown to cause cancer.

• Disease and death from tobacco use in the United States is overwhelmingly caused by smoking cigarettes and other burned tobacco products.¹

• In Texas, 27% of cancer deaths among adults 35 years of age or older were attributed to smoking — 32% in males and 21% in females.²

Tobacco Use and Cancer

• Tobacco use causes cancer throughout the body and is attributed to a higher proportion of cancer cases than any other known modifiable risk factor.¹

• Tobacco smoke has at least 70 chemicals that cause cancer, known as carcinogens.¹

• Low levels of smoke exposure, including secondhand smoke, are harmful.

• Smoking reduces a person’s ability to fight cancers unrelated to tobacco.

• Regular smokers lose on average at least 10 years of life.

¹ Centers for Disease Control and Prevention, Tobacco and Cancer, cdc.gov/cancer/tobacco/index.htm
Tobacco use is associated with increased risk of at least 12 different types of cancer:

- Oral cavity and pharynx (mouth and throat)
- Esophagus
- Stomach
- Colon and rectum
- Liver
- Pancreas
- Larynx (voice box)
- Lung, bronchus, and trachea
- Kidney and renal pelvis
- Urinary bladder
- Cervix
- Acute myeloid leukemia

Cancers Attributable to Tobacco Use

• The proportion of cases that can be attributed to smoking cigarettes varies with site and sex. About 19% of all new cancer cases (23.6% in males, 14.5% in females) are likely to be directly attributable to (or caused by) cigarette use.¹

Proportion of Cancer Cases Attributable to Cigarette Smoking in US Adults Age 30 Years or Older¹

<table>
<thead>
<tr>
<th>Cancer Site</th>
<th>All</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lung</td>
<td>81.7</td>
<td>84.4</td>
<td>78.9</td>
</tr>
<tr>
<td>Larynx</td>
<td>73.8</td>
<td>74.9</td>
<td>69.5</td>
</tr>
<tr>
<td>Esophagus</td>
<td>50.0</td>
<td>52.1</td>
<td>42.2</td>
</tr>
<tr>
<td>Oral cavity, pharynx</td>
<td>49.2</td>
<td>51.9</td>
<td>42.8</td>
</tr>
<tr>
<td>Urinary bladder</td>
<td>46.9</td>
<td>49.4</td>
<td>39.1</td>
</tr>
<tr>
<td>Liver</td>
<td>23.2</td>
<td>24.8</td>
<td>18.4</td>
</tr>
<tr>
<td>Cervix</td>
<td>19.9</td>
<td>—</td>
<td>19.9</td>
</tr>
<tr>
<td>Kidney, renal pelvis</td>
<td>17.4</td>
<td>19.2</td>
<td>14.2</td>
</tr>
<tr>
<td>Stomach</td>
<td>17.4</td>
<td>19.4</td>
<td>14.3</td>
</tr>
<tr>
<td>Acute Myeloid Leukemia</td>
<td>15.1</td>
<td>17.1</td>
<td>12.5</td>
</tr>
<tr>
<td>Colorectal</td>
<td>11.7</td>
<td>13.5</td>
<td>9.7</td>
</tr>
<tr>
<td>Pancreas</td>
<td>10.2</td>
<td>11.7</td>
<td>8.5</td>
</tr>
</tbody>
</table>

• Using smokeless tobacco, such as chewing tobacco, also increases risk for three cancers: esophagus, oral cavity and pharynx, and pancreas.²

² Cancer, Smoking & Tobacco Use, CDC. cdc.gov/tobacco/basic_information/health_effects/cancer/
An estimated 19% of new cancer cases are attributable to cigarette smoking. In Texas, this is approximately 20,400 cases per year.

Lung, bronchus, and trachea cancer was the most common tobacco-associated cancer with by far the largest number of cases attributable to smoking — about 10,890 cases per year.

Average New Cancer Cases per Year by Tobacco-Associated Cancer Site and Estimated Proportion Attributable to Smoking

Overall Incidence Rates and Trends
Tobacco-Associated Cancers in Texas

1 Steele et al. 2017. MMWR, 66(39):1052-1058
Tobacco-Associated Cancer Incidence by Sex

• In 2013–2017, tobacco-associated cancer incidence rates were 70% higher in males than females.
• An estimated 24% of all cancer cases in males and 15% of cancer cases in females are attributable to smoking.

Tobacco-Associated Cancers by Sex, Texas, 2013–2017

<table>
<thead>
<tr>
<th>Age-Adjusted Incidence Rate per 100,000</th>
<th>All</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>171.8</td>
<td>222.3</td>
<td>130.6</td>
</tr>
</tbody>
</table>
Tobacco-Associated Cancer by Race/Ethnicity

- Incidence rates of tobacco-associated cancer were highest among non-Hispanic blacks, followed closely by NH whites, in Texas.
- Tobacco-associated cancer incidence rates were lowest among NH Asians/Pacific Islanders in Texas.
- Incidence rates were significantly higher for Hispanics in Texas compared to the U.S.
- Rates were significantly lower for NH whites, NH A/PI, and NH American Indian/Alaska Natives in Texas compared to the U.S.

NH = Non-Hispanic; A/PI = Asian/Pacific Islander; AI/AN = American Indian/Alaska Native.
The incidence rate of tobacco-associated cancers is highest in PHRs 4 and 5. It is lowest in PHRs 10 and 11.
Tobacco-Associated Cancer Incidence by Urban-Rural Classification

- Incidence rates of tobacco-associated cancers were higher in less urban areas — small metro, micropolitan, and non-core.
- Tobacco-associated cancer incidence rates were lower in more urban areas — large central metro, large fringe metro, and medium metro.

**Tobacco-Associated Cancers by Urban-Rural Classification, Texas, 2013–2017**

<table>
<thead>
<tr>
<th>Category</th>
<th>Age-Adjusted Incidence Rate per 100,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large Central Metro</td>
<td>167.6</td>
</tr>
<tr>
<td>Large Fringe Metro</td>
<td>166.7</td>
</tr>
<tr>
<td>Medium Metro</td>
<td>167.9</td>
</tr>
<tr>
<td>Small Metro</td>
<td>190.1</td>
</tr>
<tr>
<td>Micropolitan</td>
<td>190.7</td>
</tr>
<tr>
<td>Non-core</td>
<td>187.8</td>
</tr>
</tbody>
</table>

Metropolitan: Dark blue
Nonmetropolitan: Red
Incidence rates of tobacco-associated cancer were significantly higher in nonmetropolitan counties than metropolitan counties.

Metro status is defined as counties classified as metropolitan or nonmetropolitan according to the 2013 Urban-Rural Classification Scheme for Counties.
Tobacco-Associated Cancer Incidence by Border Status

Incidence rates of tobacco-associated cancers were significantly higher in non-border counties than border counties.

Border counties are defined by the La Paz Agreement (see slide Texas Border Region).
Tobacco-Associated Cancer Incidence Trends

• Overall, tobacco-associated cancer incidence rates were lower in Texas than the U.S.

• Rates decreased significantly for both Texas and the U.S. during 2008–2017.

• In Texas, incidence rates of tobacco-associated cancer decreased by an average of 0.9% per year.

• For the U.S., tobacco-associated cancer incidence rates decreased by an average of 1.1% per year.

*Excludes colorectal cancer.
Lines represent the Joinpoint modeled trend, and points represent observed data.
Site-Specific Rates and Trends

Tobacco-Associated Cancers in Texas
• For most tobacco-associated cancer sites, incidence rates were significantly lower or similar in Texas compared to the overall U.S.

• Three sites had significantly higher incidence rates in Texas: kidney and renal pelvis, liver, and cervix.
Tobacco-Associated Cancer Incidence by Site and Metro Status

<table>
<thead>
<tr>
<th>Tobacco-Associated Cancer by Site and Metro Status, Texas, 2013–2017</th>
<th>Age-Adjusted Incidence Rates per 100,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lung, Bronchus, &amp; Trachea</td>
<td>Metropolitan: 46.8 Nonmetropolitan: 56.6</td>
</tr>
<tr>
<td>Colon &amp; Rectum</td>
<td>Metropolitan: 36.0 Nonmetropolitan: 41.3</td>
</tr>
<tr>
<td>Kidney &amp; Renal Pelvis</td>
<td>Metropolitan: 18.5 Nonmetropolitan: 19.5</td>
</tr>
<tr>
<td>Urinary Bladder</td>
<td>Metropolitan: 14.6 Nonmetropolitan: 15.8</td>
</tr>
<tr>
<td>Pancreas</td>
<td>Metropolitan: 11.6 Nonmetropolitan: 11.4</td>
</tr>
<tr>
<td>Oral Cavity &amp; Pharynx</td>
<td>Metropolitan: 10.7 Nonmetropolitan: 12.4</td>
</tr>
<tr>
<td>Liver</td>
<td>Metropolitan: 9.9 Nonmetropolitan: 9.1</td>
</tr>
<tr>
<td>Cervix</td>
<td>Metropolitan: 8.9 Nonmetropolitan: 11.1</td>
</tr>
<tr>
<td>Stomach</td>
<td>Metropolitan: 6.5 Nonmetropolitan: 6.2</td>
</tr>
<tr>
<td>Esophagus</td>
<td>Metropolitan: 3.7 Nonmetropolitan: 4.3</td>
</tr>
<tr>
<td>Acute Myeloid Leukemia</td>
<td>Metropolitan: 3.4 Nonmetropolitan: 3.7</td>
</tr>
<tr>
<td>Larynx</td>
<td>Metropolitan: 2.8 Nonmetropolitan: 3.6</td>
</tr>
</tbody>
</table>

- Incidence rates were significantly higher in non-metro areas than metro areas for most of the tobacco-associated sites.
- However, incidence rates were significantly higher in metro areas for liver cancer.
- Also, incidence rates for pancreatic and stomach cancers and acute myeloid leukemia were not significantly different between metro and non-metro areas.
Incidence rates were significantly higher in border areas for four cancers: kidney and renal pelvis, stomach, cervical, and liver.

Rates were significantly higher in non-border areas for six cancers: lung, bronchus, and trachea; urinary bladder; pancreas; oral cavity and pharynx; esophagus; and acute myeloid leukemia.

Incidence rates for colorectal and laryngeal cancers were not significantly different between metro and non-metro areas.
Lung, Bronchus, & Trachea Cancer

- In Texas from 2013 to 2017, the incidence rate of lung, bronchus, and trachea cancer was 48.2 cases per 100,000 persons.
- An estimated 82% of lung, bronchus, and trachea cancer cases are attributable to cigarette smoking.¹
- Lung, bronchus, and trachea cancer is the second most commonly diagnosed cancer in both males (after prostate cancer) and females (after breast cancer).

Lung, Bronchus, & Trachea Cancer Incidence Rates by Sex

- In Texas, lung, bronchus, and trachea cancer incidence rates were significantly higher in males than females in 2013–2017.
- During this time, an average of 6,920 cases of lung, bronchus, and trachea cancer were diagnosed in males, and 5,810 cases in females each year.
- An estimated 84% of lung, bronchus, and trachea cancer cases in males and 79% of cases in females are attributable to smoking.
Incidence rates of lung, bronchus, and trachea cancer were highest among non-Hispanic whites and NH blacks.

The rate was lowest among Hispanics.
Incidence rates of lung, bronchus, and trachea cancer increased with age.
The incidence rate of lung, bronchus, and trachea cancer is highest in PHRs 4 and 5. It is lowest in PHRs 10 and 11.
• Lung, bronchus, trachea cancer incidence rates were lower in Texas than the US during 2008–2017.
• Rates decreased significantly for both Texas and the US.
• In Texas, rates decreased by an average of 2.8% per year.
• For the U.S., rates decreased by an average of 2.1% per year.

Lines represent the Joinpoint modeled trend, and points represent observed data.
Laryngeal Cancer

• In Texas from 2013 to 2017, the incidence rate of laryngeal cancer was 2.9 cases per 100,000 persons.

• An estimated 74% of laryngeal cancer cases are attributable to cigarette smoking.¹

Laryngeal Cancer Incidence Rates by Sex

- In Texas, laryngeal cancer incidence rates were nearly six times higher in males than females in 2013–2017.
- During this time, an average of 670 cases of laryngeal cancer were diagnosed in males, and 140 cases in females each year.
- An estimated 75% of laryngeal cancer cases in males and 70% of cases in females are attributable to smoking.

### Laryngeal Cancer by Sex, Texas, 2013–2017

<table>
<thead>
<tr>
<th>Age-Adjusted Incidence Rate per 100,000</th>
<th>All</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age-Adjusted Incidence Rate</td>
<td>2.9</td>
<td>5.2</td>
<td>0.9</td>
</tr>
</tbody>
</table>

Texas Cancer Registry
Laryngeal Cancer Incidence Rates by Race/Ethnicity

- In 2013–2017, incidence rates of laryngeal cancer were highest among non-Hispanic black Texans.
- Laryngeal cancer incidence rates were lowest among NH Asians/Pacific Islanders.

Rates are suppressed for NH American Indian/Alaska Native because fewer than 16 cases were reported. NH = Non-Hispanic; A/PI = Asian/Pacific Islander.
In 2013–2017, incidence rates of laryngeal cancer increased with age.

Rates are suppressed for ages 20–29 years because fewer than 16 cases were reported.
The incidence rate of laryngeal cancer is highest in PHRs 4 and 5. It is lowest in PHRs 8 and 10.
Laryngeal Cancer Incidence Rate Trends

- Laryngeal cancer incidence rates were lower in Texas than the U.S. during 2008–2017.
- Rates decreased significantly for both Texas and the U.S.
- In Texas, rates decreased by an average of 3.6% per year.
- For the U.S., rates decreased by an average of 2.6% per year.

Lines represent the Joinpoint modeled trend, and points represent observed data.
Esophageal Cancer

• In Texas from 2013 to 2017, the incidence rate of esophageal cancer was 3.8 cases per 100,000 persons.
• An estimated 50% of esophageal cancer cases are attributable to cigarette smoking.¹
• Smokeless tobacco use also increases the risk of developing esophageal cancer.

In Texas, esophageal cancer incidence rates were over four times higher in males than females in 2013–2017.

During this time, an average of 830 cases of esophageal cancer were diagnosed in males, and 210 cases in females each year.

An estimated 52% of esophageal cancer cases in males and 42% of cases in females are attributable to smoking.
• In 2013–2017, incidence rates of esophageal cancer were highest among non-Hispanic white Texans.

• Rates were lowest among NH Asian/Pacific Islanders.

NH = Non-Hispanic; A/PI = Asian/Pacific Islander; AI/AN = American Indian/Alaska Native.
Esophageal Cancer Incidence Rates by Age at Diagnosis

In 2013–2017, incidence rates of esophageal cancer increased with age.

Esophageal Cancer in Adults by Age at Diagnosis, Texas, 2013–2017

Rates are suppressed for ages 20–29 years because fewer than 16 cases were reported.
The incidence rate of esophageal cancer is highest in PHRs 2 and 9. It is lowest in PHR 10.
• During 2008–2017, esophageal cancer incidence rates were lower in Texas than the U.S. overall.

• In Texas, there was not a statistically significant trend in incidence rates over the entire time period.

• However, from 2008–2010 incidence rates in Texas decreased significantly by 6.8% per year.

• For the U.S., rates decreased significantly by an average of 1.5% per year over the time period, while also experiencing a significant decrease from 2008–2010 of 3.7% per year.
In Texas from 2013 to 2017, the incidence rate of oral cavity & pharynx cancer was 10.9 cases per 100,000 persons.

An estimated 49% of oral cavity and pharynx cancer cases are attributable to cigarette smoking.¹

Smokeless tobacco use also increases the risk of developing oral cavity & pharynx cancer.

Oral Cavity & Pharynx Cancer Incidence Rates by Sex

- In Texas, oral cavity and pharynx cancer incidence rates were over nearly three times higher in males than females in 2013–2017.
- During this time, an average of 2,220 cases of oral cavity and pharynx cancer were diagnosed in males, and 820 cases in females each year.
- An estimated 52% of oral cavity and pharynx cancer cases in males and 43% of cases in females are attributable to smoking.

<table>
<thead>
<tr>
<th>Age-Adjusted Incidence Rate per 100,000</th>
<th>All</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Oral Cavity &amp; Pharynx Cancer by Sex, Texas, 2013–2017</strong></td>
<td></td>
<td>16.8</td>
<td>5.6</td>
</tr>
</tbody>
</table>
Oral Cavity & Pharynx Cancer Incidence Rates by Race/Ethnicity

- In 2013–2017, incidence rates of oral cavity and pharynx cancer were highest among non-Hispanic white Texans.
- Rates were lowest among Hispanics.

NH = Non-Hispanic; A/PI = Asian/Pacific Islander; AI/AN = American Indian/Alaska Native.
In 2013–2017, incidence rates of oral cavity and pharynx cancer increased with age.
The incidence rate of oral cavity and pharynx cancer is highest in PHRs 2 and 4. It is lowest in PHRs 10 and 11.
Oral Cavity & Pharynx Cancer Incidence Rate Trends

- During 2008–2017, oral cavity and pharynx cancer incidence rates were lower in Texas than the U.S. overall.
- In Texas, the trend indicating increased rates of oral cavity and pharynx cancer was not statistically significant.
- For the U.S., rates increased significantly by an average of 0.6% per year.

Lines represent the Joinpoint modeled trend, and points represent observed data.
In Texas from 2013 to 2017, the incidence rate of urinary bladder cancer was 14.8 cases per 100,000 persons.

An estimated 47% of urinary bladder cancer cases are attributable to cigarette smoking.¹

Urinary Bladder Cancer Incidence Rates by Sex

• In Texas, bladder cancer incidence rates were over four times higher in males than females in 2013–2017.
• During this time, an average of 2,960 cases of bladder cancer were diagnosed in males, and 860 cases in females each year.
• An estimated 49% of bladder cancer cases in males and 39% of cases in females are attributable to smoking.
• In 2013–2017, incidence rates of bladder cancer were highest among non-Hispanic white Texans.
• Rates were lowest among NH Asian/Pacific Islanders.

NH = Non-Hispanic; A/PI = Asian/Pacific Islander; AI/AN = American Indian/Alaska Native.
Urinary Bladder Cancer Incidence Rates by Age at Diagnosis

In 2013–2017, incidence rates of bladder cancer increased with age.

Urinary Bladder Cancer in Adults by Age at Diagnosis, Texas, 2013–2017

- Age-Adjusted Incidence Rate per 100,000

<table>
<thead>
<tr>
<th>Age</th>
<th>Incidence Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-29 Years</td>
<td>0.2</td>
</tr>
<tr>
<td>30-39 Years</td>
<td>0.8</td>
</tr>
<tr>
<td>40-49 Years</td>
<td>3.2</td>
</tr>
<tr>
<td>50-59 Years</td>
<td>12.9</td>
</tr>
<tr>
<td>60-69 Years</td>
<td>42.2</td>
</tr>
<tr>
<td>70 Years and Older</td>
<td>104.7</td>
</tr>
</tbody>
</table>
Urinary Bladder Cancer Incidence Rate Trends

- Bladder cancer incidence rates were lower in Texas than the U.S. during 2008–2017.
- Rates decreased significantly for both Texas and the U.S.
- In Texas, rates decreased by an average of 1.6% per year.
- For the U.S., rates decreased by an average of 1.3% per year.

Lines represent the Joinpoint modeled trend, and points represent observed data.
• In Texas from 2013 to 2017, the incidence rate of liver cancer was 9.8 cases per 100,000 persons.

• An estimated 23% of liver cancer cases are attributable to cigarette smoking.¹

• For more information, see TCR’s report *Liver and Intrahepatic Bile Duct Cancer in Texas*.²

Liver Cancer Incidence Rates by Sex

- In Texas, bladder cancer incidence rates were more than three times higher in males than females in 2013–2017.
- During this time, an average of 2,080 cases of liver cancer were diagnosed in males, and 7300 cases in females each year.
- An estimated 25% of liver cancer cases in males and 18% of cases in females are attributable to smoking.
Liver Cancer Incidence Rates by Race/Ethnicity

• In 2013–2017, incidence rates of liver cancer were highest among Hispanic Texans.

• Rates were lowest among non-Hispanic whites.

Liver Cancer by Race/Ethnicity, Texas, 2013–2017

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>Incidence Rate per 100,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>NH White</td>
<td>6.8</td>
</tr>
<tr>
<td>NH Black</td>
<td>12</td>
</tr>
<tr>
<td>NH A/PI</td>
<td>11.6</td>
</tr>
<tr>
<td>NH AI/AN</td>
<td>7.9</td>
</tr>
<tr>
<td>Hispanic</td>
<td>15.8</td>
</tr>
</tbody>
</table>

NH = Non-Hispanic; A/PI = Asian/Pacific Islander; AI/AN = American Indian/Alaska Native.
Liver Cancer Incidence Rates by Age at Diagnosis

In 2013–2017, incidence rates of liver cancer peaked in ages 60–69 years.
Liver Cancer Incidence Rate Trends

During 2008–2017, liver cancer incidence rates were higher in Texas than the U.S. overall.

In Texas, liver cancer rates increased significantly by an average of 1.9% per year.

For the U.S., the trend indicating increased rates of liver cancer was not statistically significant.

Lines represent the Joinpoint modeled trend, and points represent observed data.
• In Texas from 2013 to 2017, the incidence rate of cervical cancer was 9.1 cases per 100,000 women.

• An estimated 20% of cervical cancer cases are attributable to cigarette smoking.¹

• For more information, see TCR’s report Cervical Cancer in Texas.

• In Texas, the overall incidence rate for cervical cancer was 9.1 per 100,000 in 2013–2017.

• During this time, an average of 1,240 cases of cervical cancer were diagnosed in females each year.

• Incidence rates of cervical cancer were highest among Hispanic females.

• Rates were lowest among non-Hispanic Asian/Pacific Islanders.
In 2013–2017, incidence rates of cervical cancer peaked in ages 40–49 years.

![Cervical Cancer in Adults by Age at Diagnosis, Texas, 2013–2017](chart)

- 20-29 Years: 4.1
- 30-39 Years: 14.8
- 40-49 Years: 17.6
- 50-59 Years: 15.2
- 60-69 Years: 13
- 70 Years and Older: 10.4
During 2008–2017, cervical cancer incidence rates were higher in Texas than the US overall.

For Texas and the U.S., the incidence rates of cervical cancer did not have any statistically significant changes.
• In Texas from 2013 to 2017, the incidence rate of kidney and renal pelvis cancer was 18.6 cases per 100,000 persons.

• An estimated 17% of kidney and renal pelvis cancer cases are attributable to cigarette smoking.¹

Kidney & Renal Pelvis Cancer Incidence Rates by Sex

- In Texas, kidney and renal pelvis cancer incidence rates were higher in males than females in 2013–2017.
- During this time, an average of 3,150 cases of kidney and renal pelvis cancer were diagnosed in males, and 1,940 cases in females each year.
- An estimated 19% of kidney and renal pelvis cancer cases in males and 14% of cases in females are attributable to smoking.
Kidney & Renal Pelvis Cancer Incidence Rates by Race/Ethnicity

In 2013–2017, incidence rates of kidney and renal pelvis cancer were highest among Hispanic Texans. Rates were lowest among non-Hispanic Asian/Pacific Islanders.

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>Adjusted Incidence Rate per 100,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>NH White</td>
<td>18.2</td>
</tr>
<tr>
<td>NH Black</td>
<td>19.2</td>
</tr>
<tr>
<td>NH A/PI</td>
<td>6.1</td>
</tr>
<tr>
<td>NH AI/AN</td>
<td>13.2</td>
</tr>
<tr>
<td>Hispanic</td>
<td>21.2</td>
</tr>
</tbody>
</table>

NH = Non-Hispanic; A/PI = Asian/Pacific Islander; AI/AN = American Indian/Alaska Native.
Kidney & Renal Pelvis Cancer Incidence Rates by Age at Diagnosis

In 2013–2017, incidence rates of kidney and renal pelvis cancer increased with age.

Kidney & Renal Pelvis Cancer in Adults by Age at Diagnosis, Texas, 2013–2017

Age-Adjusted Incidence Rate per 100,000

- 20-29 Years: 1
- 30-39 Years: 5.3
- 40-49 Years: 15.5
- 50-59 Years: 33.1
- 60-69 Years: 61.9
- 70 Years and Older: 74.8
Kidney & Renal Pelvis Cancer Incidence Rate Trends

- During 2008–2017, kidney and renal pelvis cancer incidence rates were higher in Texas than the U.S. overall.
- In Texas, kidney and renal pelvis cancer rates increased significantly by an average of 0.8% per year.
- For the U.S., the trend indicating increased rates of liver cancer was not statistically significant.

Lines represent the Joinpoint modeled trend, and points represent observed data.
• In Texas from 2013 to 2017, the incidence rate of stomach cancer was 6.4 cases per 100,000 persons.

• An estimated 17% of stomach cancer cases are attributable to cigarette smoking.\(^1\)

\(^1\) Islami et al. CA Cancer J Clin. 2018.
In Texas, stomach cancer incidence rates were higher in males than females in 2013–2017.

During this time, an average of 1,020 cases of stomach cancer were diagnosed in males, and 680 cases in females each year.

An estimated 19% of stomach cancer cases in males and 14% of cases in females are attributable to smoking.
• In 2013–2017, incidence rates of stomach cancer were highest among non-Hispanic blacks and Hispanics.

• Rates were lowest among NH whites and NH American Indian/Alaska Natives.

NH = Non-Hispanic; A/PI = Asian/Pacific Islander; AI/AN = American Indian/Alaska Native.
In 2013–2017, incidence rates of stomach cancer increased with age.

**Stomach Cancer in Adults by Age at Diagnosis, Texas, 2013–2017**

<table>
<thead>
<tr>
<th>Age</th>
<th>Incidence Rate per 100,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-29 Years</td>
<td>0.4</td>
</tr>
<tr>
<td>30-39 Years</td>
<td>1.6</td>
</tr>
<tr>
<td>40-49 Years</td>
<td>4</td>
</tr>
<tr>
<td>50-59 Years</td>
<td>9.3</td>
</tr>
<tr>
<td>60-69 Years</td>
<td>18.4</td>
</tr>
<tr>
<td>70 Years and Older</td>
<td>33.9</td>
</tr>
</tbody>
</table>
• During 2008–2017, stomach cancer incidence rates were similar between Texas and the U.S. overall.

• For Texas and the U.S., incidence rates of stomach cancer did not have any statistically significant changes.

Lines represent the Joinpoint modeled trend, and points represent observed data.
• In Texas from 2013 to 2017, the incidence rate of acute myeloid leukemia was 3.5 cases per 100,000 persons.

• An estimated 15% of AML cases are attributable to cigarette smoking.¹

In Texas, acute myeloid leukemia (AML) incidence rates were higher in males than females in 2013–2017.

During this time, an average of 500 cases of AML were diagnosed in males, and 400 cases in females each year.

An estimated 17% of AML cases in males and 13% of cases in females are attributable to smoking.
Acute Myeloid Leukemia Incidence Rates by Race/Ethnicity

In 2013–2017, incidence rates of acute myeloid leukemia were highest among non-Hispanic whites.

Rates were similar among NH blacks, NH Asian/Pacific Islanders, Hispanics.

Rates are suppressed for NH American Indian/Alaska Native because fewer than 16 cases were reported. NH = Non-Hispanic; A/PI = Asian/Pacific Islander.
In 2013–2017, incidence rates of acute myeloid leukemia increased with age.
• During 2008–2017, acute myeloid leukemia incidence rates were lower in Texas than the U.S. overall.

• For Texas and the U.S., the incidence rates of AML did not have any statistically significant changes.

• However, U.S. rates significantly increased by 4.5% a year from 2008 to 2012.
Colorectal Cancer

- In Texas from 2013 to 2017, the incidence rate of colorectal cancer was 36.8 cases per 100,000 persons.
- Colorectal cancer is the third most common cancer in both males and women.
- An estimated 12% of colorectal cancer cases are attributable to cigarette smoking.¹
- For more information, see TCR’s report Colorectal Cancer in Texas.

In Texas, colorectal cancer incidence rates were higher in males than females in 2013–2017. During this time, an average of 5,480 cases of colorectal cancer were diagnosed in males, and 4,430 cases in females each year. An estimated 14% of colorectal cancer cases in males and 10% of cases in females are attributable to smoking.
Colorectal Cancer Incidence Rates by Race/Ethnicity

Colorectal Cancer by Race/Ethnicity, Texas, 2013–2017

- In 2013–2017, incidence rates of colorectal cancer were highest among non-Hispanic blacks.
- Rates were lowest among NH Asian/Pacific Islanders.

NH = Non-Hispanic; A/PI = Asian/Pacific Islander; AI/AN = American Indian/Alaska Native.
In 2013–2017, incidence rates of colorectal cancer increased with age.

![Colorectal Cancer in Adults by Age at Diagnosis, Texas, 2013–2017]
Colorectal Cancer Incidence Rate Trends

- Colorectal cancer incidence rates were lower in Texas than the U.S. during 2008–2017.
- Rates decreased significantly for both Texas and the U.S.
- In Texas, rates decreased by an average of 1.7% per year.
- For the U.S., rates decreased by an average of 2.3% per year.

Lines represent the Joinpoint modeled trend, and points represent observed data.
Pancreatic Cancer

- In Texas from 2013 to 2017, the incidence rate of pancreatic cancer was 11.6 cases per 100,000 persons.

- An estimated 10% of pancreatic cancer cases are attributable to cigarette smoking.\(^1\)

- Smokeless tobacco use also increases the risk of developing pancreatic cancer.

\(^1\) Islami et al. CA Cancer J Clin. 2018.
Pancreatic Cancer Incidence Rates by Sex

• In Texas, pancreatic cancer incidence rates were higher in males than females in 2013–2017.
• During this time, an average of 1,600 cases of pancreatic cancer were diagnosed in males, and 1,480 cases in females each year.
• An estimated 12% of pancreatic cancer cases in males and 9% of cases in females are attributable to smoking.
Pancreatic Cancer Incidence Rates by Race/Ethnicity

Pancreatic Cancer by Race/Ethnicity, Texas, 2013–2017

- In 2013–2017, incidence rates of pancreatic cancer were highest among non-Hispanic blacks.
- Rates were lowest among NH Asian/Pacific Islanders.

NH = Non-Hispanic; A/PI = Asian/Pacific Islander; AI/AN = American Indian/Alaska Native.
Pancreatic Cancer Incidence Rates by Age at Diagnosis

In 2013–2017, incidence rates of pancreatic cancer increased with age.

Pancreatic Cancer in Adults by Age at Diagnosis, Texas, 2013–2017

<table>
<thead>
<tr>
<th>Age</th>
<th>Incidence Rate per 100,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-29 Years</td>
<td>0.3</td>
</tr>
<tr>
<td>30-39 Years</td>
<td>1.0</td>
</tr>
<tr>
<td>40-49 Years</td>
<td>4.2</td>
</tr>
<tr>
<td>50-59 Years</td>
<td>15.2</td>
</tr>
<tr>
<td>60-69 Years</td>
<td>36.7</td>
</tr>
<tr>
<td>70 Years and Older</td>
<td>68.8</td>
</tr>
</tbody>
</table>
Pancreatic Cancer Incidence Rate Trends

- Pancreatic cancer incidence rates were lower in Texas than the U.S. during 2008–2017.
- Rates increased significantly for both Texas and the U.S.
- In Texas, rates increased by an average of 1.0% per year.
- For the U.S., rates increased by an average of 0.7% per year.

Lines represent the Joinpoint modeled trend, and points represent observed data.
Report Information

*Tobacco-Associated Cancers in Texas*
Definitions and Abbreviations

• **Age-adjusted incidence rate**: number of new cancers of a specific site/type occurring in a specified population during a year, usually expressed as the number of cancers per 100,000 population at risk. An age-adjusted rate is a weighted average of the age-specific rates, where the weights are the proportions of persons in the corresponding age groups of a standard population. The potential confounding effect of age is reduced when comparing age-adjusted rates computed using the same standard population.

• **Annual percent change (APC)**: one way to characterize trends in cancer rates over time. With this approach, the cancer rates are assumed to change at a constant percentage of the rate of the previous year. For example, if the APC is 1%, and the rate is 50 per 100,000 in 1990, the rate is $50 \times 1.01 = 50.5$ in 1991 and $50.5 \times 1.01 = 51.005$ in 1992. Rates that change at a constant percentage every year change linearly on a log scale.

• **Average annual percent change (AAPC)**: a summary measure of the trend over a pre-specified fixed interval. It allows us to use a single number to describe the average APCs over a period of multiple years. It is valid even if the joinpoint model indicates that there were changes in trends during those years. It is computed as a weighted average of the APCs from the joinpoint model, with the weights equal to the length of the APC interval.

• **Race/ethnicity group abbreviations**: Non-Hispanic (NH), Asian/Pacific Islander (A/PI), American Indian/Alaska Native (AI/AN).

Texas Cancer Registry

Tobacco-Associated Cancers in Texas, September 2020

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Technical Notes

- Texas incidence data source: Texas Cancer Registry (www.dshs.texas.gov/tcr) SEER*Stat Database, 1995–2017 Incidence, Texas statewide, created December 2019, based on NPCR-CSS Submission, cut-off 11/07/2019. **Note: Cases diagnosed by death certificate or autopsy only are excluded from all data in this report to allow direct comparison with national rates.**


- Rates are per 100,000 and age-adjusted to the 2000 U.S. Standard Population (19 age groups - Census P25-1130). Confidence Intervals (CI) are 95% for rates and ratios (Tiwari mod). Small counts frequently produced unstable rates for Texas NH Native American/Alaska Natives and are therefore not always presented.

- The Joinpoint Regression Program is statistical software for the analysis of trends using joinpoint models. The software enables the user to test whether an apparent change in trend is statistically significant. Joinpoint fits the selected trend data (e.g., cancer rates) into the simplest joinpoint model that the data allow.

  - Annual Percent Change (APC) is calculated by fitting a least squares regression line to the natural logarithm of the age-adjusted rates, with year as the regressor variable. This method allows for more than one APC to describe the trend over a time period. The joinpoint model uses statistical criteria to determine when and how often the APC changes. Cancer rates are fit using joined log-linear segments, so each segment can be characterized using an APC.

  - Average Annual Percent Change (AAPC) is computed as a weighted average of the APCs from the joinpoint model. AAPC is derived by first estimating the underlying joinpoint model that best fits the data. The AAPC over any fixed interval is calculated using a weighted average of the slope coefficients of the underlying joinpoint regression line with the weights equal to the length of each segment over the interval.

  - In this report, if the AAPC was significantly greater than zero, rates were reported to have increased. If the AAPC was significantly lower than zero, rates were reported to have decreased. If the AAPC was not significantly different from zero, rates were reported as stable.

  - Joinpoint Regression Program, Version 4.7.0.0 – Feb 2019; Statistical Methodology and Applications Branch, Surveillance Research Program, National Cancer Institute.
# Tobacco-Associated Cancer Site Specifications

<table>
<thead>
<tr>
<th>Cancer</th>
<th>ICD-O-3 site codes</th>
<th>ICD-O-3 histology codes</th>
<th>Additional restrictions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral cavity and pharynx</td>
<td>C00.0–14.8</td>
<td>8000–9049, 9056–9139, 9141–9589</td>
<td></td>
</tr>
<tr>
<td>Esophagus</td>
<td>C15.0–15.9</td>
<td>8000–9049, 9056–9139, 9141–9589</td>
<td></td>
</tr>
<tr>
<td>Stomach</td>
<td>C16.0–16.9</td>
<td>8000–9049, 9056–9139, 9141–9589</td>
<td></td>
</tr>
<tr>
<td>Colon and rectum</td>
<td>C18.0–20.9, C26.0</td>
<td>8000–9049, 9056–9139, 9141–9589</td>
<td></td>
</tr>
<tr>
<td>Liver</td>
<td>C22.0</td>
<td>8000–9049, 9056–9139, 9141–9589</td>
<td></td>
</tr>
<tr>
<td>Pancreas</td>
<td>C25.0–25.9</td>
<td>8000–9049, 9056–9139, 9141–9589</td>
<td></td>
</tr>
<tr>
<td>Larynx</td>
<td>C32.0–32.9</td>
<td>8000–9049, 9056–9139, 9141–9589</td>
<td></td>
</tr>
<tr>
<td>Lung, bronchus, trachea</td>
<td>C33.9–34.9</td>
<td>8000–9049, 9056–9139, 9141–9589</td>
<td></td>
</tr>
<tr>
<td>Cervix uteri</td>
<td>C53.0–53.9</td>
<td>8000–9049, 9056–9139, 9141–9589</td>
<td>Restrict to females</td>
</tr>
<tr>
<td>Kidney and renal pelvis</td>
<td>C64.9–65.9</td>
<td>8000–9049, 9056–9139, 9141–9589</td>
<td></td>
</tr>
<tr>
<td>Urinary bladder</td>
<td>C67.0–67.9</td>
<td>8000–9049, 9056–9139, 9141–9589</td>
<td></td>
</tr>
<tr>
<td>Acute myeloid leukemia</td>
<td></td>
<td>9840; 9861; 9865–9869; 9871–9874; 9895–9898; 9910–9911; 9920</td>
<td></td>
</tr>
</tbody>
</table>

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References

- Centers for Disease Control and Prevention. Tobacco and Cancer. cdc.gov/cancer/tobacco/