CANCER IN TENNESSEE

2012-2016

March 2020

Division of Population Health Assessment
Tennessee Cancer Registry

This document presents cancer incidence and mortality information for the entire state of Tennessee focusing on the five-year period between 2012 and 2016, with comparisons to national rates. The report is made possible through data collected by the Tennessee Cancer Registry (TCR) as well as cancer registries nationwide. The TCR is dedicated to the collection and use of quality data for the purpose of decreasing the incidence and mortality of cancer in Tennessee.

PREPARED BY

- Jake Richards, MBA
- Martin Whiteside, DC, PhD, MSPH

SUGGESTED CITATION

Richards J.E., Whiteside M.A. *Cancer in Tennessee. 2012-2016*. Tennessee Department of Health: Division of Population Health Assessment – Tennessee Cancer Registry. Nashville, Tennessee, March 2020.

COPYRIGHT INFORMATION

This publication was supported by cooperative agreement grant number 5NU58DP006307 from the Centers for Disease Control and Prevention (CDC). Its contents are solely the responsibility of the authors and do not necessarily represent the views or opinions of the CDC.

CONFIDENTIALITY STATEMENT

All information obtained on patients shall be considered confidential. Absolutely no personal or identifying information, such as name or social security number, can be released to researchers unless Institutional Review Board (IRB) approval is obtained. All information shall be used solely for statistical, scientific and medical research purposes and shall be held strictly confidential.

CANCER IN TENNESSEE REPORT

This report contains cancer incidence and mortality data for the entire state of Tennessee from 2012 through 2016, with some comparisons to national rates. Data collected by the Tennessee Cancer Registry (TCR) as well as cancer registries nationwide made the creation of this report possible. This report published by the TCR is meant to serve as a reference for researchers and the general public. For additional information and publications, we encourage you to visit our website at https://www.tn.gov/health/health-program-areas/statistics.html

It is important to note that cancer data in this report is dynamic and it is possible that even after the standard reporting delay, cases may still be reported to the TCR, which may have a minor statistical impact on the most recent year of diagnosis.

ACKNOWLEDGEMENTS

The Tennessee Cancer Registry acknowledges the contributions of the following organizations and individuals in making the publication of this report possible:

- The staff of the Tennessee Cancer Registry (TCR)
- Cancer registrars from healthcare facilities throughout the State of Tennessee who completed the large majority of cancer abstracts available in the TCR database
- The staff of the Office of Vital Statistics, Division of Vital Records and Statistics, Tennessee Department of Health (TDH), for providing mortality data

These dedicated individuals labored tirelessly to ensure the quality and completeness of TDH and TCR data.

PARTNERSHIPS

The staff of the TCR wishes to give special thanks to the Centers for Disease Control and Prevention for their financial support.

The TCR also seeks to thank the following members of the TDH Executive Leadership Team for their professional support:

Lisa Piercey, MD, MBA, FAAP, Commissioner
Tim Jones, MD, Chief Medical Officer
Morgan McDonald, MD, Deputy Commissioner for Population Health
Shalini Parekh, MPH, Assistant Commissioner, Division of Population Health Assessment

The mission of the Tennessee Department of Health is to protect, promote and improve the health and prosperity of people in Tennessee.

Tennessee Department of Health
Division of Population Health Assessment
Tennessee Cancer Registry
710 James Robertson Parkway
Nashville, Tennessee 37243
Phone: (615)741-5548 or 800-547-3558

The Tennessee Cancer Registry is dedicated to the collection and use of quality data for the purpose of decreasing the incidence and mortality of cancer in Tennessee.

TABLE OF CONTENTS

TENNESSEE CANCER REGISTRY

WHO WE ARE

The Tennessee (TN) Cancer Registry (TCR) was established in 1983 by the TN General Assembly with the passage of Tennessee Code Annotated (T.C.A.) § 68-1-1001 and is responsible for collecting information on all reportable cancer diagnoses in TN, including non-residents diagnosed and/or treated in TN. The TCR has achieved "Gold Certification," the highest level of certification by the North American Association of Central Cancer Registries (NAACCR) since the 2005 diagnosis year. More information on NAACCR certification criteria and certification levels can be found at https://www.naaccr.org/certification-criteria/.

WHAT WE DO

In collaboration with local health care facilities and cancer registrars, TCR staff identifies new cases of cancer through routine, systematic review of medical records, radiation therapy and surgical logs, hospital discharge lists, state vital records and other sources. Information regarding patient characteristics, cancer diagnosis, and first-course treatment is ascertained primarily from specific statements in the medical record and other sources such as death certificates and physician reports.

OUR PURPOSE

The purpose of the TCR is:

- To collect accurate information on cancer cases diagnosed and/or treated in TN annually.
- To increase awareness of cancer in TN.
- To promote and assist cancer registries in each facility accurately code cancer abstracts.
- To provide information to the public regarding cancer incidence and mortality in TN.
- To serve as a data repository for those requesting information on cancer, its effects, treatment, risk factors, and prevention.
- To support epidemiological research into the causes, distribution, prevention, and treatment of cancer.

WHAT IS CANCER?

Cancer is a group of more than 100 diseases characterized by uncontrolled growth and spread of abnormal cells. An individual can be diagnosed with cancer at any time in their life, but persons 55 years of age and older are at a higher risk of developing of cancer. About 40-50% of all cancers might be potentially preventable with better lifestyle choices, such as, increasing physical activity, incorporating better nutrition, and abstaining from tobacco products (Islami et al., 2018.)

WHAT IS CANCER INCIDENCE?

Cancer incidence is defined as the number of new cancers diagnosed in the population at risk. The **cancer incidence rate** is the number of new cases of cancer diagnosed in a specified population during a specified time period, usually expressed as the number of new cases per 100,000 persons at risk. That is,

$$\textbf{Cancer Incidence Rate} = \left(\frac{\textbf{Number of New Cases of Cancer}}{\textbf{Population at Risk}}\right) * \textbf{100,000}$$

The numerator of the incidence rate is the number of newly diagnosed cancer cases; the denominator is the size of the population at risk. The number of new cancers may include multiple primary cancers occurring in one patient, and the primary site reported is the site of origin and not the metastatic site, which is the distant site to which the cancer has spread. The incidence rate does not include cancer recurrences and can be computed for a given cancer primary site, group of cancers or for all cancers combined.

WHAT IS CANCER MORTALITY?

Cancer mortality is defined as the number of deaths from cancer in the population at risk. The **cancer mortality rate** is defined as the number of deaths with cancer as the underlying cause of death in a specified at-risk population during a given time period, usually expressed as the number of deaths due to cancer per 100,000 persons at risk. That is,

$$\textbf{Cancer Mortality Rate} = \left(\frac{\textbf{Number of Cancer Deaths}}{\textbf{Population at Risk}}\right) * \textbf{100,000}$$

The numerator of the mortality rate is the number of cancer deaths and the denominator is the size of the population at risk. The mortality rate can be computed for a given cancer site or for all cancers combined.

OTHER IMPORTANT TERMS

Age-adjustment: Age is the most important risk factor for the incidence of most cancers, which makes it difficult to compare populations with different age distributions. Age-adjustment is a statistical technique that allows for the comparison of rates among populations with different age distributions, by weighting the age-specific rates in each population to one standard population.

Stage at diagnosis: Cancer stage is the extent to which a cancer has spread from the organ of origin at the time of diagnosis. The stage information used in this report is based on the SEER Summary Stage Guidelines:

- ***In situ***: Cancerous cells have not invaded the tissue basement membrane and there is no stromal invasion. *In situ* cancers are not considered malignant (with the exception of bladder cancers) and are not included in the incidence rate calculations
- **Local**: The tumor is confined to the organ of origin.
- **Regional**: The tumor has spread to adjacent organs or tissues. Regional lymph nodes may also be involved.
- **Distant**: The tumor has spread beyond the adjacent organs or tissues. Distant lymph nodes, organs, and/or tissues may also be involved.

EXECUTIVE SUMMARY

This report contains cancer incidence (i.e., number of newly diagnosed cancer cases), and mortality (i.e., number of deaths), data for the entire state of Tennessee from 2012 through 2016, with some comparisons to national rates. Data collected by the Tennessee Cancer Registry (TCR) as well as cancer registries nationwide made the creation of this report possible. This report is meant to serve as a reference for researchers and the general public and for additional information and publications from the TCR, we encourage you to visit our website at https://www.tn.gov/health/health-program-areas/statistics.html. It is important to note that cancer data in this report is dynamic and it is possible that even after the standard reporting delay, a few cases may be reported, which may have a minor impact on the most recent years of diagnosis.

- From 2012-2016, 179,227 Tennesseans were diagnosed with cancer and 70,361 Tennesseans died from cancer.
- Cancer was the second leading cause of death in the state and resulted in nearly 580,000 years of potential life lost in Tennesseans during the 5-year period covered by this report.
- From 2012 through 2016, the cancer incidence rate in TN decreased by 0.4% per year (statistically not significant), and the cancer mortality rate declined by 1.3% per year (statistically significant).
- From 2012-2016, TN experienced the 21st highest cancer incidence rate and the 5th highest cancer mortality rate in the United States (U.S.). Much of TN's observed cancer incidence and mortality disparities relative to other states is due to a greater cancer burden among TN men, who experience respectively, the 13th and 4th highest cancer incidence and mortality burden compared to men in all other U.S. states, whereas TN women experience, respectively, the 31st highest cancer incidence burden and the 7th highest cancer mortality burden in the U.S.
- Lung cancer was the most frequently diagnosed cancer and the most common cause of cancer deaths among Tennesseans. The fact that lung cancer is the leading type of newly diagnosed cancer in TN could be largely due to the greater prevalence of smoking among Tennesseans compared to the national average. According to the 2016 TN Behavioral Risk Factor Surveillance Survey, 22.1% of TN adults 18 years of age and older were current smokers compared to only 17.1% nationally. Smoking is the major cause of at least 80% of all lung cancers in the US, but is also a known cause for many other types of cancer including: oropharyngeal, laryngeal, colorectal, esophageal, stomach, urinary bladder, kidney, pancreatic, liver, and uterine cervix cancers. Note that several cancers caused by smoking are in the top 10 of all cancers impacting Tennesseans as newly diagnosed cases and/or cancer deaths. Through substantially reducing the prevalence of smoking, TN could potentially prevent considerable numbers of both new cancer cases and cancer deaths.

- The 10 most common types of cancers diagnosed among TN residents during the 2012-2016 period in descending number order (counts in parentheses) were: lung (29,788 cases), female breast (25,014 cases), prostate (21,109 cases), colorectal (15,493 cases), urinary bladder (7,630 cases), melanoma of the skin (7,577 cases), kidney and renal pelvis (7,048 cases), non-Hodgkin Lymphoma (6,718 cases), oropharyngeal (5,092 cases), and leukemia (5,063 cases).
- The 10 most common types of cancers principally leading to death among Tennesseans from 2012 to 2016 in descending order (counts in parentheses) were: lung (21,740 deaths), colorectal (5,941 deaths), female breast (4,629 deaths), pancreatic (4,317 deaths), prostate (2,916 deaths), liver and intrahepatic bile duct (2,728 deaths), leukemia (2,578 deaths), non-Hodgkin Lymphoma (2,318 deaths), brain and other nervous system (1,776 deaths), and esophageal (1,624 deaths).
- Cancer also demonstrates geographic disparities in TN, see Maps and Appendices. For all new cases of cancer (i.e., incidence) combined, the following are the top 5 TN counties in descending order by age-adjusted rate (rates in parentheses are displayed as cases per 100,000 population): Hancock County (543.3 cases), Claiborne County (533.3 cases), Benton County (530.8 cases), Carroll County (525.1 cases), Marion County (520.0 cases). The following are the top 5 TN counties in descending order for overall cancer mortality by age-adjusted rate (rates in parentheses are displayed as deaths per 100,000 population): Trousdale County (253.4 deaths), Marion County (239.2 deaths), Overton County (238.9 deaths), Benton County (238.3 deaths), and Grundy County (235.8 deaths). Regionally in TN, the East Region (comprised of Anderson, Blount, Campbell, Claiborne, Cocke, Grainger, Hamblen, Jefferson, Knox, Loudon, Monroe, Morgan, Roane, Scott, Sevier, and Union counties) displays the highest overall cancer incidence rate (477.9 cases per 100,000 population) of all regions in TN, whereas the Northwest Region (comprised of Benton, Carroll, Crockett, Dyer, Gibson, Henry, Lake, Obion, and Weakly counties) displays the highest overall cancer mortality rate (201.4 deaths per 100,000 population).
- Based on 2010-2016 TN data, approximately 64.0% of Tennesseans survived 5 years or more after their initial diagnosis of cancer compared to the TN population without cancer. This means about 64 cancer patients survived 5 years after being diagnosed, whereas 100 Tennesseans without cancer will survive the same 5-year period.

Data Source

CANCER AND CANCER RISK FACTORS

IMPACT OF CANCER IN THE UNITED STATES

For 2014-2016, about two out of every five individuals in the U.S. will develop invasive cancer in their lifetime (a 39.3% lifetime risk). In the US, men have a 40.1% probability and women have a 38.7% probability of developing invasive cancer in their lifetime (Howlader et. al., 2019). On average, one out of every five Americans will die from cancer in their lifetime (19.7% lifetime risk). In the U.S., men have approximately a 21.3% probability and women an 18.4% probability of dying from cancer in their lifetime. The following tables lists lifetime risks of developing and dying from certain cancers for males and females in the US from 2014 to 2016 in decreasing order of developing cancer (Tables 1A and 1B):

Table 1A: Lifetime Risk of Developing and Dying from Select Cancers, Males, U.S., 2014 - 2016

Male Site	Risk of Developing		Risk of Dying	
	%	1 in	%	1 in
Prostate	11.6	9	2.4	41
Lung and bronchus	6.7	15	5.5	19
Colon and rectum	4.4	23	1.8	55
Bladder (includes in situ)	3.9	26	0.9	108
Melanoma of the skin	2.8	37	0.4	257

Note. Adapted from the SEER Cancer Statistics Review 1975-2016 – Lifetime Risk, by the National Cancer Institute, 2019.

Table 1B: Lifetime Risk of Developing and Dying from Select Cancers, Females, U.S., 2014 - 2016

Female Site	Risk of developing		Risk of dying from	
	%	1 in	%	1 in
Breast, invasive & *in situ*	15.3	7	--	--
Breast	12.8	8	2.6	39
Lung and bronchus	6.1	17	4.5	23
Colon and rectum	4.1	25	1.7	60
Uterine corpus	3.1	33	0.6	159
Non-Hodgkin lymphoma	1.9	52	0.6	159

Note. Adapted from the SEER Cancer Statistics Review 1975-2016 – Lifetime Risk, by the National Cancer Institute, 2019.

The direct medical costs, which is the total health care expenditure for cancer in the U.S. in 2010 was $124.6 billion, or about $80,136 per cancer diagnosis. By 2020, overall cancer costs could reach $157.8 billion (in 2010 dollars), based only on increases in population; however, if costs of cancer care also increase annually by 2%, the total cost for cancer care in 2020 could reach as high as $186.7 billion (NCI, 2013). The cancer sites with the highest costs in 2010 dollars were: breast cancer ($16.5 billion), followed by colorectal cancer ($14.1 billion), lung cancer ($12.1 billion), lymphoma ($12.1 billion), and prostate cancer ($11.9 billion) (Mariotto, 2011).

IMPACT OF CANCER IN TENNESSEE

On average, one out of every two individuals in TN will develop some type of invasive cancer in their lifetime. Approximately 579,309 years of potential life were lost by TN residents due to premature cancer deaths from 2012-2016. In TN, men have a 47.8% probability of developing an invasive cancer in their lifetime, whereas women in TN have a 43.8% probability of developing an invasive cancer in their lifetime. In TN, one in five men (21.7%) and one in six women (18.0%) are at risk of dying from cancer in their lifetime. The following tables list lifetime risks of developing and dying from certain cancers for men and women in TN from 2014-2016 in decreasing order of developing cancer (Tables 2A and 2B):

Table 2A: Lifetime Risk of Developing and Dying from Select Cancers, Males, Tennessee, 2014 - 2016

Male Site	Risk of Developing		Risk of Dying From	
	%	1 in	%	1 in
Prostate	10.3	10	2.1	48
Lung and Bronchus	8.8	11	6.9	14
Colon and Rectum	4.2	24	1.7	58
Bladder (includes in situ)	3.4	30	0.8	128
Melanoma of the Skin	2.4	42	0.4	231

Table 2B: Lifetime Risk of Developing and Dying from Select Cancers, Females, Tennessee, 2014 - 2016

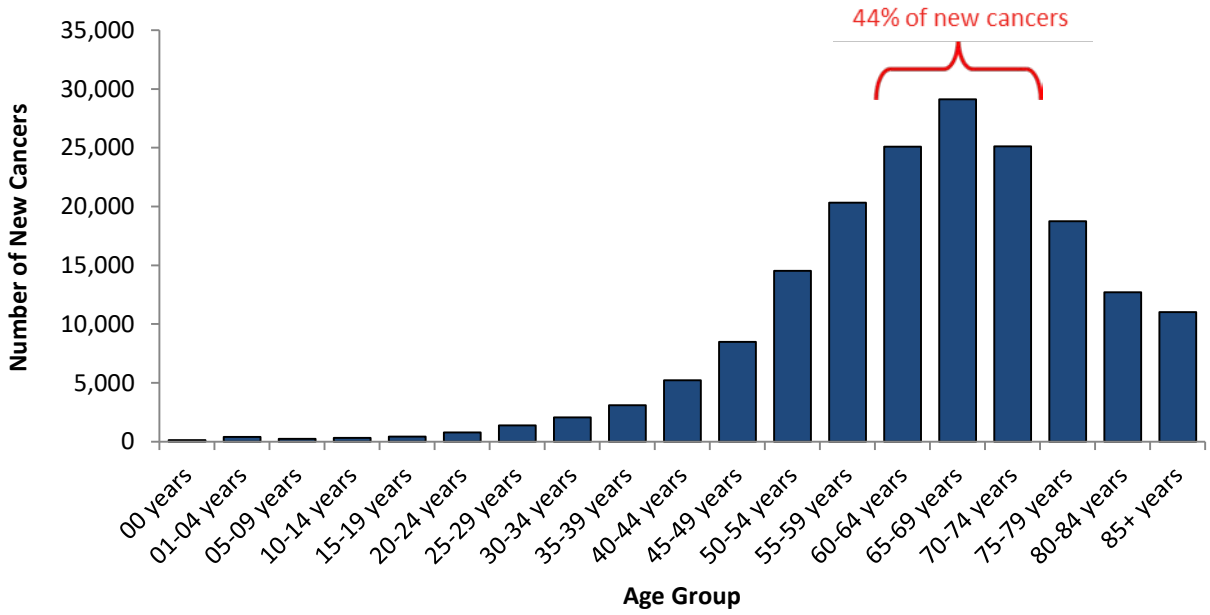
Female Site	Risk of Developing		Risk of Dying From	
	%	1 in	%	1 in
Breast	12.1	8	2.5	40
Lung and Bronchus	7.0	14	5.0	20
Colon and Rectum	4.0	25	1.6	62
Uterine Corpus	2.5	41	0.5	193
Non-Hodgkin Lymphoma	1.6	63	0.7	153

EVERY DAY IN TENNESSEE…

- **98** people are diagnosed with cancer
- **16** people are diagnosed with lung cancer
- **14** women are diagnosed with breast cancer
- **12** men are diagnosed with prostate cancer
- **8** people are diagnosed with colorectal cancer
- **39** people die from cancer.

Data Source

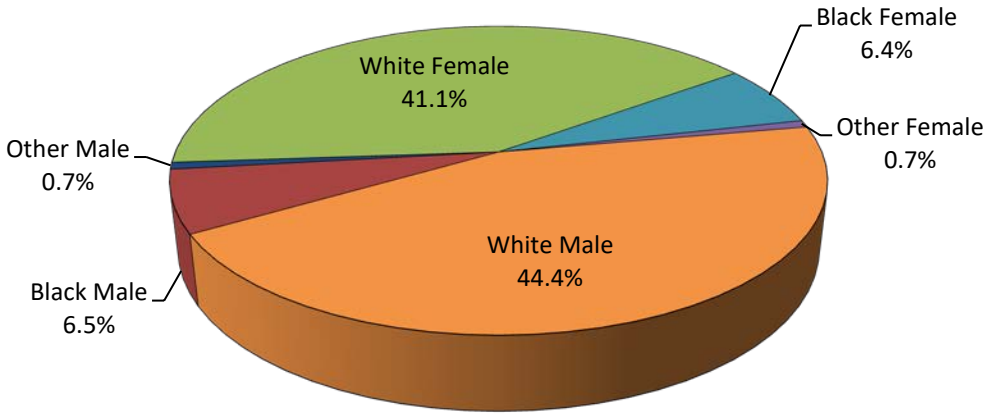
Figure 1. Cancer Incidence, By Age at Diagnosis, Tennessee, 2012-2016



- Aging is the most important risk factor for cancer overall, as well as for many individual cancer primary sites.
- The median age of a cancer diagnosis in TN is 65 years, which means that half of all cancer cases occur in Tennesseans below this age and half in Tennesseans above this age.
- Approximately 44% of new cancer cases are diagnosed in Tennesseans aged 60 to 74 years (Figure 1).
- Although the risk of most cancer types increases as individuals become older, there are some cancer types that commonly occur in younger people, e.g. leukemia and lymphoma.

Data Source

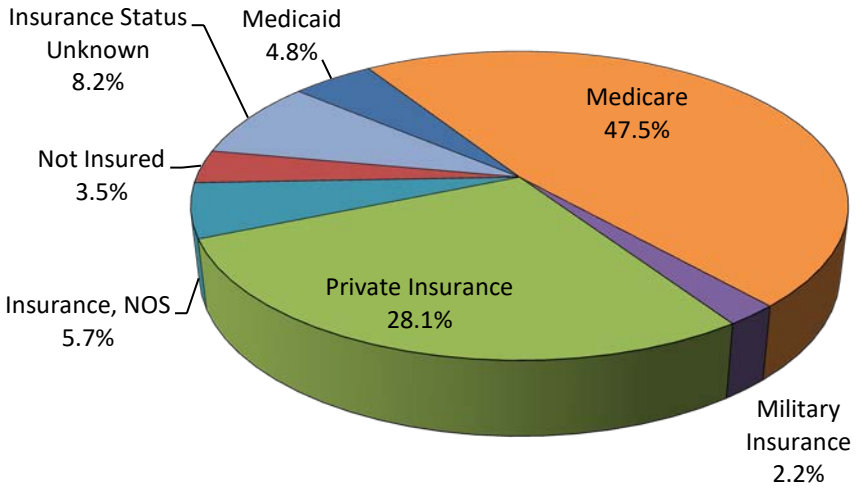
Figure 2. Cancer Incidence, By Race and Sex, Tennessee, 2012-2016



From 2012 to 2016 (Figure 2):

- 153,334 white individuals and 23,275 black individuals were diagnosed with cancer in TN.
- White Tennesseans accounted for 85.5% of all new cancer diagnoses, while blacks accounted for 12.9% of all new cancer diagnoses.

Figure 3. Insurance Coverage Among Cancer Patients, Tennessee, 2012-2016

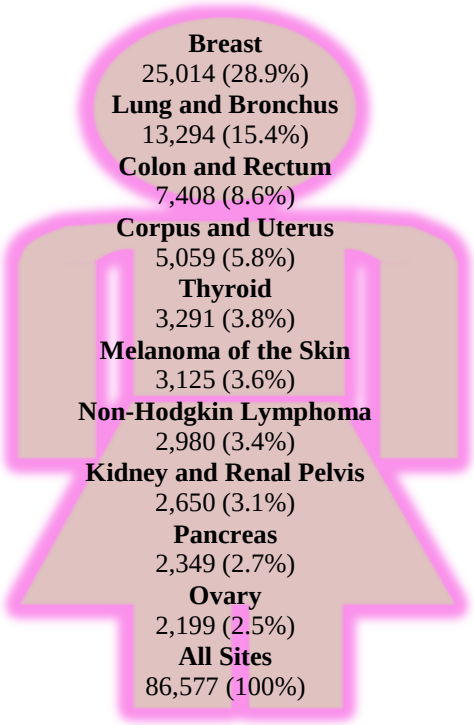


- Among those individuals with known insurance status, 88.3% of Tennesseans had insurance coverage at the time of their initial cancer diagnosis. For 5.7% of the insured, there was no additional information on type of insurance, hence these are labeled, Not Otherwise Specified (Insurance, NOS) (Figure 3).

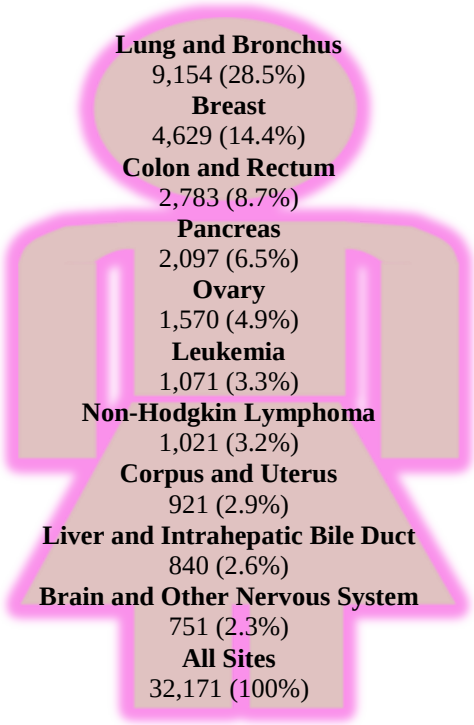
Data Source

COMMON CANCERS IN TENNESSEE BY GENDER, 2012-2016

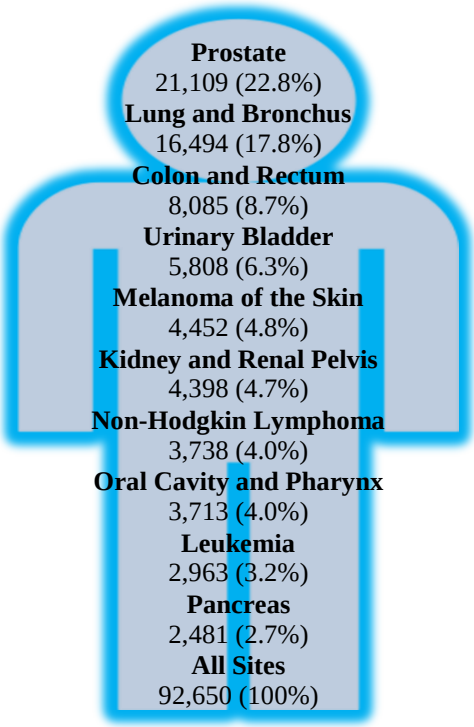
New Cancers in Women



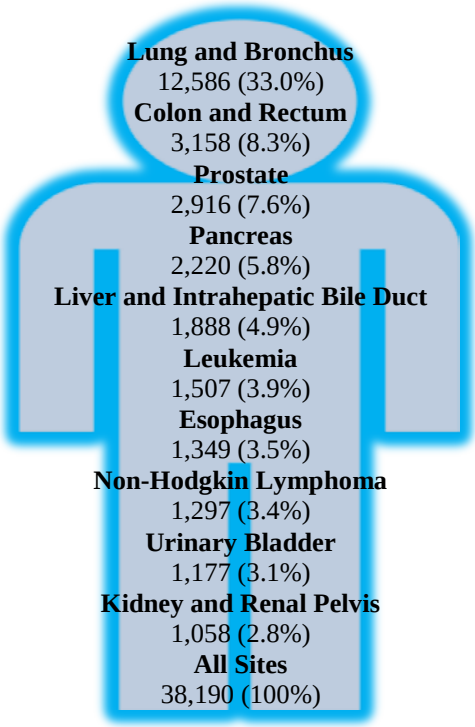
Cancer Deaths in Women



New Cancers in Men

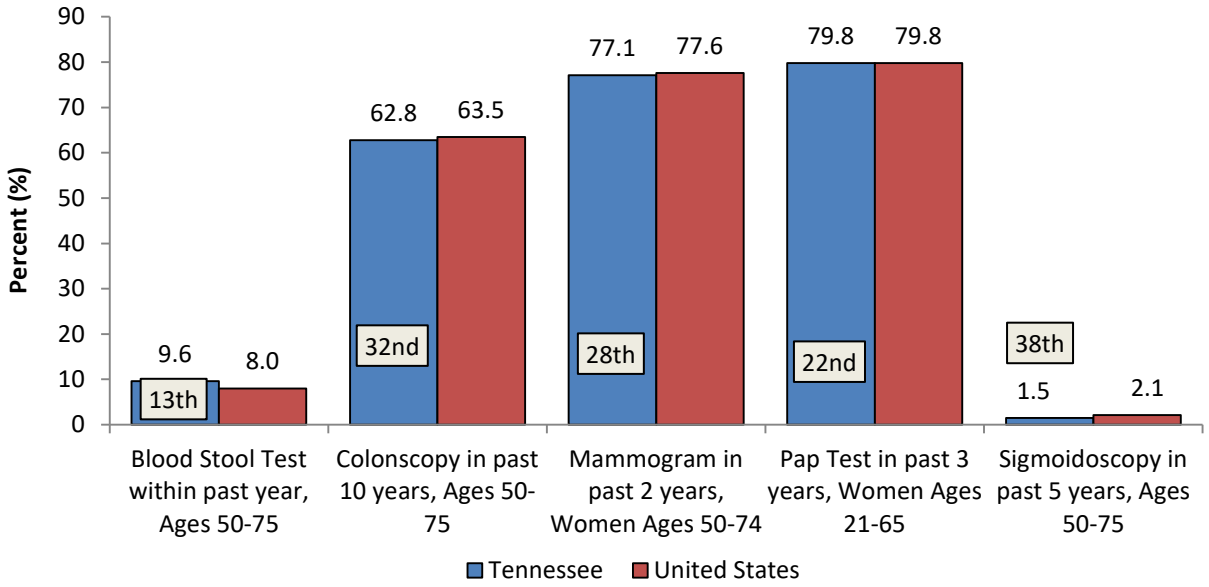


Cancer Deaths in Men



Data Source

Figure 4. Prevalence of Screening, Adults 18+ Years of Age, Tennessee and the United States, 2016



Boxed numbers indicates the percentage ranking in the U.S.

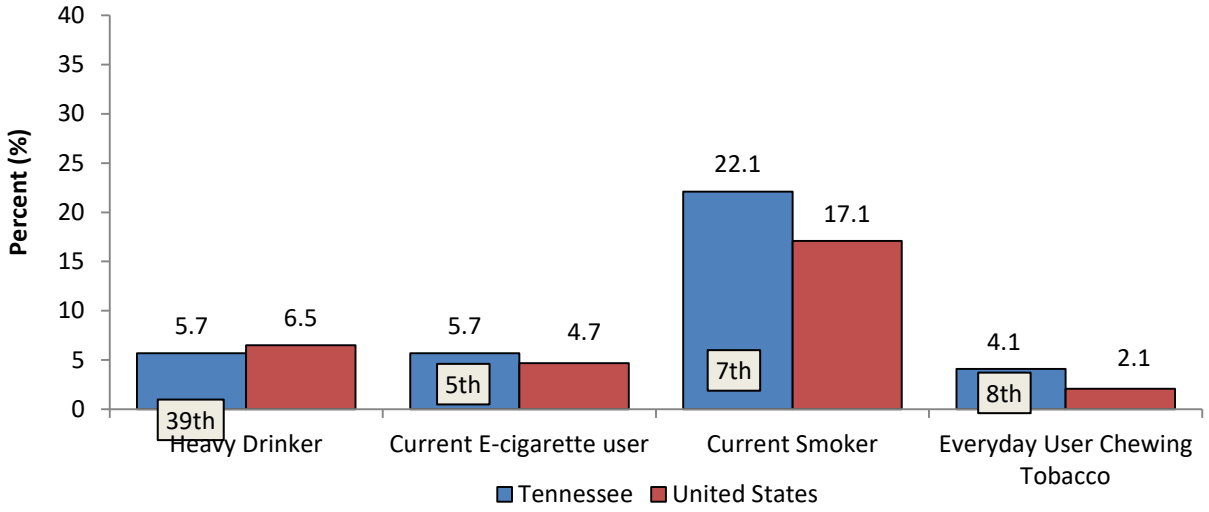
Source: Centers for Disease Control and Prevention (CDC). *Behavioral Risk Factor Surveillance Survey. Atlanta, Georgia: U.S. Department of Health and Human Services, CDC, 2019.*

In 2016 (Figure 4):

- Tennessee residents generally received preventive screening at a similar level to that observed nationally. All U.S. and TN rank statistics are for the 50 states and the District of Columbia (D.C.) only.
- Nearly 10% of the TN population, 50 to 75 years of age, indicated they received a blood stool test within the past year, which is the 13th highest percentage in the US.
- 62.8% of Tennesseans between 50 and 75 years of age had a colonoscopy in the past ten years, which is the 32nd highest percentage in the US.
- Nearly 80% of TN women between 50 and 74 years of age had a mammogram within the past two years, which is the 28th highest percentage in the US.
- Roughly four out of five (79.8%) of TN women between 21 and 65 years of age had a pap test in the past three years, which is the 22nd highest percentage in the US.
- 1.5% of Tennesseans between 50 and 75 years of age received a sigmoidoscopy in the past five years, which is the 38th highest percentage in the US.

Data Source

Figure 5. Prevalence of Alcohol and Tobacco Use, Adults Ages 18+, Tennessee and the United States, 2016



Boxed numbers indicates the percentage ranking in the U.S.

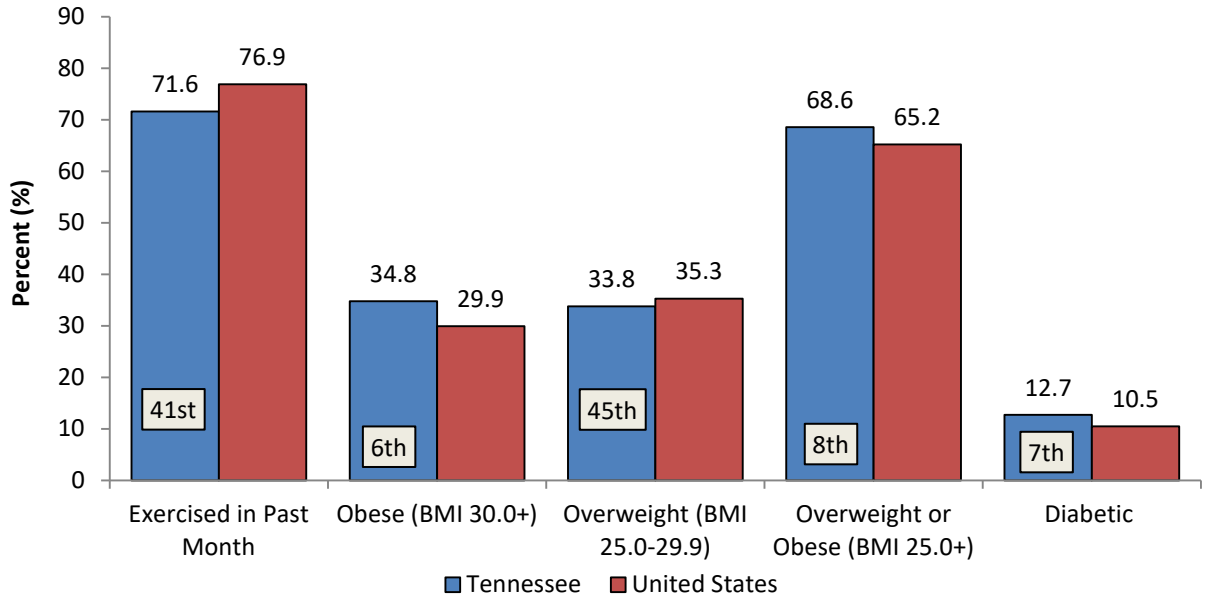
Source: Centers for Disease Control and Prevention (CDC). *Behavioral Risk Factor Surveillance Survey. Atlanta, Georgia: U.S. Department of Health and Human Services, CDC, 2019.*

In 2016 (Figure 5):

- 5.7% of Tennesseans identified themselves as heavy drinkers (i.e., men having more than 14 alcoholic drinks per week and women having more than 7 drinks per week), which is the 39th highest percentage in the US, 50 states and D.C.
- 5.7% of Tennesseans aged 18 years or older identified as a current e-cigarette user, which is the 5th highest percentage in the US, 50 states and D.C.
- 22.1% of Tennesseans were current smokers, which is the 7th highest percentage in the US, 50 states and D.C.
- 4.1% of Tennesseans were everyday users of chewing tobacco, which was the 8th highest percentage nationally, 50 states and D.C.

Data Source

Figure 6. Prevalence of Risk Factors, Adults 18+ Years of Age, Tennessee and the United States, 2016



Boxed numbers indicates the percentage ranking in the U.S.

Source: Centers for Disease Control and Prevention (CDC). *Behavioral Risk Factor Surveillance Survey Data. Atlanta, Georgia: U.S. Department of Health and Human Services, CDC, 2019.*

In 2016 (Figure 6):

- Nearly three out of every four (71.6%) Tennesseans had participated in some physical activity in the past month, which ranks TN in the bottom quartile nationally, 50 states and D.C.
- 34.8% of Tennesseans and 29.9% of Americans were considered obese with a body mass index (BMI) of 30 or more, the 6th highest percentage in the US, 50 states and DC.
- About one out of every three Tennesseans was considered overweight.
- Roughly two out of every three Tennesseans are considered either overweight or obese.
- Tennesseans had the 8th highest percentage of overweight or obese individuals nationally, 50 states and D.C.
- Roughly one out of every eight Tennesseans (12.7%) has diabetes, which is the 7th highest percentage of affected individuals in the US, 50 states and D.C.

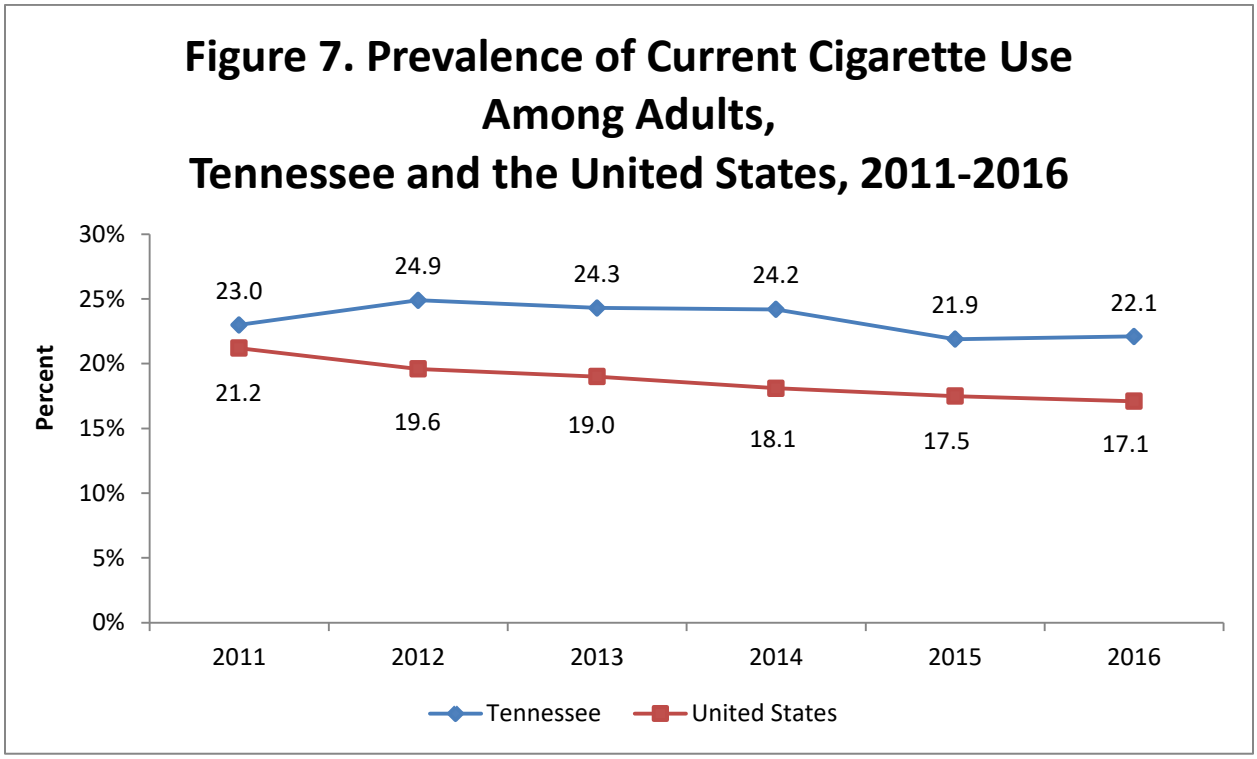
Data Source

CIGARETTE SMOKING PREVALENCE IN TENNESSEE

According to the 2016 Behavioral Risk Factor Surveillance Survey, nearly a quarter (22.1%) of Tennesseans identified themselves as current smokers compared to 17.1% of the U.S. population (Figure 7). Consequently, the state of TN had the 7th highest percentage of current smokers in the U.S. While the overall percentage of current smokers in TN decreased by 11.2% from 2012 to 2016, the state of TN had the 5th highest lung cancer incidence rate (75.1 cases per 100,000) in the U.S. during the same time period.

Based on data from 2012 to 2016, 1 in 13 Tennesseans will be diagnosed with lung cancer in their lifetime and 1 in 17 will die from lung cancer in their lifetime. During the same time period, white women had higher lung cancer incidence rates than black women, while black men had significantly higher lung cancer mortality rates than white men.

Smoking can cause cancer in many parts of the body. Nearly a third (32.9%) of cancer deaths is attributable to cigarette smoking (Lortet-Tieulent, 2016). Approximately $292.1 million is spent each year by the tobacco industry for marketing expenditures in TN, which equates to roughly 3.0% of the annual tobacco industry's marketing expenditures nationwide (U.S. Federal Trade Commission, 2019). According to the 2017 National Youth Risk Behavior Survey, about 14.0% of high school students in TN stated they had smoked cigarettes or cigars on at least 1 day during the 30 days prior to being surveyed. Among TN high school students, 11.8% of women and 15.5% of men indicated they had smoked cigarettes or cigars on at least 1 day during the 30 days prior to being surveyed. Furthermore, 2.0% of all high school students in TN stated they had used cigarettes on a daily basis for the 30 days prior to being surveyed.



Data Source

SMOKING AND CANCER

WHY ARE CIGARETTES BAD FOR YOUR BODY?

Tobacco smoke is made up of over 7,000 chemicals and at least 250 of them are harmful to the body. Furthermore, about 70 of the chemicals found in cigarette smoke are linked to cancer development (NCCDPHP, 2017). Each time an individual smokes, these chemicals damage the body in ways that may lead to disease and death.

Figure 8. Smoking

Nearly **ONE** in 6 American adults currently smoke cigarettes.

Nearly **ONE** in 5 deaths are attributed to cigarette smoking.

HOW IS SMOKING RELATED TO CANCER?

Once tobacco smoke has damaged cells, they may grow uncontrollably and become cancer, however, because cells are tiny, it may be many years before a lump or tumor is discovered.

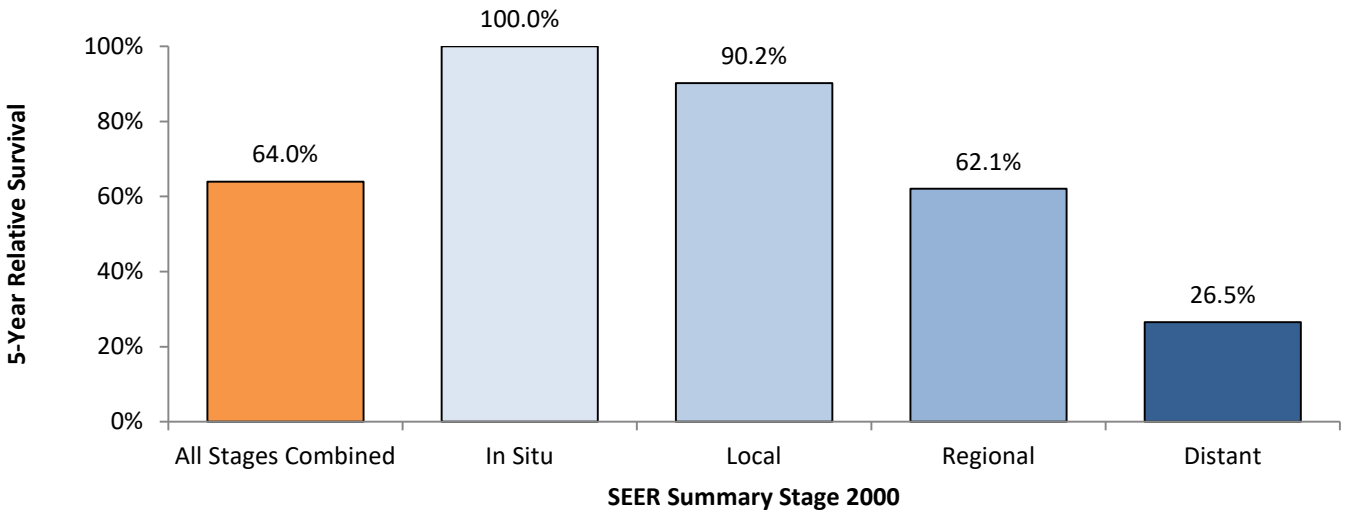
DNA is the cell's "instruction manual", it controls a cell's growth and function, and poisons in cigarette smoke weaken tumor fighters, resulting in cells that multiply out of control and develop into a cancerous tumor. For this reason, smoking not only causes cancer but blocks your body's ability to fight it (U.S. Department of Health and Human Services, 2010).

IMPACT OF SMOKING

People who smoke cigarettes are 15 to 30 times more likely to get lung cancer or die from lung cancer than people who do not smoke. Even smoking a few cigarettes a day or smoking occasionally increases the risk of lung cancer and the more years a person smokes and the more cigarettes smoked each day, the more risk increases. Tobacco use accounts for at least 30% of all cancer deaths, causing 87% of lung cancer deaths in men and 70% of lung cancer deaths in women (American Cancer Society, 2015).

Data Source

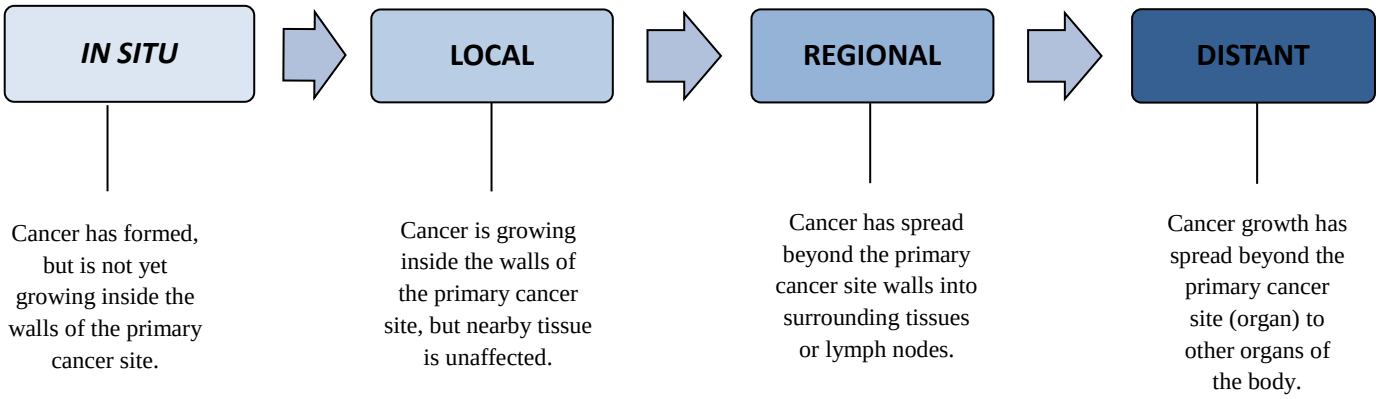
Figure 9. Five-Year Relative Survival (%) in Tennessee, 2010-2016, By SEER Summary Stage 2000



From 2010 to 2016 (Figure 9):

- About 64.0% of TN cancer patients survived 5 years or more after their initial diagnosis compared to the TN population without cancer. This means that about 64 cancer patients in TN will survive 5 years after being diagnosed whereas 100 Tennesseans without cancer will survive the same 5-year period.
- The relative cancer survival rates were higher for individuals diagnosed with cancer in the early stages (i.e., in situ and localized) as opposed to the late states (i.e., regional and distant).
- It should be noted that 53.5% of all cancer patients in TN are diagnosed in the early stages.

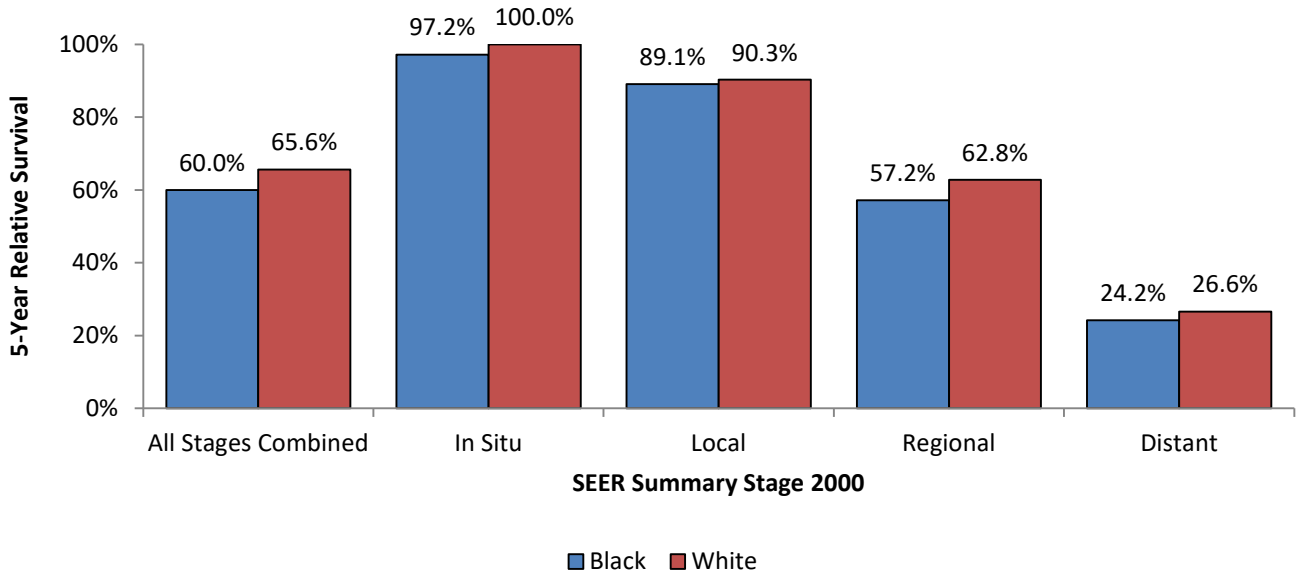
Figure 10. Stages of Cancer



For more information on SEER Summary Stage 2000 please visit: https://training.seer.cancer.gov/ss2k/staging/categories/.

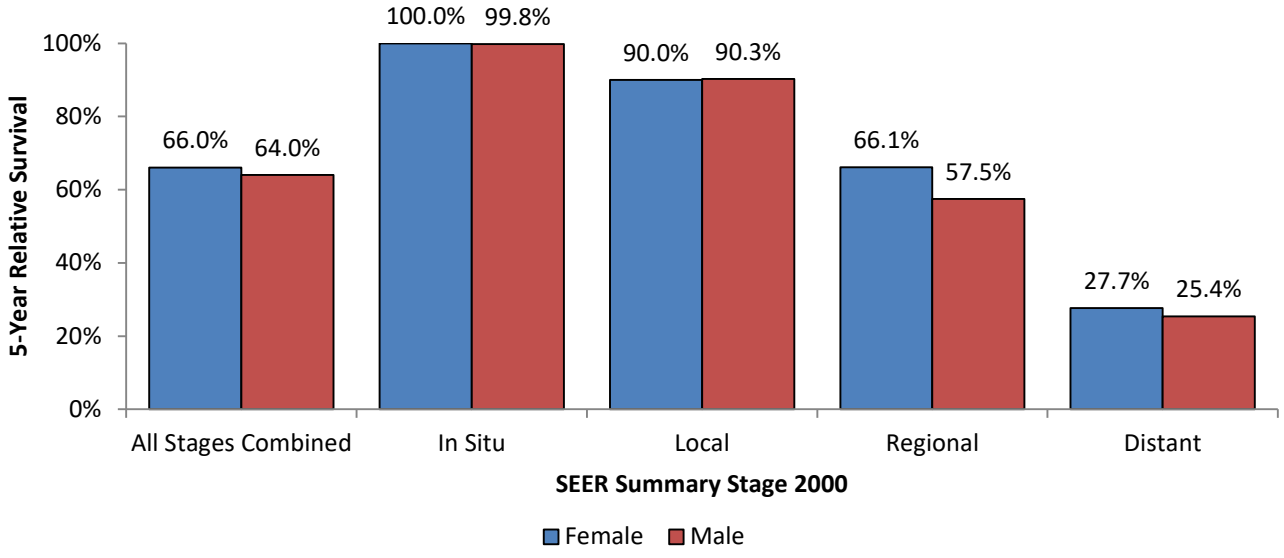
Data Source

Figure 11. Five-Year Relative Survival (%) in Tennessee, 2010-2016, By Race and SEER Summary Stage 2000



- The lower cancer survival rates among black Tennesseans could be partially attributed to the fact that black Tennesseans are significantly more likely to be diagnosed with cancer in the late stages (i.e., regional or distant) when treatment is less effective (Figure 11).

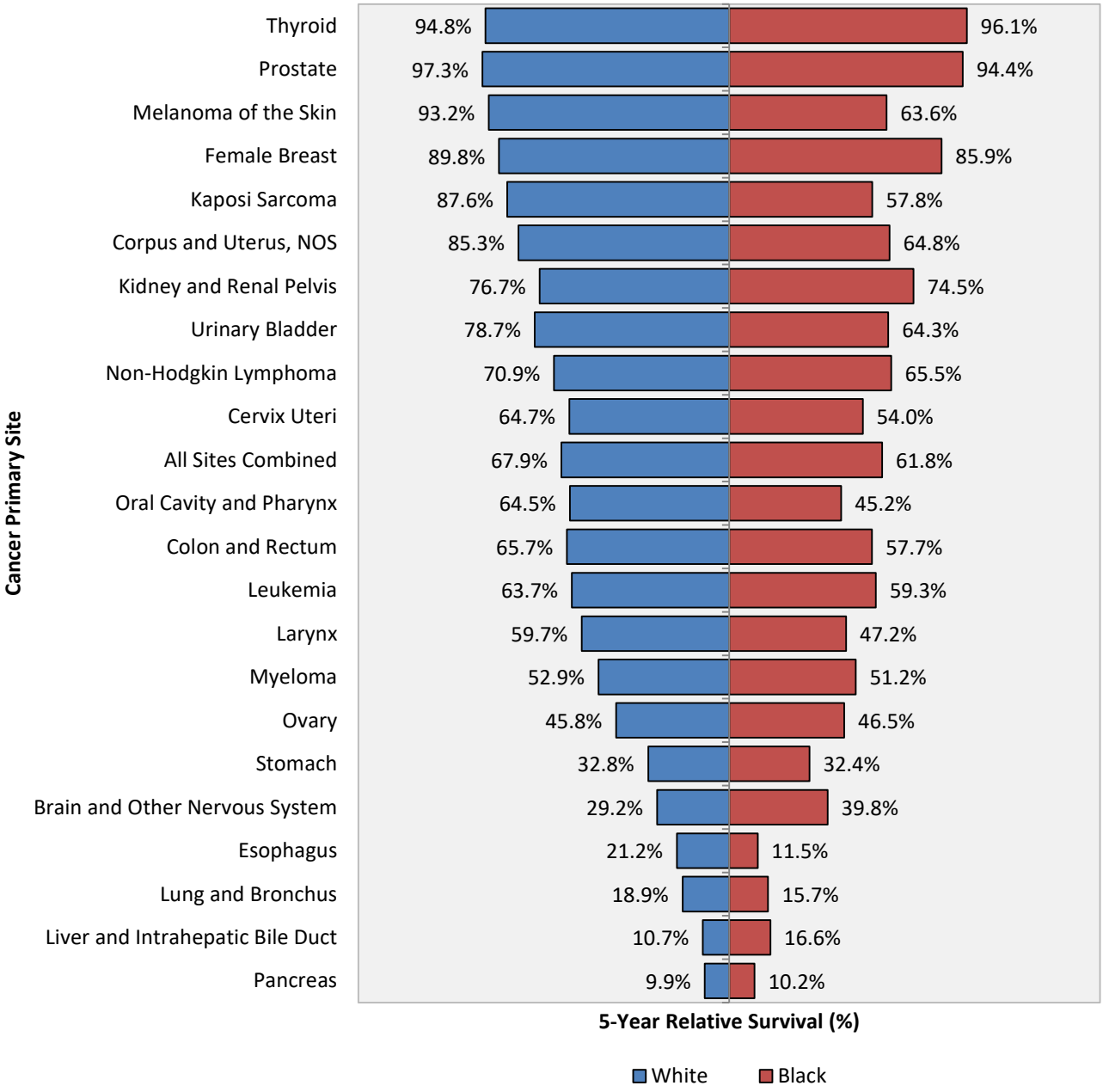
Figure 12. Five-Year Relative Survival (%) in Tennessee, 2010-2016, By Sex and SEER Summary Stage 2000



- Lower survival rates among TN men could be partially attributed to the fact that they are significantly more likely to be diagnosed with cancer in the late stages (i.e., regional or distant) when treatment is less effective (Figure 12).

Data Source

Figure 13. Five-Year Relative Survival (%) in Tennessee, 2010-2016, Both Sexes, By Race and Cancer Primary Site

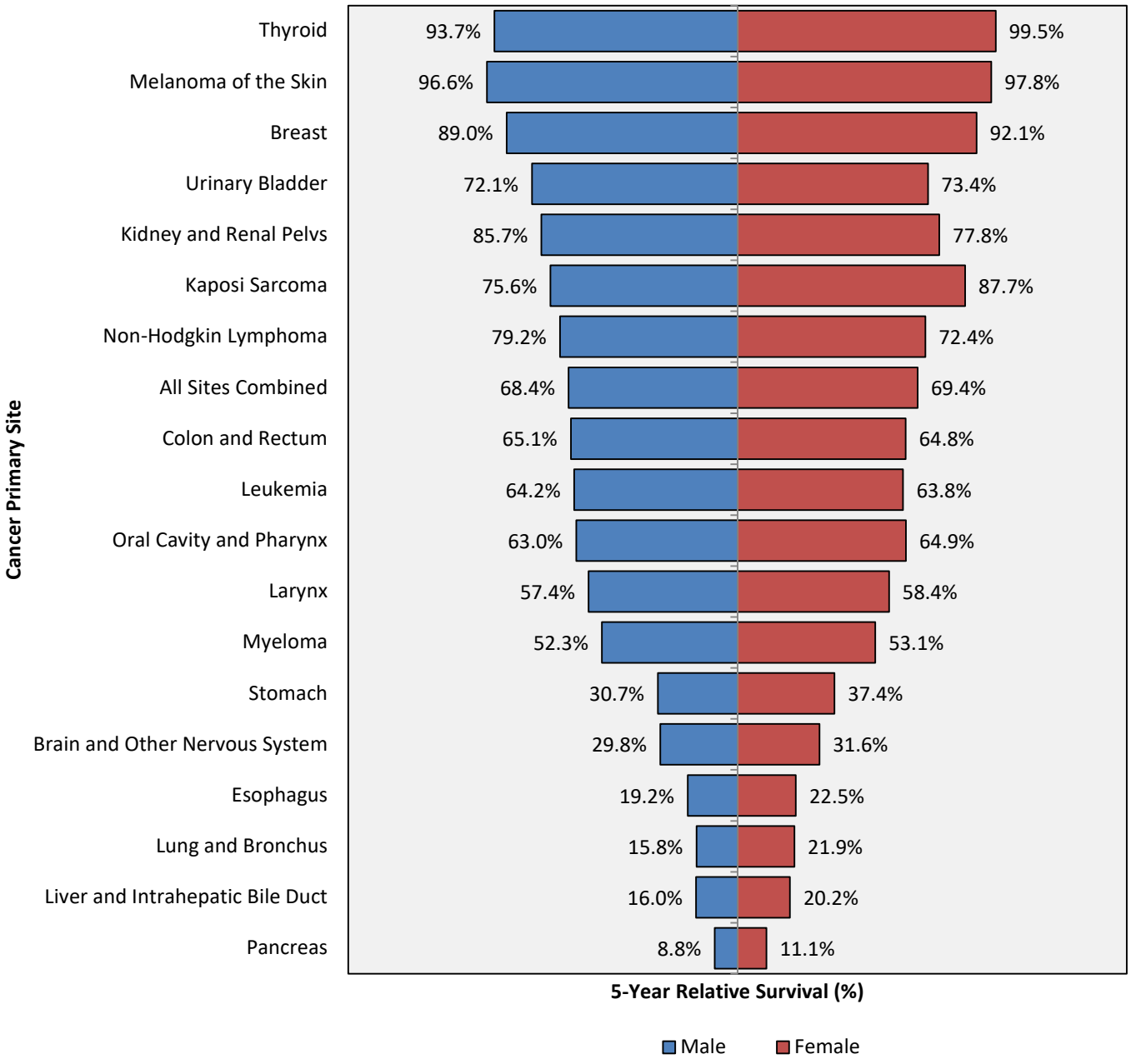


In TN from 2010-2016 (Figure 13):

- About 65.6% of white Tennesseans survived 5 years or more compared to the TN population without cancer. While, approximately 60.0% of black Tennesseans survived 5 years or more compared to the TN population without cancer.
- Among both black and white Tennesseans the 5-year relative survival rates were highest for those individuals diagnosed with prostate or thyroid cancers.

Data Source

Figure 14. Five-Year Relative Survival (%) in Tennessee, 2010-2016, All Races, By Sex and Cancer Site

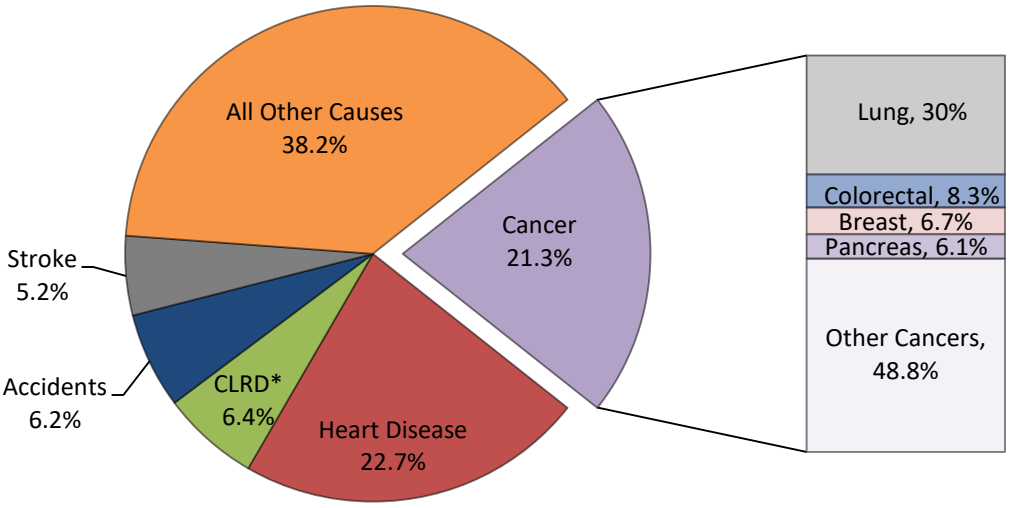


In TN from 2010-2016 (Figure 14):

- About 66.0% of women survived 5 years or more compared to the TN female population without cancer.
- About 64.0% of men survived 5 years or more compared to the TN male population without cancer.

Data Source

Figure 15. Leading Causes of Mortality, Tennessee, 2016



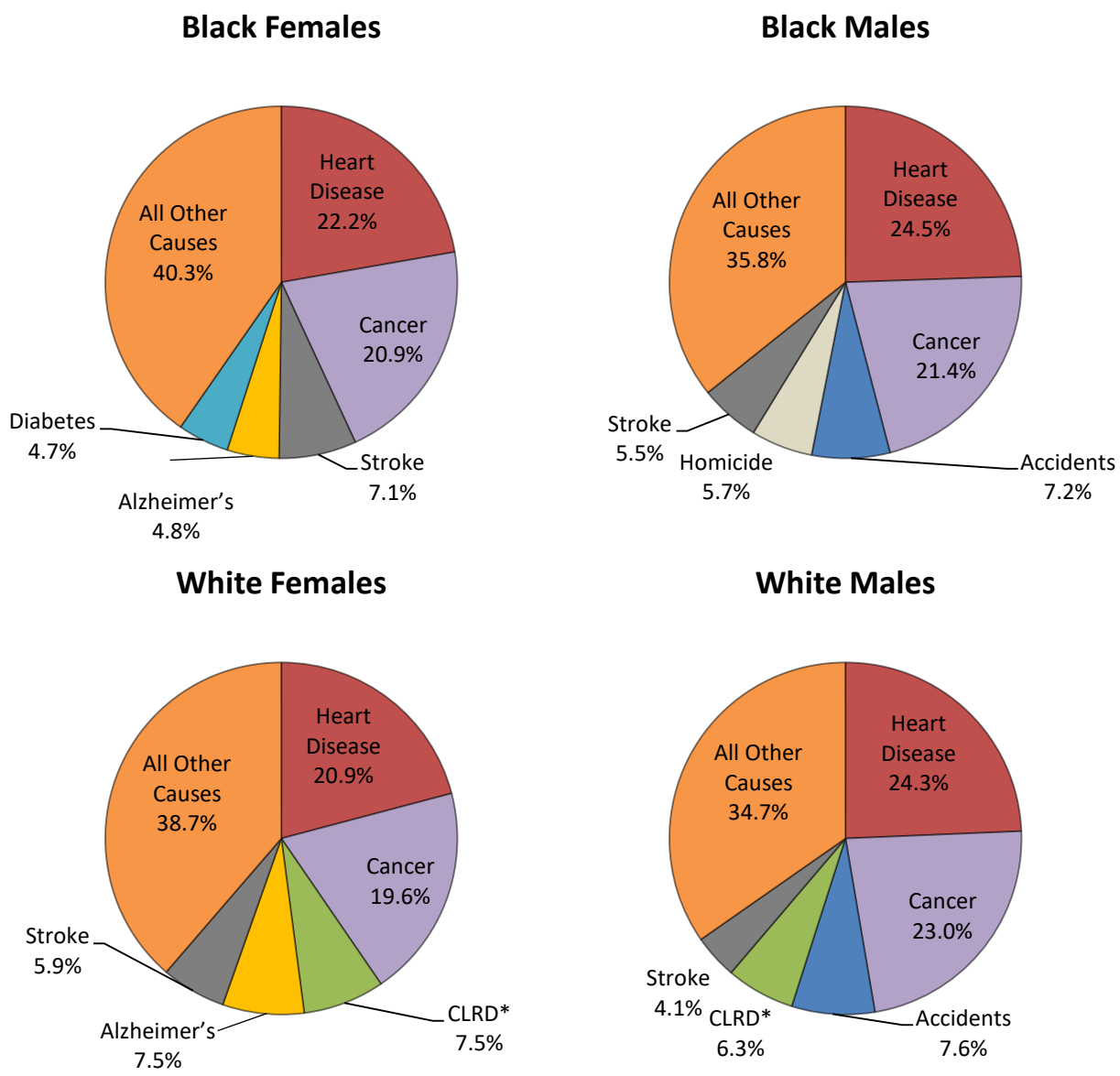
*CLRD represents all Chronic Lower Respiratory Diseases combined

In 2016 (Figure 15):

- Following heart disease (15,434 deaths), cancer (14,464 deaths) was the second leading cause of death among Tennesseans.
- Lung cancer (4,341 deaths) was the leading cause of cancer deaths among Tennesseans followed by colorectal cancer (1,206 deaths), female breast cancer (959 deaths), and pancreatic cancer (887 deaths).

Data Source

Figure 16. Leading Causes of Mortality By Race and Sex, Tennessee, 2016



*CLRD represents all Chronic Lower Respiratory Diseases combined

In 2016 (Figure 16):

- Following heart disease, cancer was the second leading cause of death among all TN cohorts (i.e., black men, black women, white men, and white women).

Data Source

YEARS OF POTENTIAL LIFE LOST TO CANCER, TENNESSEE, 2012-2016

Years of potential life lost (YPLL) is an estimate of premature mortality and measures the average time a person would have lived had they not prematurely died. While statistics that include all mortalities are dominated by deaths of the elderly, YPLL emphasizes deaths of younger persons that could have been prevented. For this report, YPLL was calculated for each individual by subtracting the age at death in years from the assumed life expectancy, which was 75 years of age for this report. From 2012 to 2016, approximately 2,837,469 YPLL were lost among TN residents, and cancer (579,309 YPLL) accounted for over a fifth (21.3%) of all deaths and 20.4% of all YPLL in TN between 2012 and 2016 (Figure 17). The average YPLL (AYPLL) in TN is calculated by dividing the total YPLL by the total number of deaths for that time period. During 2012-2016, a cancer death resulted in an average of about 8.2 years of life lost per person in TN (Figure 18).

Figure 17. Years of Potential Life Lost, By Cause of Death, Tennessee, 2012-2016

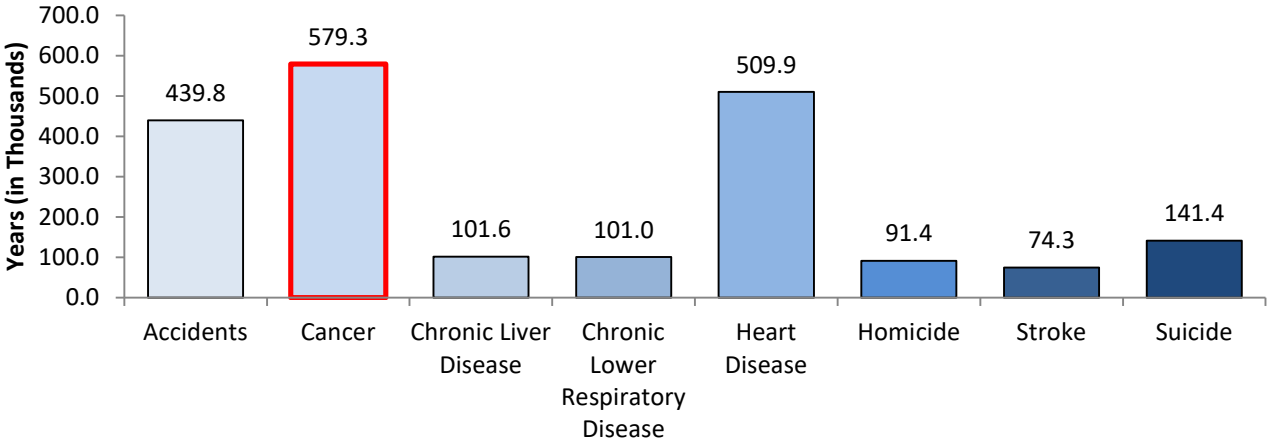
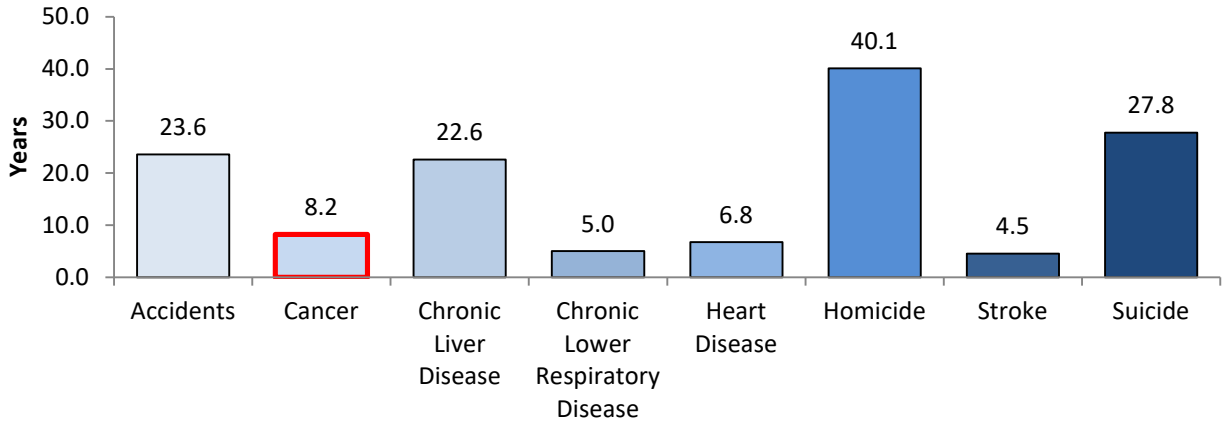
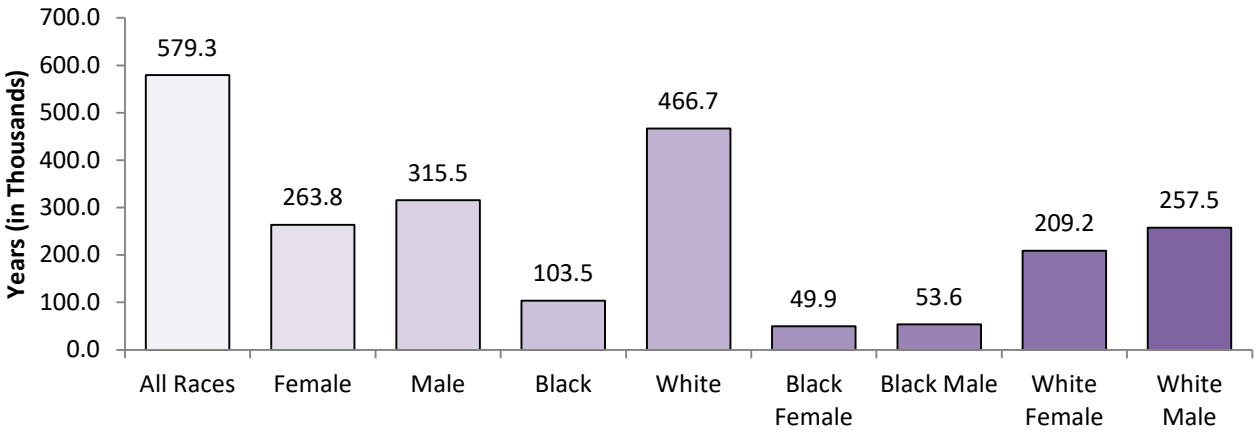


Figure 18. Average Years of Potential Life Lost, By Cause of Death, Tennessee, 2012-2016



Data Source

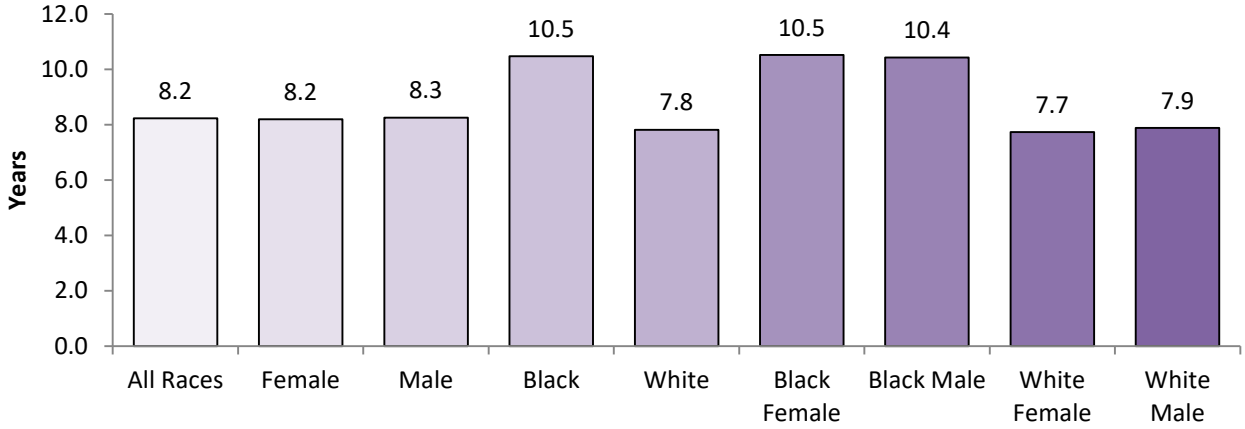
Figure 19. Total Years of Potential Life Lost to Cancer, By Gender and Race, Tennessee, 2012-2016



From 2012 to 2016 (Figure 19):

- A total of 579,309 years of potential life were lost (YPLL) due to premature cancer deaths (deaths before 75 years of age) for all Tennesseans.
- TN women had a total of 263,815 YPLL and TN men had 315,489 YPLL.
- Black Tennesseans had a total of 103,506 YPLL and white Tennesseans had 466,660 YPLL.

Figure 20. Average Years of Potential Life Lost to Cancer, By Gender and Race, Tennessee, 2012-2016

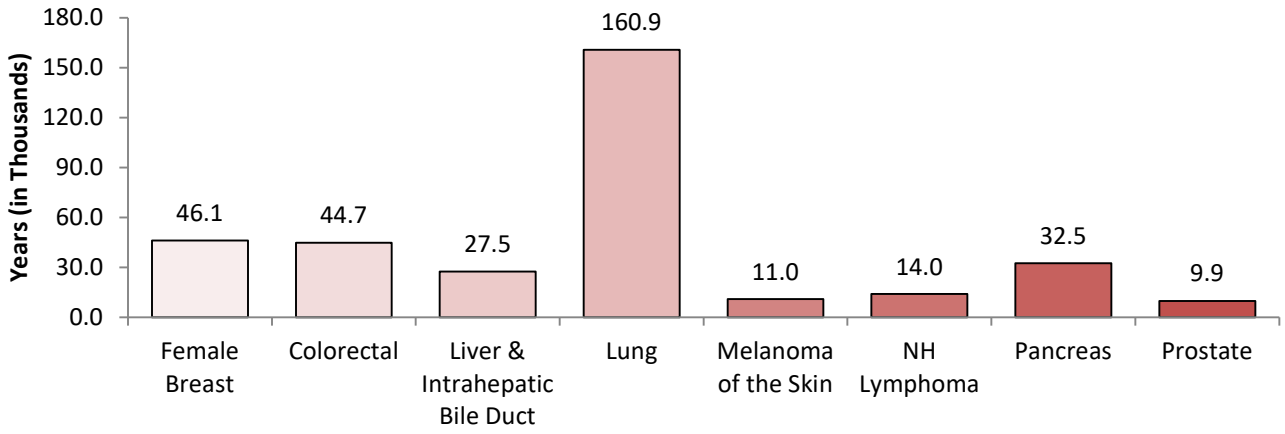


From 2012 to 2016 (Figure 20):

- On average, each Tennessean who died from cancer lost an estimated 8.2 years of potential life.
- On average, each black Tennessean who died from cancer during this period lost an estimated 10.5 years and each white Tennessean who died from cancer lost an estimated 7.8 years of potential life.

Data Source

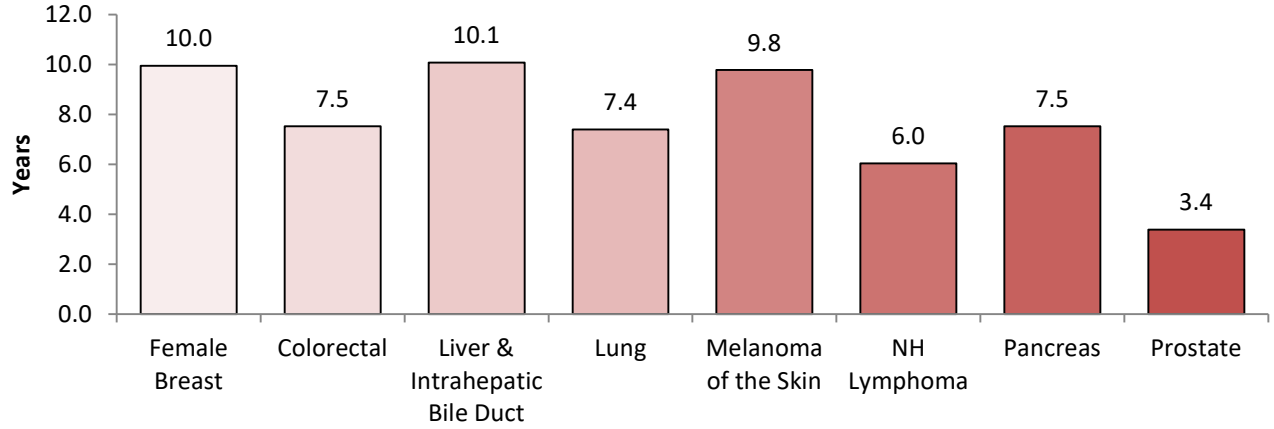
Figure 21. Total Years of Potential Life Lost to Cancer, By Common Cancer Site, Tennessee, 2012-2016



From 2012 to 2016 (Figure 21):

- Lung cancer (160,898 YPLL) accounted for the most years of potential life lost for a specific cancer site followed by female breast cancer (46,072 YPLL), colorectal cancer (44,744 YPLL), pancreatic cancer (32,491 YPLL), liver & intrahepatic bile duct cancer (27,512 YPLL), Non-Hodgkin lymphoma (NHL) (14,009 YPLL), melanoma skin cancer (10,977 YPLL) and prostate cancer (9,863 YPLL).
- The eight most common causes of cancer death—lung, colorectal, female breast, pancreas, prostate, leukemia, NHL and liver in decreasing order by count (see Appendix I)—represented 12.5% of the total YPLL for all causes of death in TN and 61.4% of the total YPLL due to cancer from 2012 to 2016.

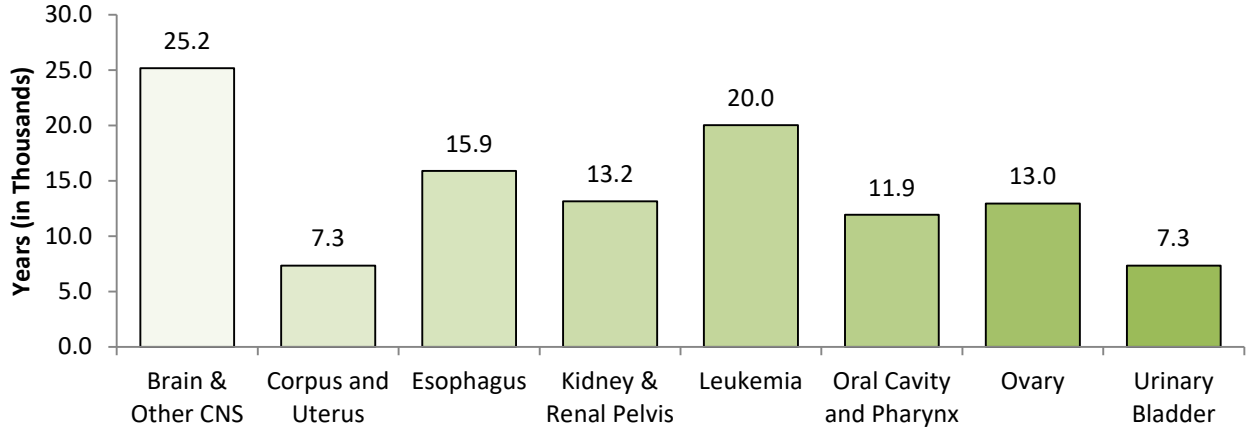
Figure 22. Average Years of Potential Life Lost to Cancer, By Common Cancer Site, Tennessee, 2012-2016



- From 2012-2016, liver cancer, female breast cancer and melanoma of the skin cancer represented the highest AYPLL of the common causes of cancer death (Figure 22).

Data Source

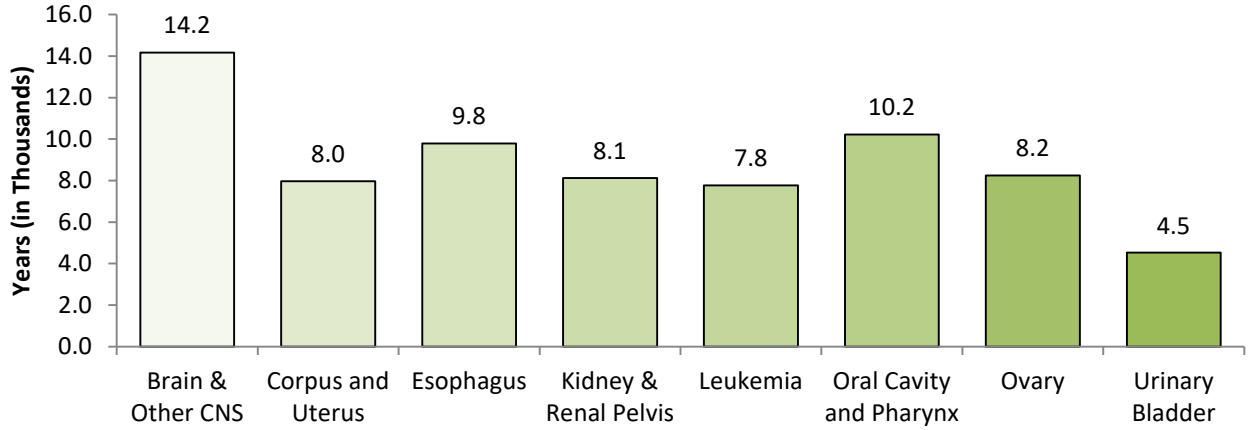
Figure 23. Total Years of Potential Life Lost to Cancer, By Other Cancer Site, Tennessee, 2012-2016



From 2012 to 2016 (Figure 23):

- Outside of the most common cancers, presented on the previous page, brain and other central nervous system (CNS) cancers (25,178 YPLL) accounted for the most years of potential life lost for a specific cancer site followed by leukemia (20,041 YPLL), esophageal cancer (15,901 YPLL), kidney cancer (13,155 YPLL), ovarian cancer (12,951 YPLL), oral cavity and pharynx cancer (11,924 YPLL), uterine cancer (7,332 YPLL) and urinary bladder cancer (7329 YPLL). The eight cancers above accounted for 19.6% of the total YPLL due to cancer from 2012 to 2016.

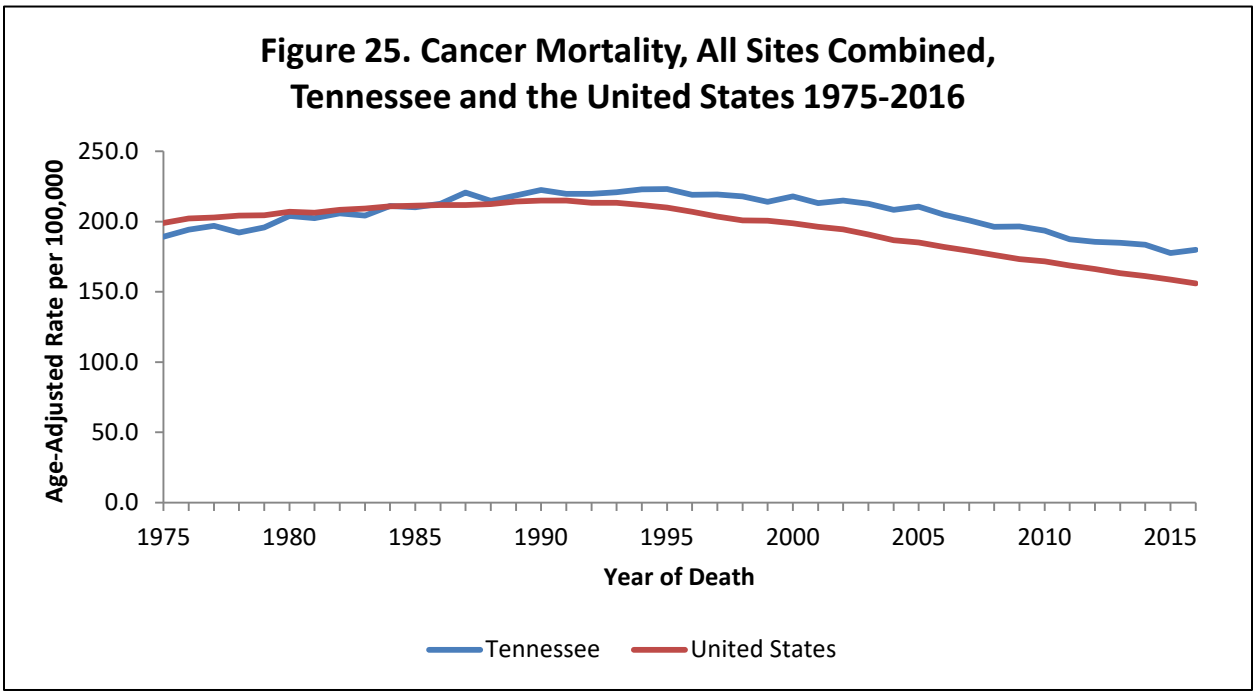
Figure 24. Average Years of Potential Life Lost, By Other Cancer Site, Tennessee, 2012-2016



- During 2012-2016, among other cancers, brain and other central nervous system (CNS) cancer represented the highest AYPLL due to cancer (Figure 24).

Data Source

CANCER MORTALITY HISTORICAL TREND, 1975-2016



Data Source: National Cancer Institute (2019). State Cancer Profiles. Retrieved from http://statecancerprofiles.cancer.gov/index.html

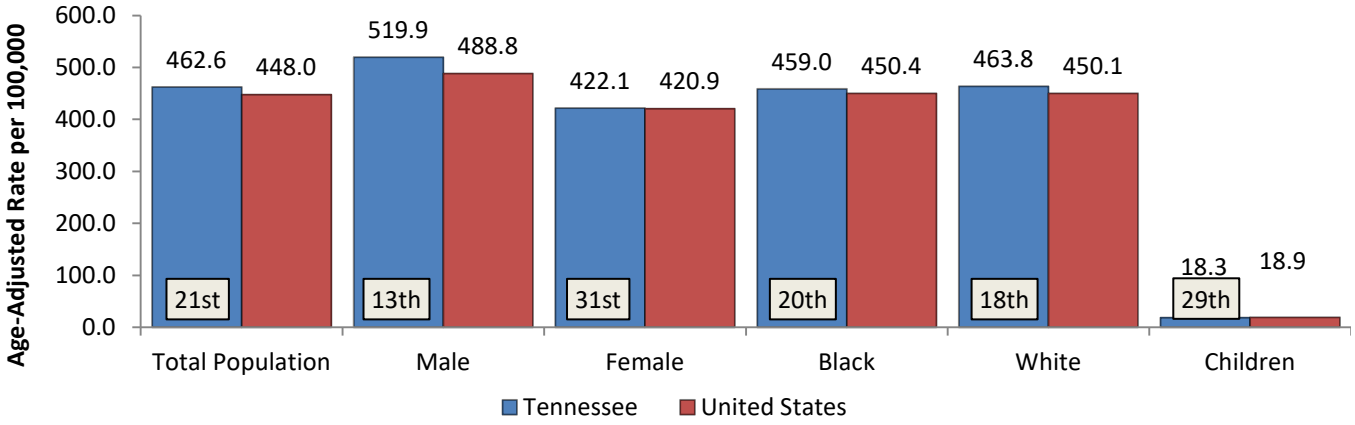
From Figure 25:

- In 1975, the cancer mortality rate in the US was 5.2% higher than the TN rate, and in 2016, the cancer mortality rate in TN was 15.4% higher than the US rate.
- The cancer mortality rate peaked in the US in 1991 at 215.1 deaths per 100,000 Americans and peaked in TN in 1995 at 223.3 deaths per 100,000.
- From 1975 to 2016, the cancer mortality rate among Tennesseans fell by 5.0%, while the cancer mortality rate among Americans fell by 21.7%.
- From 2012 to 2016, the cancer mortality rate among Tennesseans fell by 3.1%, whereas the cancer mortality rate among Americans fell by 6.3%.

Note: Rates presented in figures 26-29 were retrieved from State Cancer Profiles and will differ from rates presented elsewhere in this report due to the availability of more current data.

Data Source

Figure 26. Incidence Rate Rankings, All Sites Combined, Tennessee and United States, 2012-2016

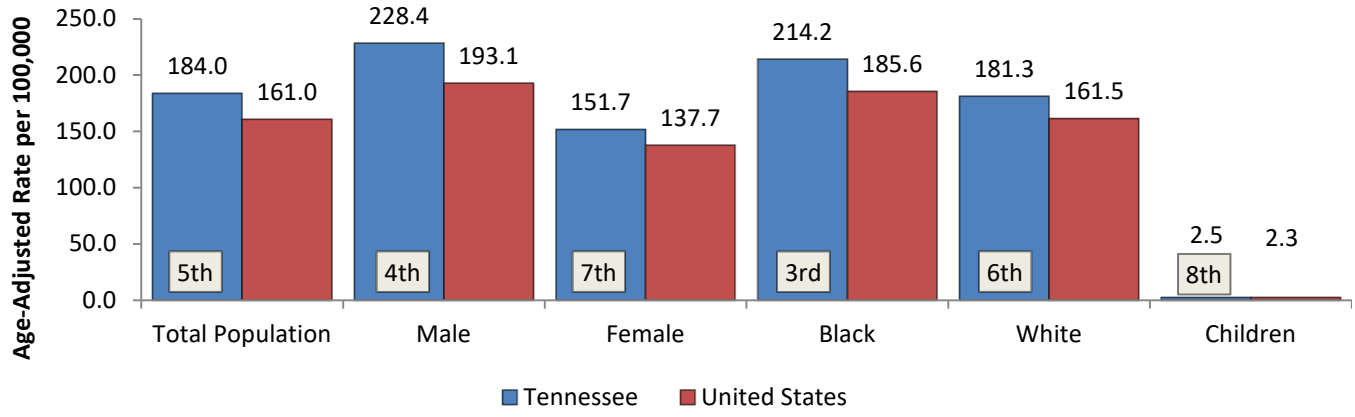


Source: National Cancer Institute (2019). State Cancer Profiles. Retrieved from http://statecancerprofiles.cancer.gov/index.html

From 2012 to 2016 (Figure 26):

- TN had the 21st highest cancer incidence rate nationally. Please note that for figures 26-29, all rankings are presented as the rank of TN versus the 50 states and D.C. (See Technical Notes).
- All Tennesseans, TN blacks, TN whites and TN men experienced statistically significantly higher cancer incidence rates than the corresponding US incidence rates.

Figure 27. Mortality Rate Rankings, All Sites Combined, Tennessee and United States, 2012-2016



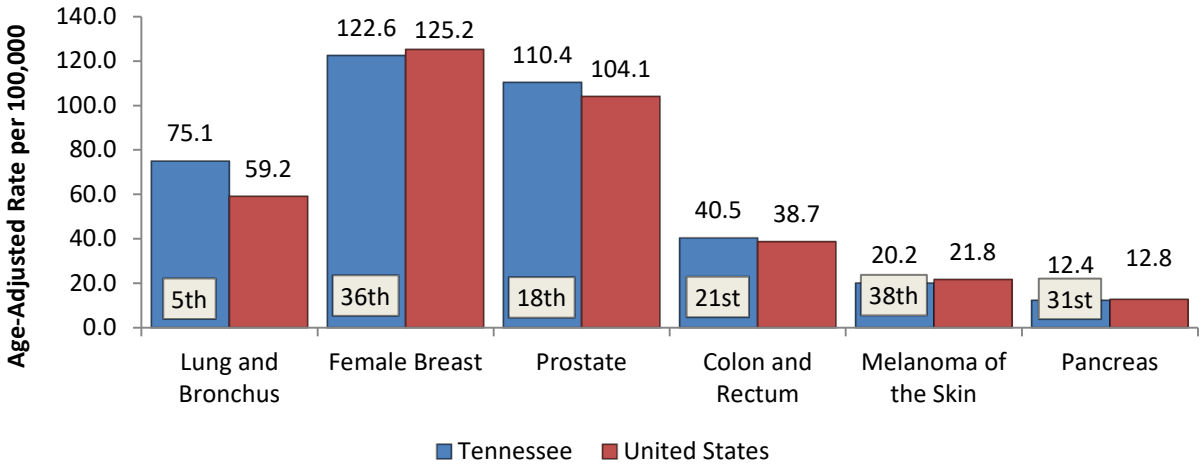
Source: National Cancer Institute (2019). State Cancer Profiles. Retrieved from http://statecancerprofiles.cancer.gov/index.html

From 2012 to 2016 (Figure 27):

- TN had the 5th highest cancer mortality rate among all US states and D.C.
- All Tennesseans, TN whites, TN blacks, TN men, and TN women experienced statistically significantly higher cancer mortality rates than the corresponding US mortality rates (Figure 27).

Data Source

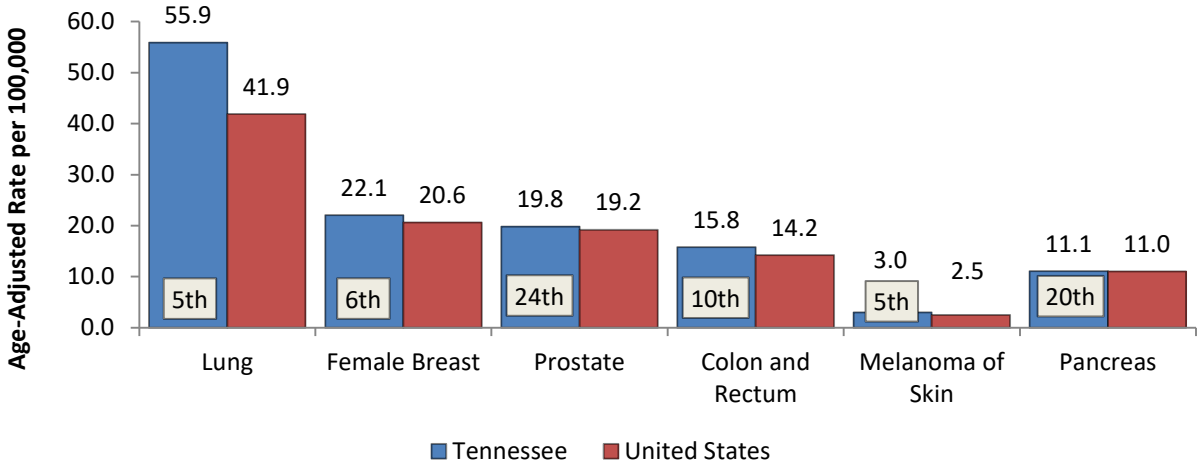
Figure 28. Incidence Rate Rankings, By Site, Tennessee and United States, 2012-2016



Source: National Cancer Institute (2019). State Cancer Profiles. Retrieved from http://statecancerprofiles.cancer.gov/index.html

- The cancer incidence rates in TN during 2012-2016 for lung, prostate, and colorectal cancer were statistically significantly higher than the US site-specific rates. The TN incidence rate for female breast cancer and melanoma of the skin were statistically significantly lower than the US rate.

Figure 29. Mortality Rate Rankings, By Site, Tennessee and United States, 2012-2016



Source: National Cancer Institute (2019). State Cancer Profiles. Retrieved from http://statecancerprofiles.cancer.gov/index.html

- In TN during 2012-2016, the cancer mortality rates for lung cancer, female breast cancer, colorectal cancer, and melanoma of the skin cancer were statistically significantly higher than the US site-specific cancer mortality rates.

Data Source

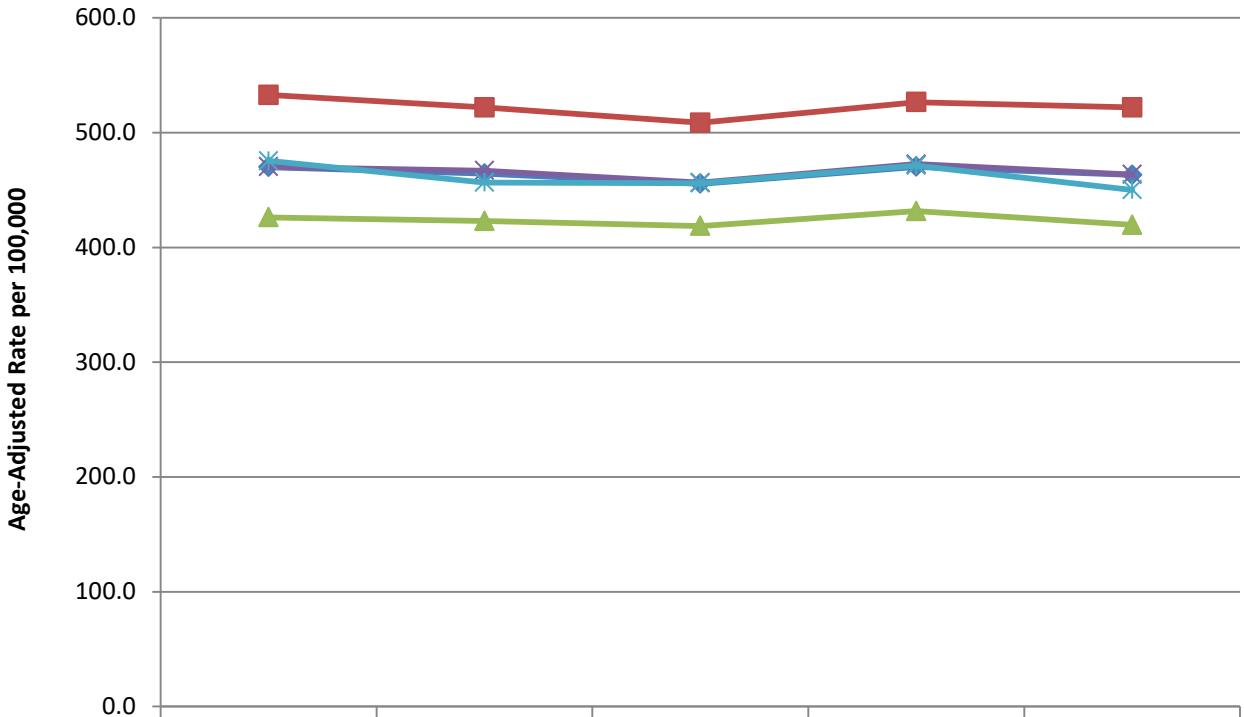
TABLE 5. ALL SITES COMBINED CANCER INCIDENCE AND MORTALITY, TENNESSEE, 2012-2016

		Incidence				Mortality				M:I
Gender*	**Race**	**Count****	**Rate*****	**Lower CI**	**Upper CI**	**Count****	**Rate*****	**Lower CI**	**Upper CI**	**Ratio‡**
Both	All Races†	179,227	464.6	462.4	466.8	70,361	183.5	182.1	184.8	0.39
	Black	23,275	461.8	455.6	468.1	9,879	212.7	208.3	217.2	0.46
	White	153,334	465.8	463.4	468.2	59,689	179.8	178.3	181.3	0.39
Female	All Races†	86,577	423.8	420.9	426.7	32,171	151.3	149.6	153	0.36
	Black	11,544	404.8	397.2	412.5	4,745	173.5	168.5	178.7	0.43
	White	73,715	428.6	425.5	431.8	27,028	148.1	146.3	149.9	0.35
Male	All Races†	92,650	522.3	518.8	525.8	38,190	227.8	225.4	230.2	0.44
	Black	11,731	551.2	540.2	562.3	5,134	278.1	269.7	286.7	0.50
	White	79,619	518.6	514.9	522.4	32,661	222.6	220.2	225.2	0.43
Age at Diagnosis or Death										
0-19		1,527	18.4	17.5	19.3	205	2.5	2.1	2.8	0.14
20-44		12,543	124.4	122.2	126.6	1,861	18.7	17.9	19.6	0.15
45-64		68,428	723.4	717.9	728.9	21,062	217.5	214.5	220.5	0.30
65+		96,729	2,004.0	1,991.2	2,016.8	47,233	1,009.8	1,000.6	1,019.0	0.50
Year of Diagnosis or Death										
2012		34,799	469.9	464.9	475	13,632	186.2	183.1	189.5	0.40
2013		35,092	464.3	459.4	469.3	13,938	185.7	182.5	188.8	0.40
2014		35,132	455.5	450.6	460.4	14,153	184.4	181.3	187.5	0.40
2015		37,009	470.3	465.4	475.2	14,174	180.7	177.7	183.8	0.38
2016		37,195	463.1	458.2	467.9	14,464	180.7	177.7	183.7	0.39

*Excludes hermaphrodites and transsexuals.
**Total counts are from 2012 to 2016.
***Rates are per 100,000 and age-adjusted to the 2000 US standard population (19 age groups: <1, 1-4, 5-9,…, 80-84,85+). Rates are for invasive cancer only (except for bladder cancer which is invasive and in situ) or unless otherwise specified.
†Includes blacks, whites, other races, and those cases missing race information.
‡Mortality-to-Incidence ratio. See Technical Notes for details.

Data Source

Figure 30. Cancer Incidence, All Sites Combined, By Gender and Race, Tennessee, 2012-2016



	2012	2013	2014	2015	2016
All Races Incidence	469.9	464.3	455.5	470.3	463.1
Male Incidence	532.9	522.0	508.6	526.5	522.0
Female Incidence	426.2	423.0	418.6	431.6	419.7
White Incidence	470.2	466.9	456.5	472.6	463.6
Black Incidence	475.4	456.6	456.0	471.3	450.2

Year of Diagnosis

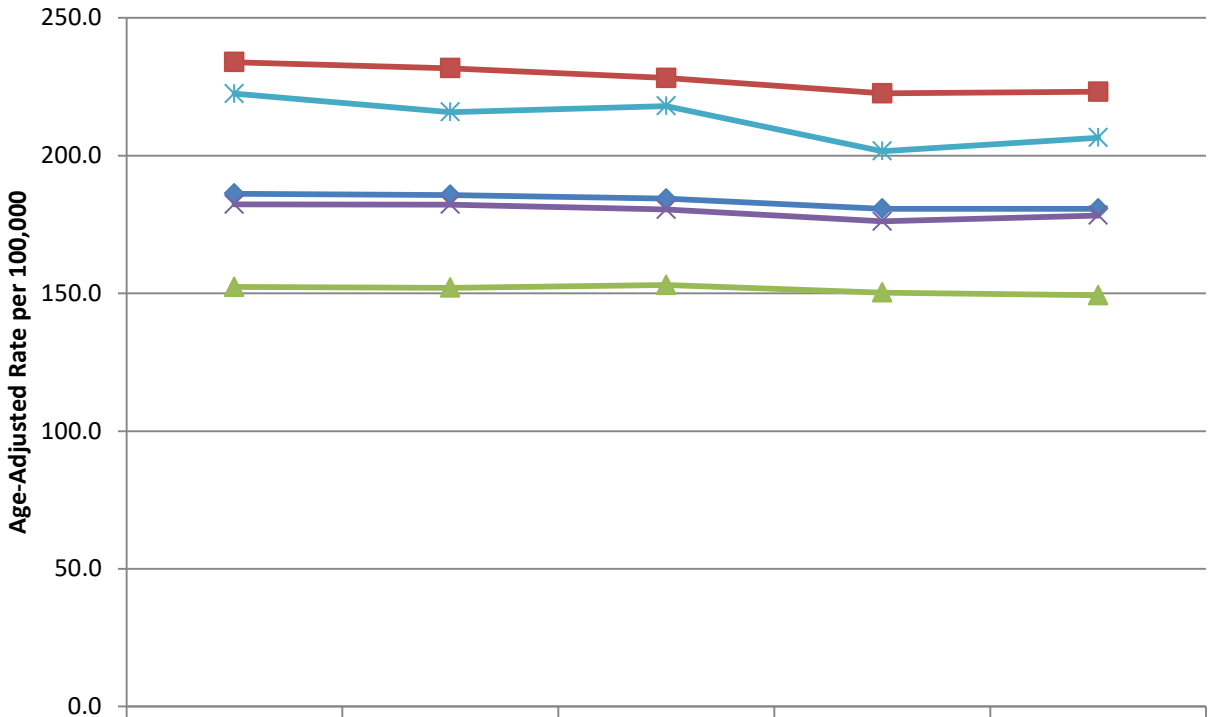
From 2012 to 2016 in TN (Figure 30) the cancer incident rate*:

- *Decreased* 0.4% per year for all races.
- *Decreased* 0.6% among men and 0.4% among women per year.
- *Decreased* 1.0% among blacks and 0.4% among whites per year.

*not statistically significant

Data Source

Figure 31. Cancer Mortality, All Sites Combined, By Gender and Race, Tennessee, 2012-2016



	2012	2013	2014	2015	2016
All Races Mortality	186.2	185.7	184.4	180.7	180.7
Male Mortality	233.9	231.7	228.2	222.6	223.2
Female Mortality	152.3	152.0	153.0	150.3	149.3
White Mortality	182.3	182.2	180.4	176.1	178.3
Black Mortality	222.5	215.8	218.0	201.6	206.5

Year of Death

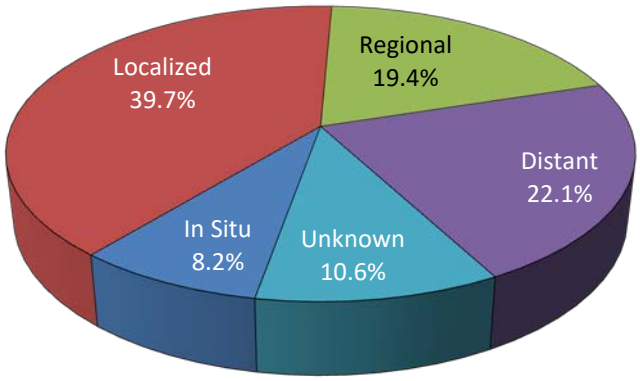
From 2012 to 2016 in TN, the cancer mortality rate* (Figure 31):

- *Decreased* 1.3% per year for all races.
- *Decreased* 1.7% per year for men and 0.7% per year for women.
- *Decreased* 2.2% per year in blacks and by 1.2% for whites.

*Statistically significant

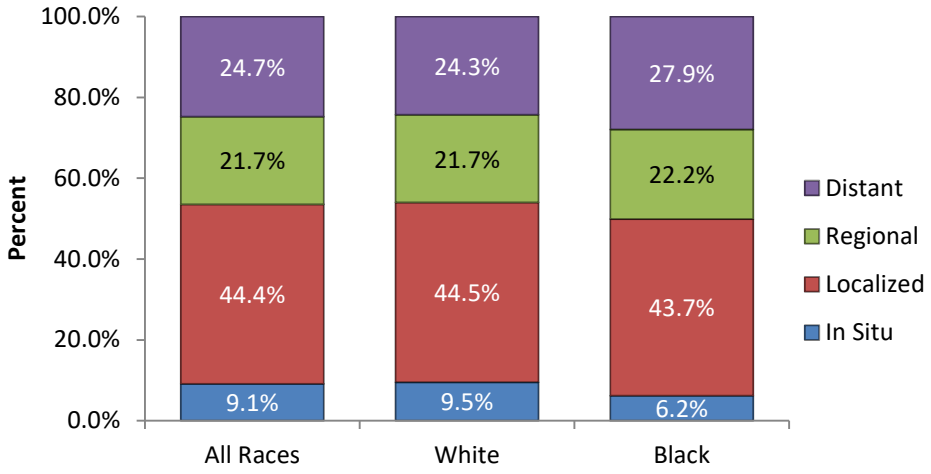
Data Source

Figure 32. Cancer Stage, All Sites Combined, Tennessee, 2012-2016



- Including cancers with unknown stage, 47.9% of all new cancer cases were confined to the organ of origin, otherwise known as *in situ* or localized stage, when treatment is usually much more effective; 19.4% were diagnosed at regional stage; and 22.1% at a distant stage (Figure 32).

Figure 33. Cancer Stage, All Sites Combined, By Race, Tennessee, 2012-2016



Cases with unknown stage were excluded. Numbers may not sum to 100% due to rounding errors.

From 2012 to 2016 (Figure 33):

- Among Tennesseans with cancers diagnosed at a known stage, 53.5% of all new cases were confined to the organ of origin, otherwise known as *in situ* or localized stage.
- 50.1% of black Tennesseans were diagnosed at late stages (i.e., regional or distant stage) compared to 46.0% of whites, and this difference was statistically significant, which may partially explain why blacks have a significantly higher cancer mortality rate and lower 5-year relative survival compared to whites.

Data Source

MOST COMMON CANCERS IN TENNESSEE, 2012-2016

LUNG CANCER

Incidence

- During 2012-2016, TN had the fifth highest lung cancer incidence rate in the US, and Tennesseans had a 7.9%, or a one in thirteen, lifetime risk of developing lung cancer during the period 2014-2016.
- From 2012 through 2016, lung cancer was the leading cause of cancer incidence in TN and accounted for 16.6% of all new cancers. There were 29,788 cases of lung cancer diagnosed among Tennesseans, resulting in an age-adjusted rate of 75.4 cases per 100,000 Tennesseans.
- The lung cancer incidence rate remained stable during 2012-2016.

Mortality

- TN had the fifth highest lung cancer mortality rate in the US during 2012-2016.
- From 2012 to 2016, lung cancer accounted for nearly a third (30.9%) of all cancer mortalities with 21,740 Tennesseans dying from lung cancer, resulting in an age-adjusted rate of 55.7 deaths per 100,000 Tennesseans. The mortality-to-incidence ratio for lung cancer among Tennesseans was 0.74, making it one of the deadliest cancers in TN. The lung cancer mortality rate decreased on average by 2.3% per year from 2012 to 2016, a change that was statistically significant.
- From 2012-2016, Tennesseans had a 5.9%, or a one in seventeen, probability of dying from lung cancer during their lifetime.

Survival

- Tennesseans that died of lung cancer died on average 7.4 years earlier than expected.
- Only 20.3% of all lung cancer cases were diagnosed in early stages (i.e., *in situ* or local stages).
- Stage at diagnosis appears to greatly influence survival; over half (51.2%) of lung cancer patients diagnosed in the early stages survived 5 years or more after their initial diagnosis while only 12.2% of lung cancer patients diagnosed in the late stages survived 5 years or more after their initial diagnosis.

Health Disparities

- Overall in TN, men had higher lung cancer incidence and mortality rates than women. Black Tennesseans had higher lung cancer incidence rates than white Tennesseans.
- Black Tennesseans were more likely to be diagnosed with lung cancer in the late stages (i.e., regional and distant) than white Tennesseans and this finding was statistically significant. Based on 2010-2016 data, approximately 16.5% of black lung cancer patients and 19.5% of white lung cancer patients survived 5 years or more after their initial diagnosis.

Screening

- In recent years, the National Lung Screening Trial has illustrated a lung cancer screening test can help lower the risk of dying from this disease in certain individuals (NLSTRT, 2011). Thus, the US Preventive Services Taskforce recently gave low-dose computed tomography screening for lung cancer a grade of “B” for certain individuals: adults aged 55-80 years with a 30 pack-year history of smoking and who currently smoke or quit smoking within the past 15 years. It should be noted a pack year is defined as smoking an average of 1 pack of cigarettes per day for 1 year.

Data Source

TABLE 6. CANCER INCIDENCE AND MORTALITY, LUNG AND BRONCHUS,TENNESSEE 2012-2016

		Incidence				Mortality				M:I
Gender	**Race**	**Count****	**Rate*****	**Lower CI**	**Upper CI**	**Count****	**Rate*****	**Lower CI**	**Upper CI**	**Ratio ‡**
Both*	All Races†	29,788	75.4	74.6	76.3	21,740	55.7	55	56.5	0.74
	Black	3,341	69.7	67.2	72.2	2,652	57.2	55	59.6	0.82
	White	26,195	76.7	75.8	77.7	18,883	55.8	55	56.6	0.73
Female	All Races†	13,294	61.8	60.8	62.9	9,154	42.5	41.7	43.4	0.69
	Black	1,430	51.4	48.6	54.2	1,089	40.3	37.9	42.9	0.78
	White	11,752	63.9	62.7	65.1	7,968	43.1	42.1	44.1	0.67
Male	All Races†	16,494	93.4	91.9	94.9	12,586	73.1	71.8	74.4	0.78
	Black	1,911	98.1	93.3	103.1	1,563	83.5	79	88.2	0.85
	White	14,443	93.4	91.8	95	10,915	72.3	70.9	73.7	0.77
Age at Diagnosis or Death										
	0-19	^	^	^	^	^	^	^	^	^
	20-44	393	4	3.6	4.5	200	2.1	1.8	2.4	0.53
	45-64	10,033	102.8	100.7	104.8	6,570	66.8	65.2	68.4	0.65
	65+	19,354	404.5	398.7	410.3	14,969	317.4	312.3	322.6	0.78
Year of Diagnosis or Death										
	2012	5,748	76.2	74.2	78.3	4,327	58.3	56.5	60.1	0.77
	2013	5,832	75.8	73.9	77.8	4,302	56.3	54.6	58.1	0.74
	2014	5,902	74.9	73	76.9	4,429	56.6	54.9	58.4	0.76
	2015	6,296	78	76.1	80	4,341	54.2	52.6	55.9	0.69
	2016	6,010	72.3	70.4	74.1	4,341	53.4	51.8	55	0.74

^Statistic not displayed due to fewer than 11 cases. Adjacent counts are offset so suppressed counts cannot be derived.

*Excludes hermaphrodites and transsexuals.

**Total counts are from 2012 to 2016.

***Rates are age-adjusted to the 2000 US standard population (19 age groups: <1, 1-4, 5-9,…, 80-84,85+).

Rates are cases per 100,000 population.

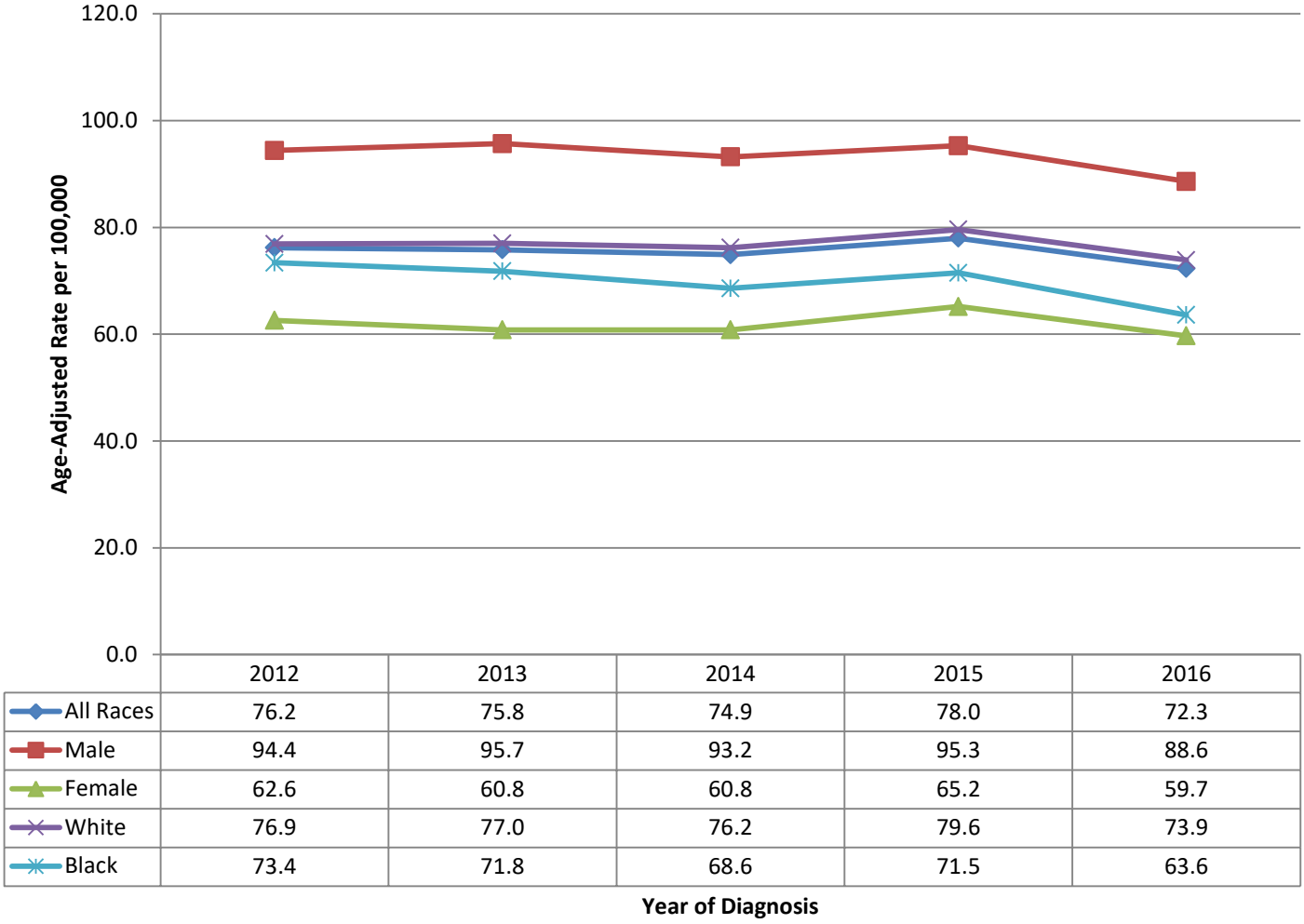
Rates are for invasive cancer only.

†Includes blacks, whites, other races, and those missing race information.

‡Mortality incidence ratio. See Technical Notes for details.

Data Source

Figure 34. Cancer Incidence, Lung and Bronchus, By Gender and Race, Tennessee, 2012-2016



	2012	2013	2014	2015	2016
All Races	76.2	75.8	74.9	78.0	72.3
Male	94.4	95.7	93.2	95.3	88.6
Female	62.6	60.8	60.8	65.2	59.7
White	76.9	77.0	76.2	79.6	73.9
Black	73.4	71.8	68.6	71.5	63.6

Year of Diagnosis

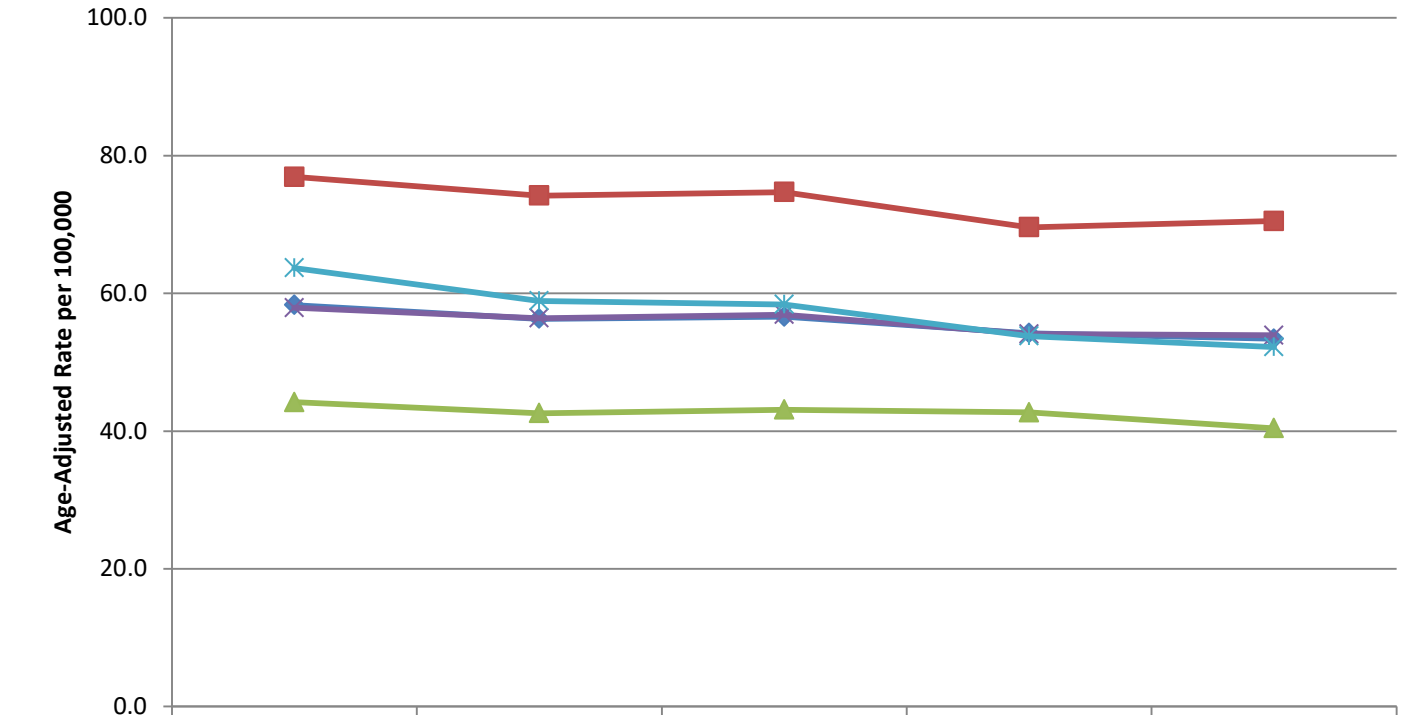
From 2012 to 2016 in TN, the lung cancer incidence rate* (Figure 34):

- *Decreased* 1.1% per year for all races.
- *Decreased* 1.5% per year for men and by 0.7% per year for women.
- *Decreased* 3.0% per year for blacks and by 0.8% per year for whites.

*Not Statistically Significant

Data Source

Figure 35. Cancer Mortality, Lung and Bronchus, By Gender and Race, Tennessee, 2012-2016



	2012	2013	2014	2015	2016
All Races	58.3	56.3	56.6	54.2	53.4
Male	76.9	74.2	74.7	69.6	70.5
Female	44.2	42.6	43.1	42.7	40.4
White	57.9	56.4	56.9	54.1	53.9
Black	63.7	58.9	58.4	53.8	52.2

Year of Death

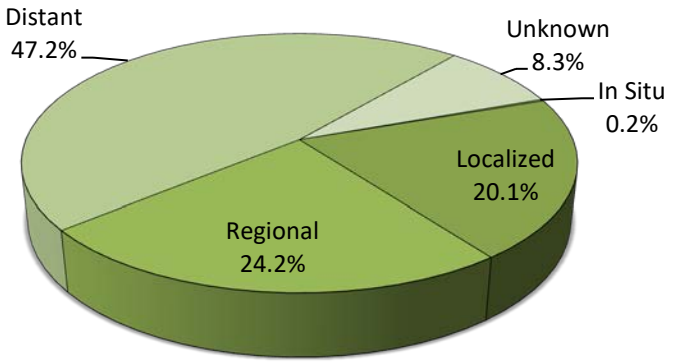
From 2012 to 2016 in TN, the lung cancer mortality rate* (Figure 35):

- *Decreased* 2.3% per year for all races.
- *Decreased* 3.1% per year for men and by 1.5% per year for women.
- *Decreased* 2.7% per year for blacks and by 2.2% per year among whites

*Statistically Significant

Data Source

Figure 36. Cancer Stage, Lung and Bronchus, Tennessee, 2012-2016



In TN from 2012 to 2016 (Figure 36):

- 0.2% of all lung cancer cases were diagnosed at the *in situ* stage.
- One in five cases (20.1%) was diagnosed at the localized stage, one in four cases (24.2%) was diagnosed at the regional stage and almost half of new cases (47.2%) were diagnosed at the distant stage.
- 8.3% of cases had unknown stage information.

Figure 37. Cancer Stage, Lung and Bronchus, By Race, Tennessee, 2012-2016

Cases with unknown stage were excluded. Numbers may not sum to 100% due to rounding errors.

- In TN, black patients had a higher proportion (82.3%) of cases diagnosed at late stages than white patients (77.3%), and this difference was statistically significant (Figure 37).

Data Source

PROSTATE CANCER

Incidence

- TN had the eighteenth highest prostate cancer incidence rate in the US from 2012-2016. During this same time period, men in TN had a 10.3% probability of developing prostate cancer in their lifetime.
- From 2012-2016, prostate cancer accounted for nearly a quarter (22.8%) of new cancer cases among TN men and was the leading cause of cancer incidence among TN men (21,109 cases), resulting in an age-adjusted rate of 110.7 cases per 100,000 TN men.
- Prostate cancer incidence rates fell on average by 1.0% per year from 2012 to 2016, but this change was not statistically significant.

Mortality

- TN had the twenty-fourth highest mortality rate (tied with California) in the US from 2012 to 2016.
- From 2012 to 2016, prostate cancer accounted for 7.6% of deaths due to cancer and was the third leading cause of cancer mortality among TN men. TN men who died of prostate cancer died on average 3.4 years earlier than expected.
- From 2012 to 2016, prostate cancer accounted for 2,916 deaths, resulting in an age-adjusted rate of 19.8 per 100,000 TN men. The mortality-to-incidence ratio of prostate cancer was 0.18, which may partially be attributed to screening methods and steadily improving treatment options.
- Prostate cancer mortality rates increased on average 0.4% per year from 2012-2016, but this change was not statistically significant.

Survival

- Based on 2010-2016 data, almost 97% of men in TN survived 5 years of more after their initial diagnosis of prostate cancer. This means about 97 out of 100 TN men were alive 5 years after being diagnosed with prostate cancer.
- Only 24.7% of TN men diagnosed with prostate cancer at the distant stage survived 5 years or more after their initial diagnosis. Roughly four out of five (80.8%) cases with known stage information were diagnosed at early stages, which may be partially attributable to prostate cancer screening methods and the slow progressive course prostate cancer typically displays compared to most other cancers.

Health Disparities

- During 2012 to 2016, black men were disproportionately affected by this disease compared to white men. In TN, black men experienced an incidence rate over one and a half times higher and a mortality rate over two and a half times higher than white men.

Screening

- The US Preventive Services Taskforce (USPSTF) does not recommend population-based screening for prostate cancer for men 70 years or older. The USPSTF provides a “C” grade for Prostate Specific Antigen (PSA) screening among men, who are 55-69 years of age. According to the 2016 Behavioral Risk Factor Surveillance Survey, 43.2% of TN men 40 years of age or older had a PSA screening during the past two years.

Data Source

TABLE 7. CANCER INCIDENCE AND MORTALITY, PROSTATE, TENNESSEE, 2012-2016

		Incidence				Mortality				M:I
Gender	Race	Count**	Rate***	Lower CI	Upper CI	Count**	Rate***	Lower CI	Upper CI	Ratio ‡
Male	All Races†	21,109	110.7	109.1	112.2	2,916	19.8	19.0	20.5	0.18
	Black	3,886	174.8	168.8	180.9	654	45.6	41.9	49.6	0.26
	White	16,922	102	100.4	103.6	2,238	17.2	16.4	17.9	0.17
Age at Diagnosis or Death										
	0-19	^	^	^	^	^	^	^	^	^
	20-44	119	2.5	2.1	3	^	^	^	^	^
	45-64	8,578	178.6	174.8	182.5	392	7.9	7.1	8.7	0.04
	65+	12,411	554.3	544.3	564.5	2,519	142.4	136.7	148.1	0.26
Year of Diagnosis or Death										
	2012	4,250	117.8	114.2	121.5	545	20.0	18.3	21.8	0.17
	2013	4,109	110.4	106.9	113.9	541	18.7	17.1	20.4	0.17
	2014	3,903	102.1	98.8	105.5	580	19.7	18.1	21.4	0.19
	2015	4,340	110.7	107.3	114.1	586	19.4	17.9	21.1	0.18
	2016	4,507	112.4	109.1	115.8	664	21.0	19.4	22.7	0.19

^Statistic not displayed due to fewer than 11 cases. Adjacent counts are offset so suppressed counts cannot be derived.

*Excludes hermaphrodites and transsexuals.

**Total counts are from 2012 to 2016.

***Rates are age-adjusted to the 2000 US standard population (19 age groups: <1, 1-4, 5-9, …, 80-84,85+).

Rates are cases per 100,000 population.

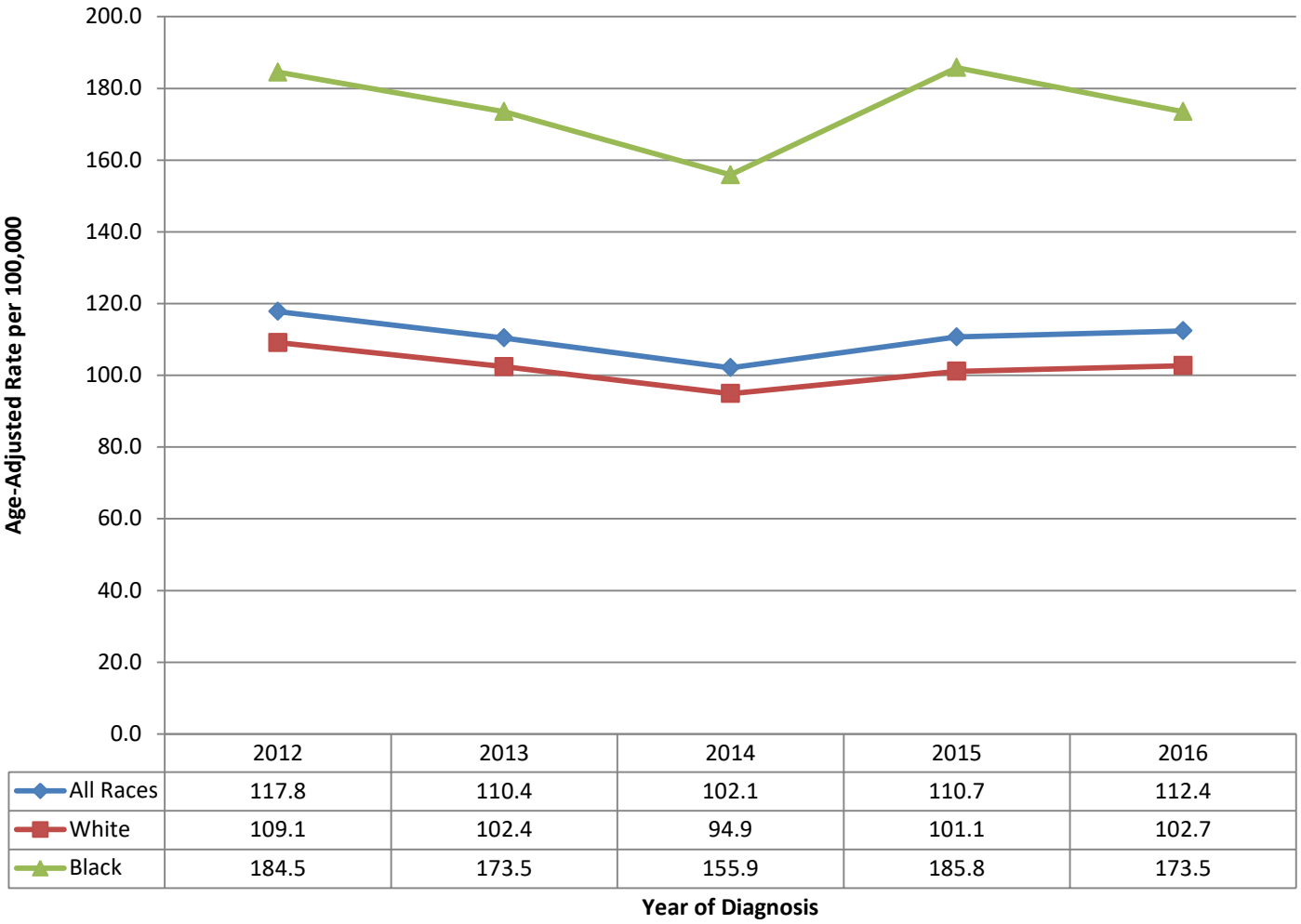
Rates are for invasive cancer only.

†Includes blacks, whites, other races, and those missing race information.

‡Mortality incidence ratio. See Technical Notes for details.

Data Source

Figure 38. Cancer Incidence, Prostate, By Race, Tennessee, 2012-2016



	2012	2013	2014	2015	2016
All Races	117.8	110.4	102.1	110.7	112.4
White	109.1	102.4	94.9	101.1	102.7
Black	184.5	173.5	155.9	185.8	173.5

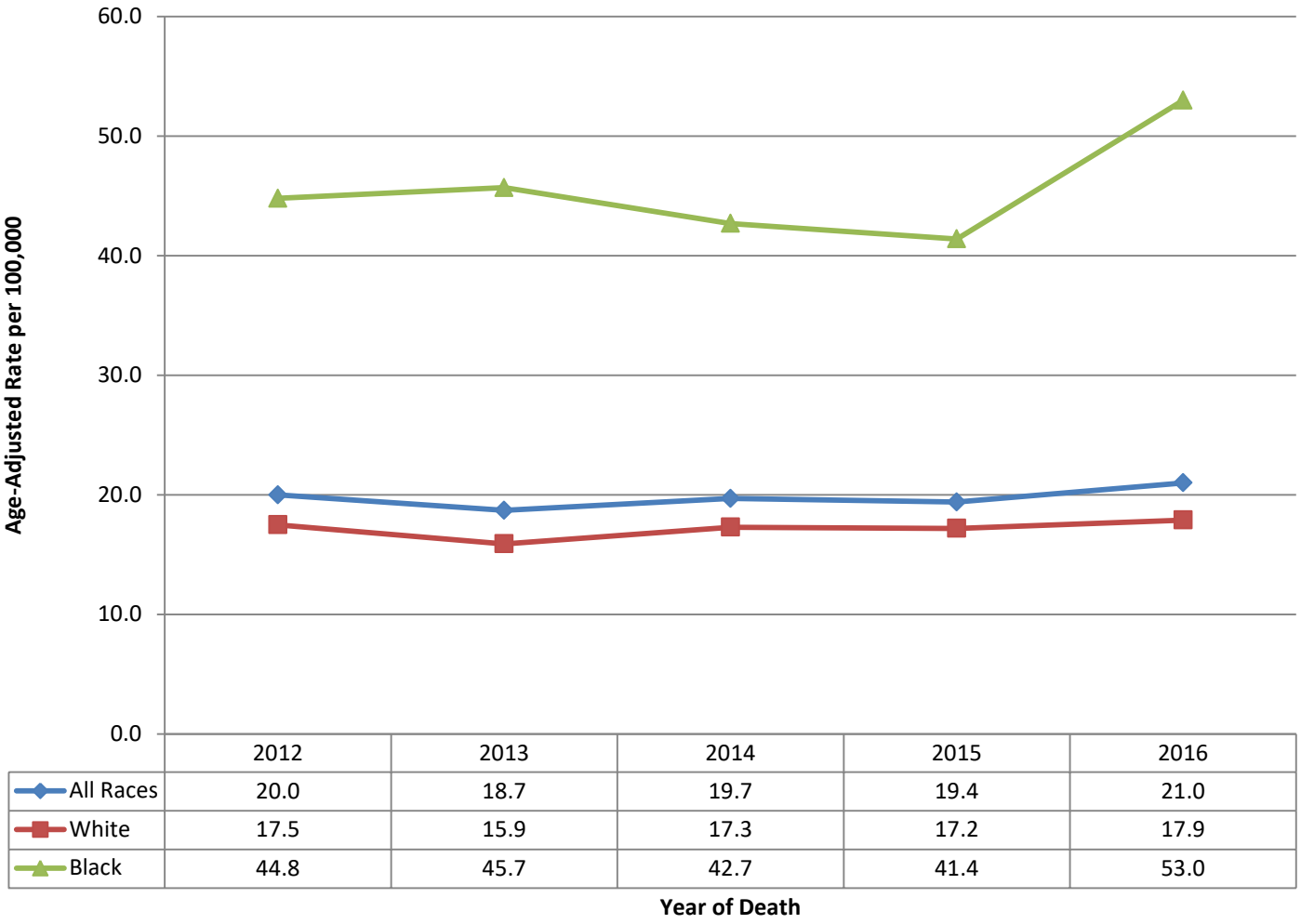
From 2012 to 2016 in TN, the prostate cancer incident rate* (Figure 38):

- *Decreased* 1.0% per year in all races.
- *Decreased* 0.7% per year in blacks and by 1.4% per year in whites.

*Not statistically significant

Data Source

Figure 39. Cancer Mortality, Prostate, By Race, Tennessee, 2012-2016



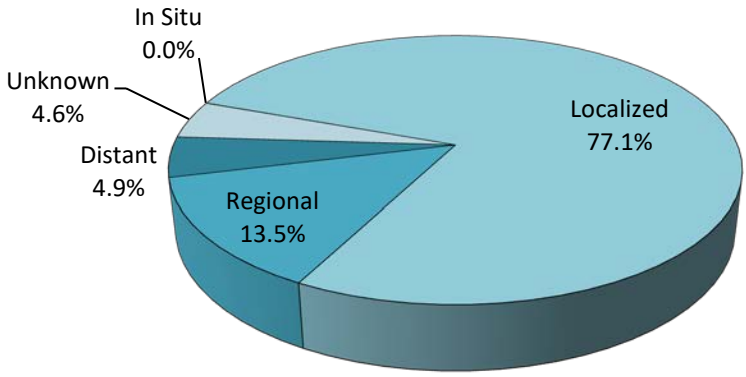
	2012	2013	2014	2015	2016
All Races	20.0	18.7	19.7	19.4	21.0
White	17.5	15.9	17.3	17.2	17.9
Black	44.8	45.7	42.7	41.4	53.0

From 2012 to 2016 in TN, the prostate cancer mortality rate (Figure 39):

- *Increased* by 0.4% per year in all races, but was not statistically significant.
- *Decreased* 3.5% per year in blacks and 3.5% in whites and both were statistically significant.

Data Source

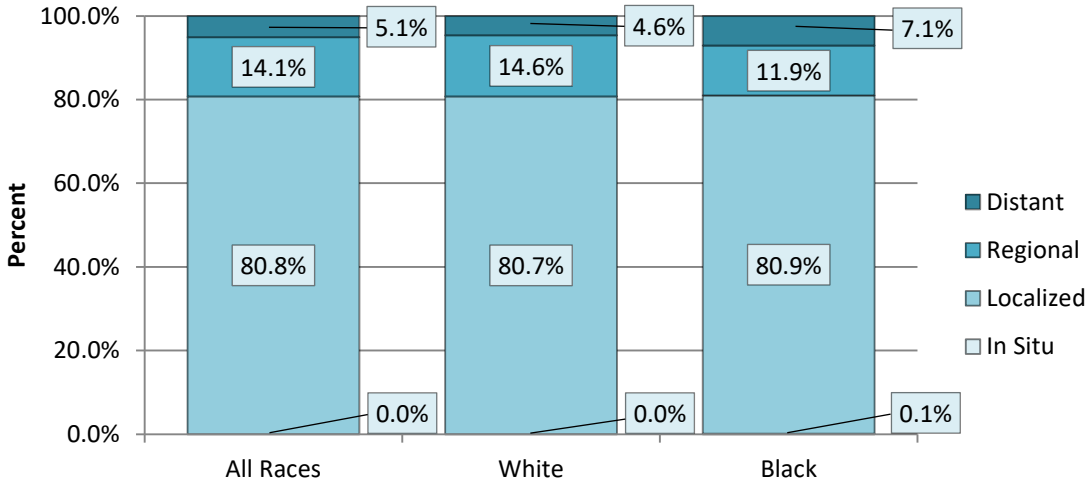
Figure 40. Cancer Stage, Prostate, Tennessee, 2012-2016



In TN from 2012-2016 (Figure 40):

- Less than 11 prostate cancer cases were diagnosed at the *in situ* stage.
- About 77.1% were diagnosed at the localized stage, 13.5% of cases were diagnosed at the regional stage and 4.9% of cases were diagnosed at the distant stage. About 4.6% of cases had unknown stage.

Figure 41. Cancer Stage, Prostate, By Race, Tennessee, 2012-2016



Cases with unknown stage were excluded. Numbers may not sum to 100% due to rounding errors.

From 2012 to 2016 (Figure 41):

- Among cases with known stage information, 19.2% were diagnosed at late stages (i.e., regional or distant stage).
- A slightly higher percentage of white patients were diagnosed at late stages (19.2%) than black patients (19.0%), but this difference was not statistically significant.
- Early diagnosis of prostate cancer may contribute to a low mortality-to-incidence ratio, though this is hotly debated.

Data Source

FEMALE BREAST CANCER

Incidence

- TN women had the thirty-sixth highest breast cancer incidence rate in the US from 2012 through 2016. During this time period, TN women had a 12.1% lifetime risk of developing breast cancer.
- From 2012 through 2016, breast cancer represented 28.9% of new female cancer cases and was the leading cause of cancer incidence (25,014 cases) among women in TN.
- Incidence rates decreased on average by 0.8% per year, but this change was not statistically significant.
- Nearly three quarters (71.7%) of new cases with known stage information were diagnosed at early stages, *in situ* and localized stages, when treatment is more effective.

Mortality

- TN women had the sixth highest mortality rate (tied with Maryland) in the US during 2012-2016.
- From 2012 through 2016, breast cancer represented 14.4% of female cancer deaths and was the second leading cause of cancer mortality (4,629 deaths) among TN women. Early detection and effective treatment options contributed to the low mortality-to-incidence ratio of breast cancer (0.18).
- Mortality rates decreased on average by 1.5.6% per year from 2012-2016 and this change was statistically significant.
- TN women, who died of breast cancer from 2012-2016, died 10.0 years earlier than expected. During 2014-2016, TN women had a 2.5% lifetime risk of dying from breast cancer.

Survival

- Based on 2010-2016 TN data, approximately 89.8% of whites and 85.9% of blacks diagnosed with breast cancer survived 5 years or more after their initial diagnosis. This means that about 90 out of 100 white TN women and 86 out of 100 black TN women were alive 5 years after being diagnosed with breast cancer, whereas 100 TN women without cancer will survive the same 5-year period.
- A little over a quarter (26.7%) of TN women diagnosed with breast cancer in the distant stage (i.e., late stage) survived 5 years or more after their initial diagnosis.

Health Disparities

- Black women are significantly more likely than white women to be diagnosed with breast cancer in the late stages (i.e., regional and distant) when treatment is more difficult, which may partially explain the significantly higher breast cancer mortality rates of black women compared to white women in TN.

Screening

- According to the 2016 Behavioral Risk Factor Surveillance System (BRFSS), nearly four of five TN women (77.1%), 50-74 years of age, received a mammogram in the past two years, which explains the high percentage of early stage breast cancers observed statewide.
- The US Preventative Services Taskforce (USPSTF) recommends biennial screening mammography for women 50-74 years as there is moderate certainty that the net benefit of screening is moderate to substantial. However, the decision to start regular, biennial screening mammography before the age of 50 years should be an individual one and take patient context into account, including the patient's perceived value regarding specific benefits and harms. Of all the age groups, women aged 60 to 69 years are most likely to avoid breast cancer death through mammography screening (USPSTF, 2016).

Data Source

TABLE 8. CANCER INCIDENCE AND MORTALITY, FEMALE BREAST,TENNESSEE, 2012-2016

		Incidence				Mortality				M:I
Gender	**Race**	**Count****	**Rate*****	**Lower CI**	**Upper CI**	**Count****	**Rate*****	**Lower CI**	**Upper CI**	**Ratio ‡**
Female	All Races †	25,014	123.1	121.6	124.7	4,629	22	21.4	22.7	0.18
	Black	3,624	124.8	120.6	129	862	30.2	28.2	32.4	0.24
	White	21,004	122.9	121.2	124.6	3,712	20.6	19.9	21.3	0.17
Age at Diagnosis or Death										
	0-19	^	^	^	^	^	^	^	^	^
	20-44	2,418	49.1	47.1	51.1	240	4.9	4.3	5.5	0.10
	45-64	11,130	235.9	231.4	240.4	1,648	34.1	32.4	35.8	0.14
	65+	11,463	418.1	410.4	425.9	2,741	100.1	96.4	104	0.24
Year of Diagnosis or Death										
	2012	4,844	123.1	119.5	126.7	905	22.4	21	24	0.18
	2013	5,104	127.1	123.5	130.7	924	22.2	20.8	23.7	0.17
	2014	4,846	119.9	116.5	123.4	906	21.5	20.1	23	0.18
	2015	5,150	124.7	121.2	128.3	935	22	20.5	23.5	0.18
	2016	5,070	121	117.6	124.5	959	21.9	20.5	23.4	0.18

^Statistic not displayed due to fewer than 11 cases. Adjacent counts are offset so suppressed counts cannot be derived.

*Excludes hermaphrodites and transsexuals.

**Total counts are from 2012 to 2016.

***Rates are age-adjusted to the 2000 US standard population (19 age groups: <1, 1-4, 5-9, …, 80-84,85+).

Rates are cases per 100,000 population.

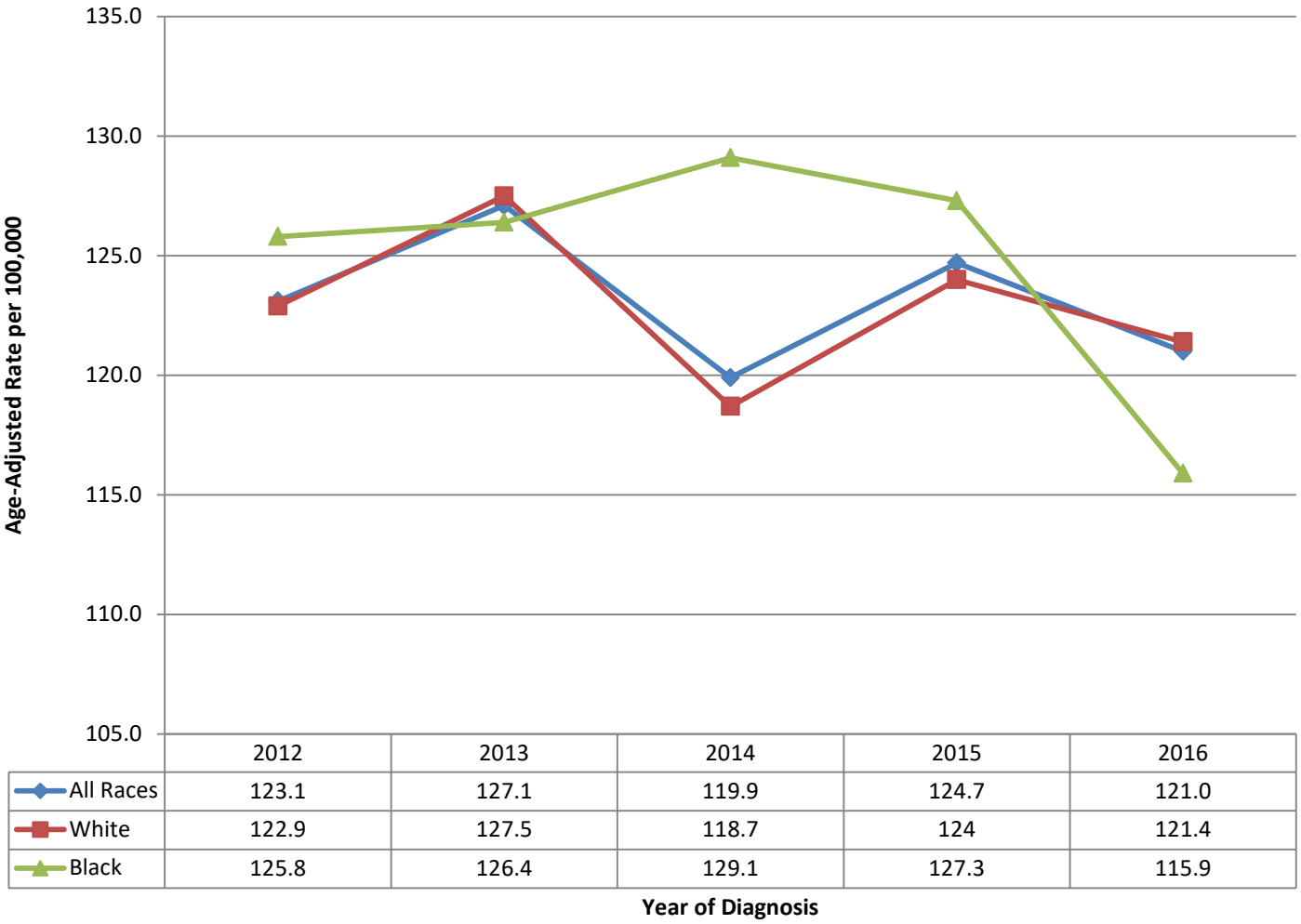
Rates are for invasive cancer only.

†Includes blacks, whites, other races, and those missing race information.

‡Mortality incidence ratio. See Technical Notes for details.

Data Source

Figure 42. Cancer Incidence, Female Breast, By Race, Tennessee, 2012-2016



	2012	2013	2014	2015	2016
All Races	123.1	127.1	119.9	124.7	121.0
White	122.9	127.5	118.7	124	121.4
Black	125.8	126.4	129.1	127.3	115.9

Year of Diagnosis

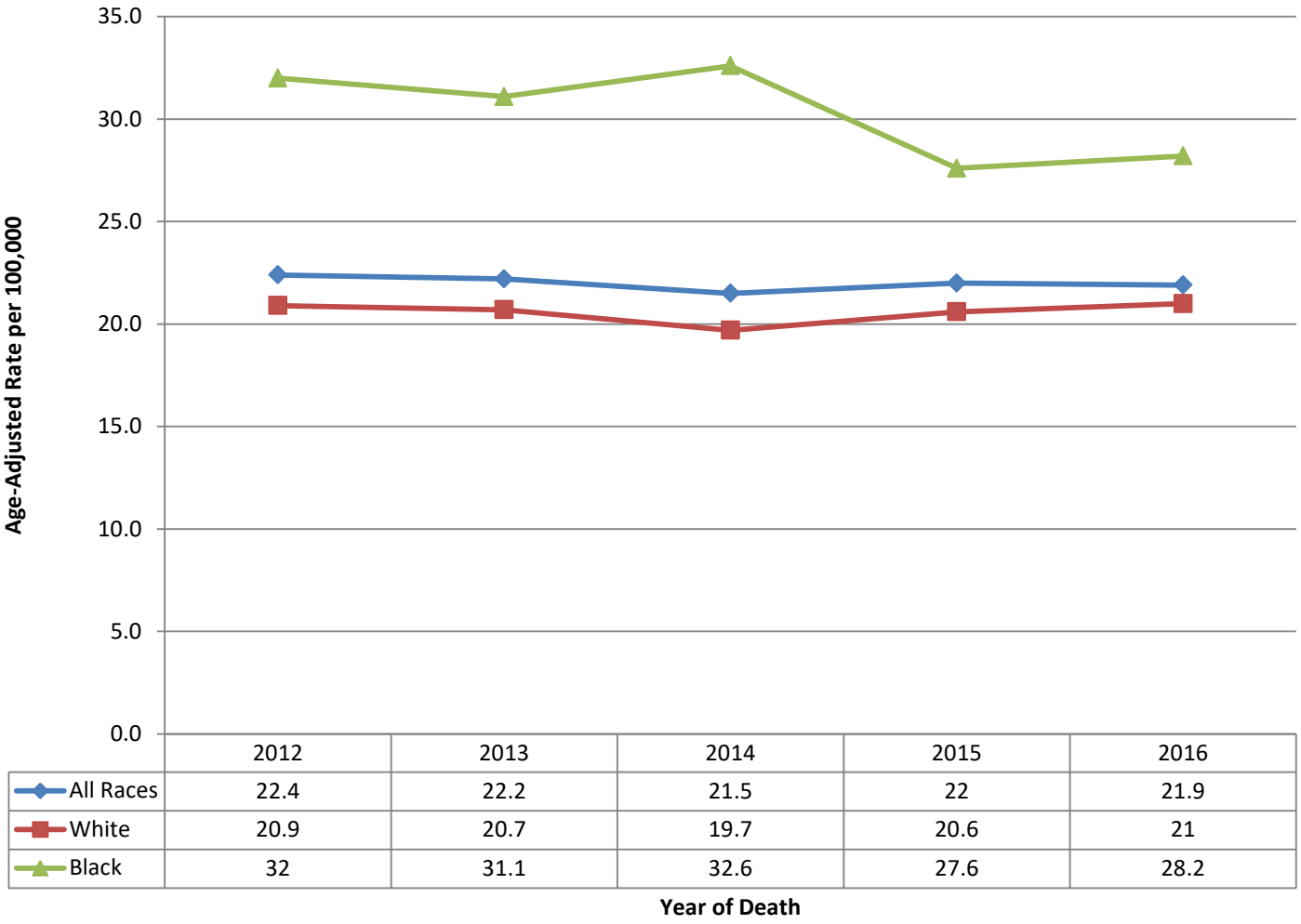
From 2012-2016 in TN, the female breast cancer incidence rate* (Figure 42):

- *Decreased* 0.8% per year for all races.
- *Decreased* 1.8% and 0.8% per year among blacks and whites, respectively.

*Not statistically significant

Data Source

Figure 43. Cancer Mortality, Female Breast, By Race, Tennessee, 2012-2016



	2012	2013	2014	2015	2016
All Races	22.4	22.2	21.5	22	21.9
White	20.9	20.7	19.7	20.6	21
Black	32	31.1	32.6	27.6	28.2

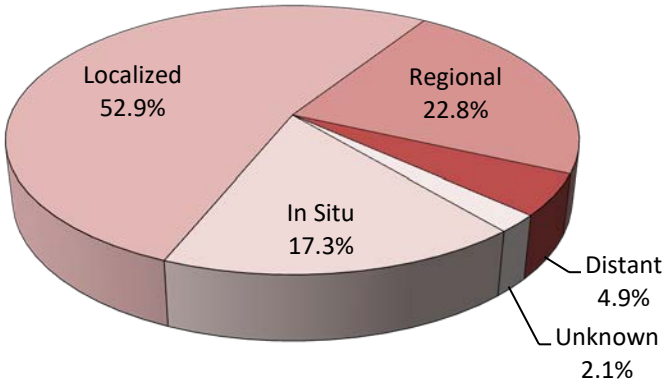
From 2012-2016 in TN, the female breast cancer mortality rate* (Figure 43):

- *Decreased* 1.5% per year in all races.
- *Decreased* 2.8% per year among black women and by 1.6% per year among white women.

*Statistically significant

Data Source

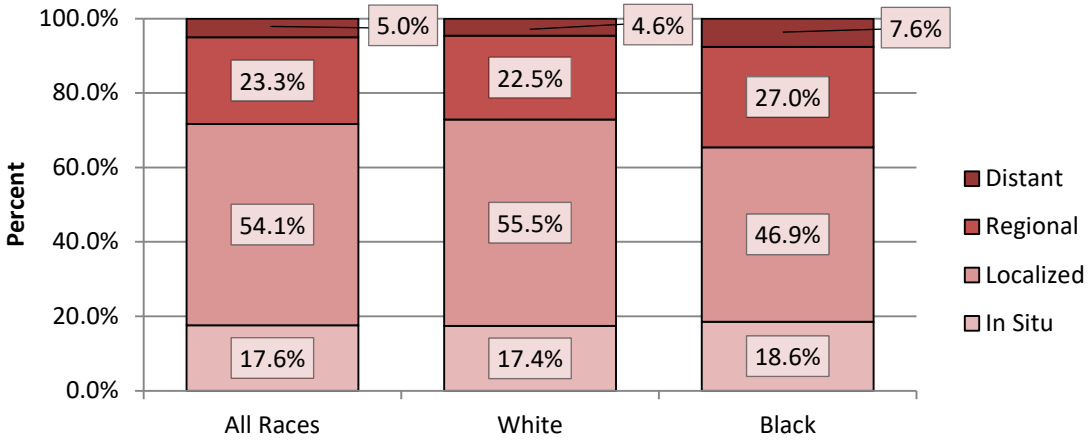
Figure 44. Cancer Stage, Female Breast, Tennessee, 2012-2016



In TN from 2012-2016 (Figure 44):

- Nearly one in five (17.3%) female breast cancer cases were diagnosed at the *in situ* stage.
- More than half of cases (52.9%) were diagnosed at the localized stage, one in four cases (22.8%) at the regional stage and 4.9% in the distant stage.
- 2.1% of cases had unknown stage information.

Figure 45. Cancer Stage, Female Breast, By Race, Tennessee, 2012-2016



Cases with unknown stage were excluded. Numbers may not sum to 100% due to rounding errors.

From 2012 to 2016 (Figure 45):

- Among those cancer cases with known stage, 28.3% were diagnosed at late stages (i.e., regional or distant stages).
- Black women had a higher proportion (34.6%) of cases diagnosed at late stages than white women (27.1%) and this difference was statistically significant, which may partially explain the significantly higher breast cancer mortality rate among black women compared to white women in TN.

Data Source

COLON AND RECTUM CANCER

Incidence

- From 2012-2016, TN had the twenty-first highest rate in the US. During the same time period Tennesseans had a 4.1%, or a one in twenty-four, lifetime risk of developing colorectal cancer.
- Colorectal cancer was the fourth leading cause of cancer incidence in TN. There were 15,493 new colorectal cancer cases in TN from 2012-2016, which represented 8.6% of all new cancers.
- The colorectal cancer incidence rate fell on average by 0.4% per year from 2012 to 2016, but this change was not statistically significant.
- Less than half (40.0%) of the cases in TN with known stage information were diagnosed at early stages when treatment is generally more effective.

Mortality

- TN had the tenth highest mortality rate in the US for colorectal cancer during 2012-2016.
- From 2012-2016, colorectal cancer accounted for 8.4% of all cancer deaths and was the second leading cause of cancer mortality (5,941 deaths) in TN.
- During the same time period, the colorectal cancer mortality rate fell on average by 1.7% per year and this change was statistically significant.
- Tennesseans, who died of colorectal cancer from 2012-2016, died on average 7.5 years earlier than expected. During the same time period, Tennesseans had a 1.7% or a one in sixty probability of dying from colorectal cancer in their lifetime.

Survival

- Based on 2010-2016 TN data, approximately 65.0% of colorectal cancer patients survived 5 years or more after their initial diagnosis. This means that 65 out of 100 Tennesseans were alive 5 years after being diagnosed with colorectal cancer.
- Stage at diagnosis appears to influence survival. The large majority (89.1%) of colorectal cancer patients diagnosed in the early stages, while less than half (40.0%) of colorectal cancer patients, survived 5 years or more after their initial diagnosis.

Health Disparities

- Black Tennesseans experienced significantly greater incidence and mortality rates for colorectal cancer compared to whites. In addition, TN men experienced significantly greater incidence and mortality rates for colorectal cancer than TN women.

Screening

- Regular colorectal cancer screening can identify lesions before they become cancer and find colorectal cancer early, when it is highly curable. The screening methodology for colorectal cancer recommended by most healthcare professionals is the colonoscopy.
- The US Preventive Services Taskforce (USPSTF) recommends colorectal cancer screening using fecal occult blood testing, sigmoidoscopy, or colonoscopy in adults, beginning at the age of 50 and continuing until the age of 75. However, the USPSTF has recommended adults between the ages of 76 and 85 take into account their overall health and prior screening history to determine whether to undergo colorectal screening.

Data Source

TABLE 9. CANCER INCIDENCE AND MORTALITY, COLON AND RECTUM, TENNESSEE, 2012-2016

		Incidence				Mortality				M:I
Gender	Race	Count**	Rate***	Lower CI	Upper CI	Count**	Rate***	Lower CI	Upper CI	Ratio‡
Both*	All Races †	15,493	40.6	40	41.3	5,941	15.7	15.3	16.1	0.39
	Black	2,335	47.6	45.6	49.7	1,004	22.3	20.9	23.8	0.47
	White	12,938	39.6	38.9	40.4	4,873	14.9	14.5	15.3	0.38
Female	All Races †	7,408	35.7	34.9	36.6	2,783	13.1	12.6	13.6	0.37
	Black	1,167	41.5	39.1	44.1	469	17.8	16.2	19.5	0.43
	White	6,137	34.8	33.9	35.7	2,278	12.5	11.9	13	0.36
Male	All Races †	8,085	46.5	45.5	47.6	3,158	19	18.3	19.7	0.41
	Black	1,168	56.9	53.3	60.6	535	29.7	27	32.6	0.52
	White	6,801	45.3	44.2	46.4	2,595	17.9	17.2	18.6	0.40
Age at Diagnosis or Death										
	0-19	23	0.3	0.2	0.4	^	^	^	^	^
	20-44	964	9.7	9.1	10.4	207	2.1	1.8	2.4	0.22
	45-64	5,927	63.7	62.1	65.4	1,812	19.1	18.2	20	0.30
	65+	8,579	180.6	176.8	184.6	3,922	84.6	81.9	87.3	0.47
Year of Diagnosis or Death										
	2012	3,049	41.7	40.2	43.2	1,181	16.4	15.4	17.3	0.39
	2013	2,905	38.9	37.4	40.3	1,212	16.4	15.4	17.3	0.42
	2014	3,162	41.6	40.1	43.1	1,149	15.2	14.3	16.1	0.37
	2015	3,142	40.2	38.8	41.7	1,193	15.4	14.6	16.4	0.38
	2016	3,235	40.8	39.4	42.3	1,206	15.2	14.3	16.1	0.37

^Statistic not displayed due to fewer than 11 cases. Adjacent counts are offset so suppressed counts cannot be derived.

*Excludes hermaphrodites and transsexuals.

**Total counts are from 2012 to 2016.

***Rates are age-adjusted to the 2000 US standard population (19 age groups: <1, 1-4, 5-9, …, 80-84,85+).

Rates are cases per 100,000 population.

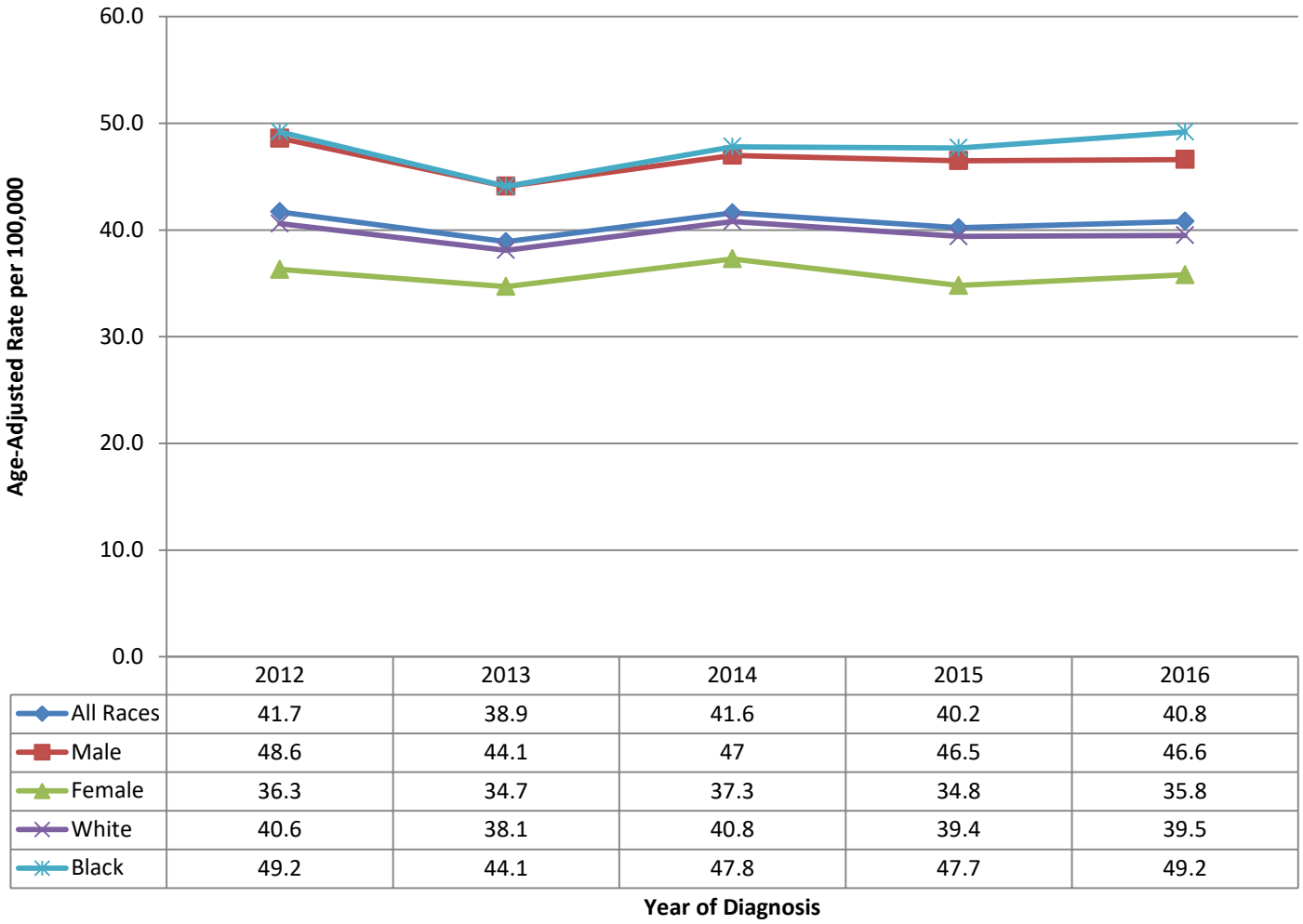
Rates are for invasive cancer only.

†Includes blacks, whites, other races, and those missing race information.

‡Mortality incidence ratio. See Technical Notes for details.

Data Source

Figure 46. Cancer Incidence, Colon and Rectum, By Gender and Race, Tennessee, 2012-2016



	2012	2013	2014	2015	2016
All Races	41.7	38.9	41.6	40.2	40.8
Male	48.6	44.1	47	46.5	46.6
Female	36.3	34.7	37.3	34.8	35.8
White	40.6	38.1	40.8	39.4	39.5
Black	49.2	44.1	47.8	47.7	49.2

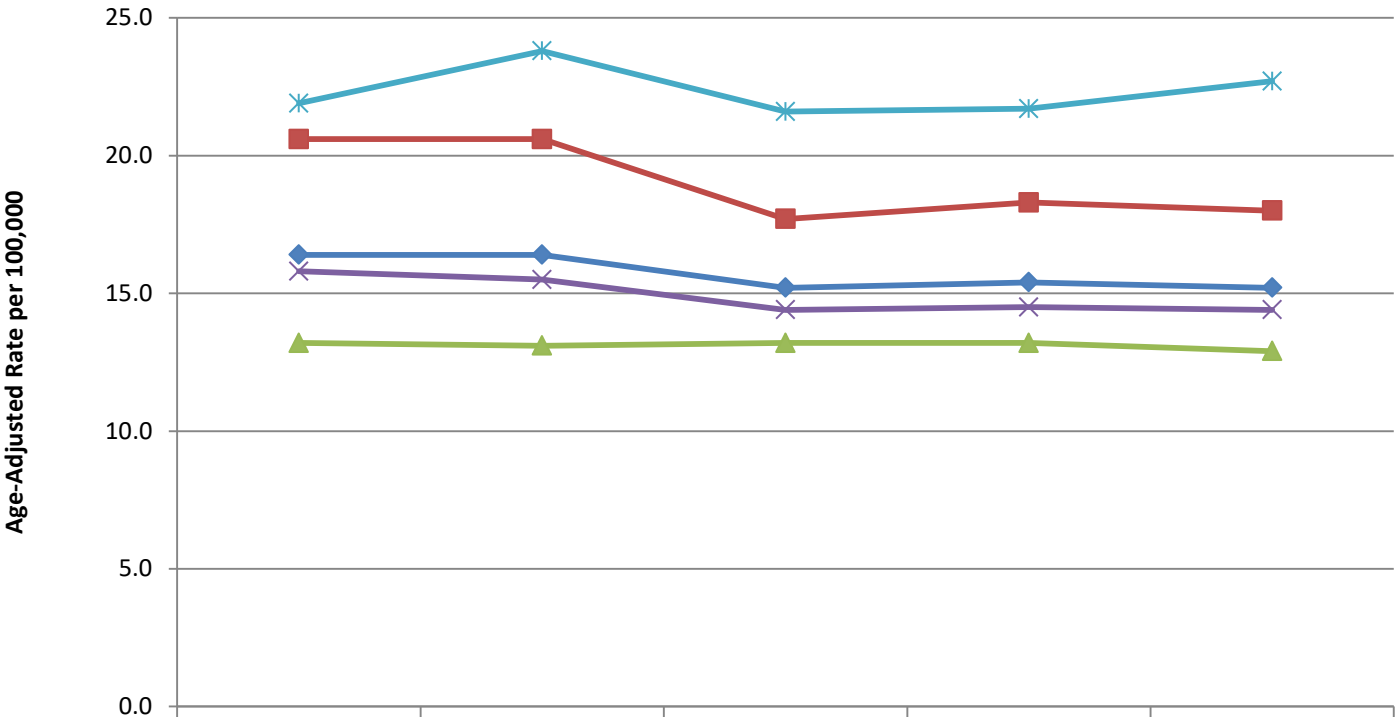
From 2012 to 2016 in TN, the colorectal cancer incidence rate* (Figure 46):

- *Decreased* by 0.4% per year in all races.
- *Decreased* by 0.7% per year among men and 0.6% per year among women.
- *Increased* by 0.2% per year in blacks, and *decreased* by 0.5% in whites.

*Not statistically significant

Data Source

Figure 47. Cancer Mortality, Colon and Rectum, By Gender and Race, Tennessee, 2012-2016



	2012	2013	2014	2015	2016
All Races	16.4	16.4	15.2	15.4	15.2
Male	20.6	20.6	17.7	18.3	18
Female	13.2	13.1	13.2	13.2	12.9
White	15.8	15.5	14.4	14.5	14.4
Black	21.9	23.8	21.6	21.7	22.7

Year of Death

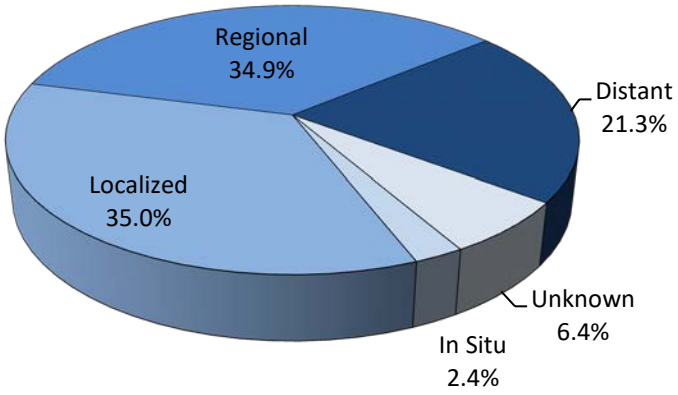
From 2012-2016 in TN, the colorectal cancer mortality rate*(Figure 47):

- *Decreased* by 1.7% per year in all races.
- *Decreased* among men by 1.8% per year by 1.7% per year in women.
- *Decreased* among blacks by 2.9% per year and by 1.6% per year in whites.

*Statistically significant

Data Source

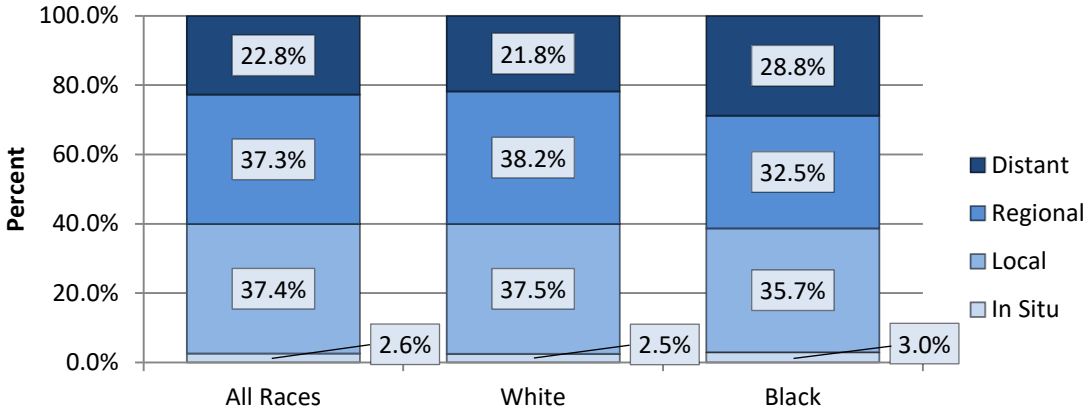
Figure 48. Cancer Stage, Colon and Rectum, Tennessee, 2012-2016



In TN from 2012-2016 (Figure 48):

- 2.4% of the colorectal cancer incidence cases were diagnosed at the in situ stage, 35.0% of new cases were diagnosed at the localized stage, 34.9% at the regional stage and 21.3% at the distant stage.
- 6.4% of new cases had unknown stage information.

Figure 49. Cancer Stage, Colon and Rectum, By Race, Tennessee, 2012-2016



Cases with unknown stage were excluded. Numbers may not sum to 100% due to rounding errors.

From 2012 to 2016 (Figure 49):

- Among those cases in TN with known stage, 60.1% were diagnosed at either the regional or distant stage (i.e., late stages).
- Black Tennesseans (61.3%) had a higher proportion of cases diagnosed at late stages than white Tennesseans (60.0%), but this difference was not statistically significant.

Data Source

MELANOMA OF THE SKIN CANCER

Incidence

- TN had the thirty-eighth highest incidence rate of melanoma of the skin in the US from 2012-2016. Tennesseans had about a 1.9% lifetime probability of developing a melanoma of the skin cancer.
- From 2012 through 2016, there were 7,577 newly diagnosed melanoma of the skin cases, which represented 4.2% of all new cancers cases. Only 10.1% of melanoma of the skin cases with known stage information were diagnosed in the late stages from 2012-2016.
- From 2012 to 2016, melanoma of the skin incidence rates remained stable.

Mortality

- TN experienced the fifth highest melanoma of the skin mortality rate (tied with Kansas) in the US from 2012-2016.
- From 2012 through 2016, 1,122 Tennesseans died from melanoma of the skin, which represented 1.6% of all cancer deaths.
- On average during 2012-2016, Tennesseans who died from melanoma of the skin died 9.8 years before expected. Melanoma of the skin mortality rates remained stable during 2012-2016.

Survival

- Based on 2010-2016 data, approximately 97.4% of melanoma of the skin patients survived 5 years or more after their initial diagnosis. This means that 97 out of 100 Tennesseans were alive 5 years after being diagnosed.
- Virtually all Tennesseans diagnosed with melanoma of the skin in the early stages (i.e., in situ and local) survived 5 years or more after their initial diagnosis, while only 53.8% of Tennesseans diagnosed with melanoma of the skin in the late stages (i.e., regional and distant) survived 5 years or more after their initial diagnosis.

Health Disparities

- From 2012 to 2016 in TN, melanoma of the skin incidence rates in whites were twenty-six times higher than blacks. However, black Tennesseans experience a much higher mortality-to-incidence ratio for this disease (i.e., black individuals survive for a much shorter time than white individuals).
- A statistically significantly higher percentage of blacks in TN (28.0%) with known stage information were diagnosed with melanoma of the skin at late stages than whites (10.1%), which may partially explain the high mortality-to-incidence ratio for melanoma of the skin among black Tennesseans. However, please note this comparison may be statistically unstable since there were less than fifty black Tennesseans diagnosed with melanoma of the skin between 2012 and 2016.

Screening

- The US Preventive Services Taskforce (USPSTF) recommends advising people ages 6 months to 24 years about minimizing their exposure to ultraviolet radiation to reduce the risk for skin cancer, in general. However, the USPSTF has stated that there is currently insufficient evidence to recommend general population-based screening for skin cancer, grade of “I”, which means the Taskforce considers there is insufficient available evidence to assess the balance of benefits and harms of visual skin examination by a clinician to screen for skin cancer in adults.

Data Source

TABLE 10. CANCER INCIDENCE AND MORTALITY, MELANOMA, TENNESSEE, 2012-2016

		Incidence				Mortality				M:I
Gender	Race	Count**	Rate***	Lower CI	Upper CI	Count**	Rate***	Lower CI	Upper CI	Ratio‡
Both*	All Races †	7,577	20.3	19.8	20.8	1,122	3.0	2.8	3.2	0.15
	Black	43	0.9	0.6	1.2	22	0.4	0.2	0.6	0.44
	White	7,391	23.4	22.9	24.0	1,087	3.4	3.2	3.6	0.15
Female	All Races †	3,125	16.1	15.5	16.7	334	1.6	1.5	1.8	0.10
	Black	23	0.8	0.5	1.3	^	^	^	^	^
	White	3,031	19.0	18.3	19.7	321	1.9	1.7	2.1	0.10
Male	All Races †	4,452	26.1	25.3	26.9	788	4.8	4.4	5.1	0.18
	Black	20	0.9	0.6	1.5	13	0.5	0.3	0.9	0.56
	White	4,360	29.5	28.6	30.4	766	5.3	4.9	5.7	0.18
Age at Diagnosis or Death										
0-19		24	0.3	0.2	0.4	^	^	^	^	^
20-44		994	9.8	9.2	10.5	74	0.7	0.6	0.9	0.07
45-64		2,859	31.1	30.0	32.3	365	3.8	3.4	4.3	0.12
65+		3,700	77.0	74.5	79.5	682	14.7	13.6	15.8	0.19
Year of Diagnosis or Death										
2012		1,425	20.0	18.9	21.1	213	2.9	2.6	3.4	0.15
2013		1,506	20.5	19.5	21.6	245	3.3	2.9	3.8	0.16
2014		1,448	19.4	18.4	20.4	215	2.9	2.5	3.4	0.15
2015		1,692	22.3	21.2	23.4	245	3.1	2.7	3.5	0.14
2016		1,506	19.3	18.3	20.3	204	2.6	2.3	3.0	0.13

^Statistic not displayed due to fewer than 11 cases. Adjacent counts are offset so suppressed counts cannot be derived.

*Excludes hermaphrodites and transsexuals.

**Total counts are from 2012 to 2016.

***Rates are age-adjusted to the 2000 US standard population (19 age groups: <1, 1-4, 5-9, …, 80-84,85+).

Rates are cases per 100,000 population.

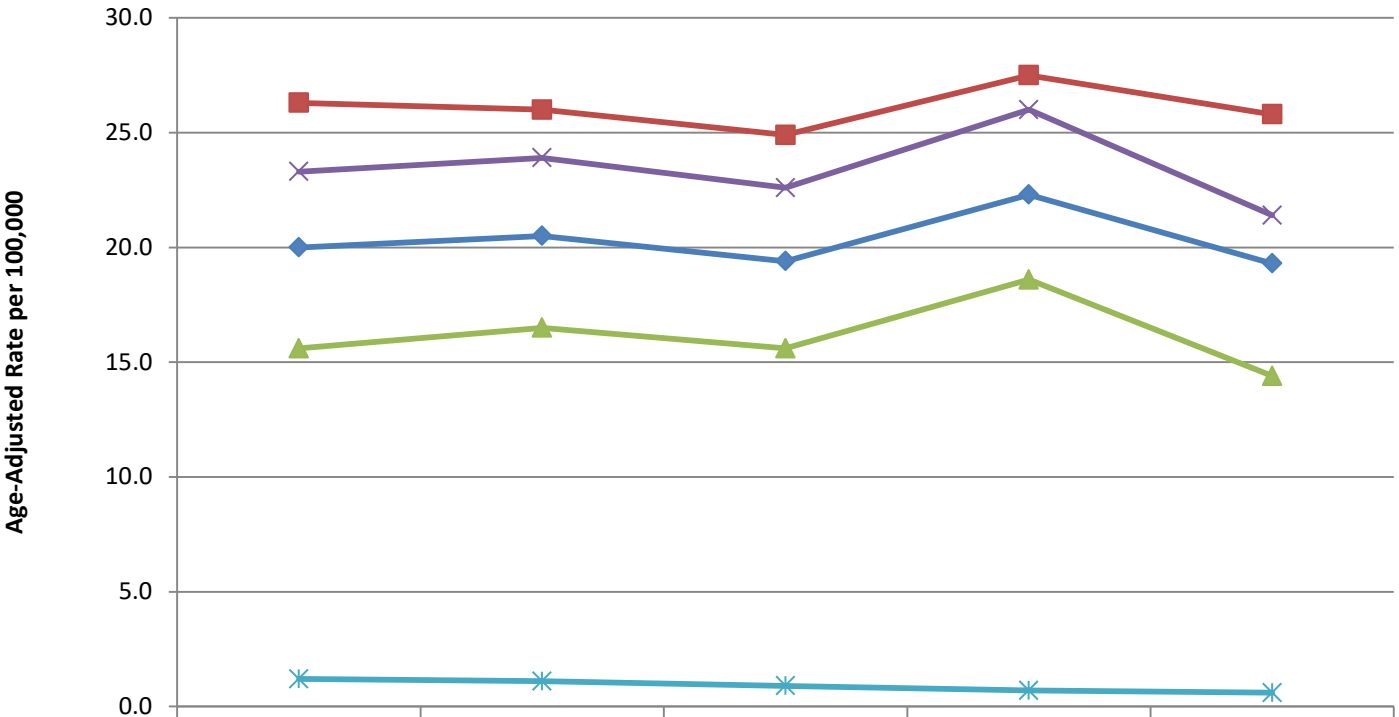
Rates are for invasive cancer only.

†Includes blacks, whites, other races, and those missing race information.

‡Mortality incidence ratio. See Technical Notes for details.

Data Source

Figure 50. Cancer Incidence, Melanoma of the Skin, By Gender and Race, Tennessee, 2012-2016



	2012	2013	2014	2015	2016
All Races	20.0	20.5	19.4	22.3	19.3
Male	26.3	26.0	24.9	27.5	25.8
Female	15.6	16.5	15.6	18.6	14.4
White	23.3	23.9	22.6	26.0	21.4
Black	1.2	1.1	0.9	0.7	0.6

Year of Diagnosis

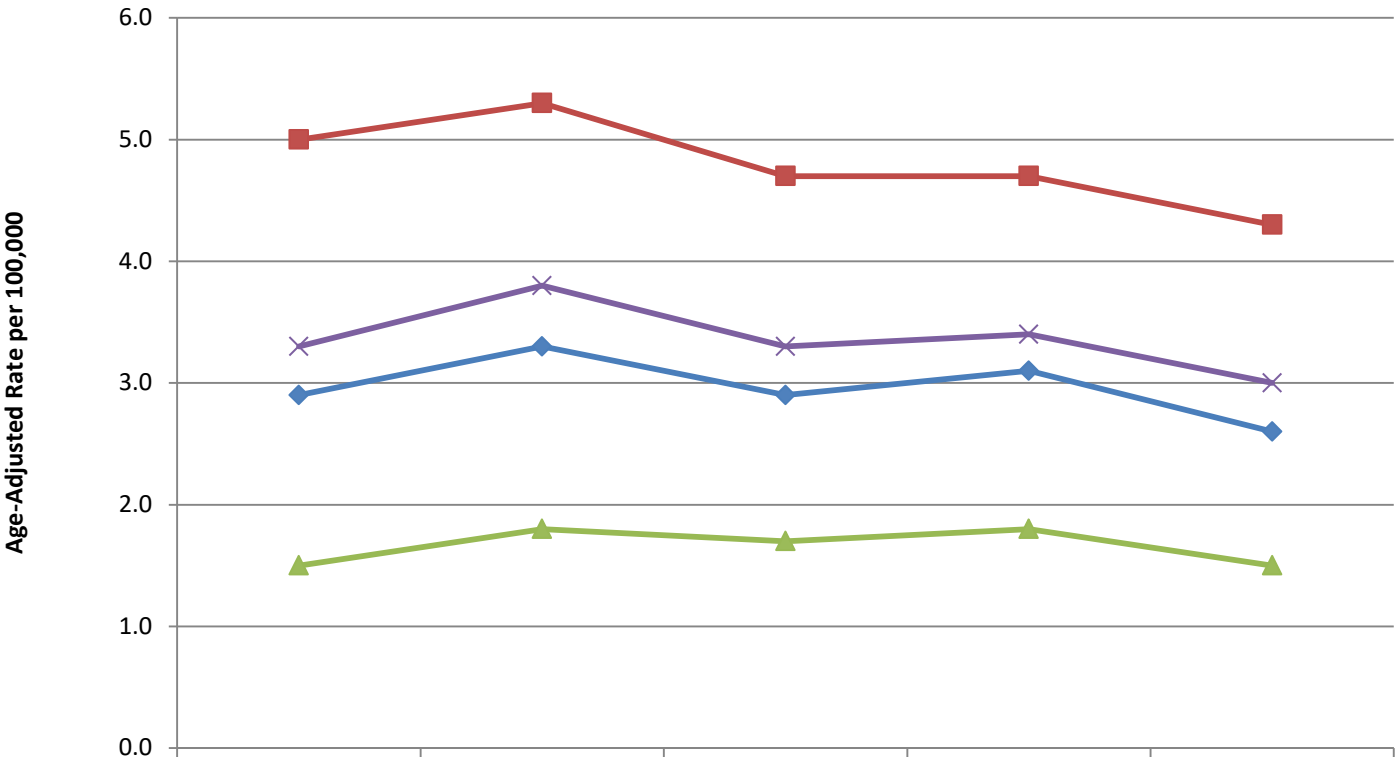
From 2012-2016 in TN, the melanoma of the skin incidence rate (Figure 50):

- *Remained stable* for all races and sexes combined.
- *Decreased* among both men and women by 0.1% per year.
- *Decreased* among blacks by 12.8%* per year and by 0.8% per year in whites.

*statistically significant

Data Source

Figure 51. Cancer Mortality, Melanoma of the Skin, By Gender and Race, Tennessee, 2012-2016



	2012	2013	2014	2015	2016
All Races	2.9	3.3	2.9	3.1	2.6
Male	5.0	5.3	4.7	4.7	4.3
Female	1.5	1.8	1.7	1.8	1.5
White	3.3	3.8	3.3	3.4	3.0

Year of Death

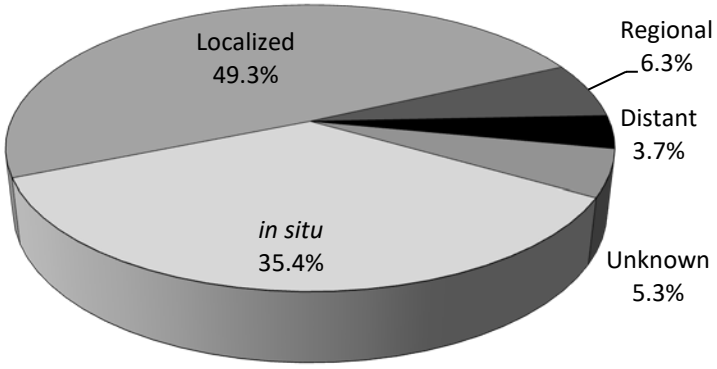
During the period 2012 to 2016 in TN, the melanoma skin cancer mortality rate (Figure 51):

- *Remained stable* for all races and sexes combined.
- *Increased* among men on average by 0.7%* per year and *decreased* among women by 1.2%* per year.
- *Increased* by 0.1% per year among white Tennesseans.
- The trend in the melanoma of the skin mortality rate among black Tennesseans was unstable due to the small number of deaths; therefore, no trends were calculated.

*statistically significant

Data Source

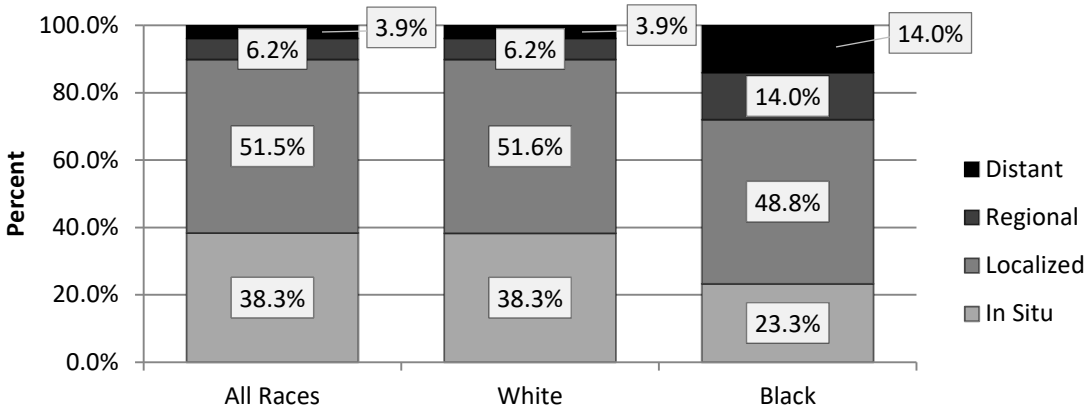
Figure 52. Cancer Stage, Melanoma of the Skin, Tennessee, 2012-2016



In TN from 2012-2016 (Figure 52):

- About a third (35.4%) of new melanoma of skin cancer cases were diagnosed at the *in situ* stage.
- Roughly one half of cases (49.3%) were diagnosed at the localized stage, 6.3% at the regional stage and 3.7% at the distant stage.
- 5.3% of cases had unknown stage information

Figure 53. Cancer Stage, Melanoma of the Skin, By Race, Tennessee, 2012-2016



Cases with unknown stage were excluded. Numbers may not sum to 100% due to rounding errors.

From 2012 to 2016 (Figure 53):

- Among those with known stage, one in ten (10.1%) were diagnosed at the regional or distant stage (i.e., late stages), which may partially explain why melanoma was not as deadly compared to other common cancers.
- Black Tennesseans had a statistically significantly higher proportion of cases (28.0%) diagnosed at late stages than white Tennesseans (10.1%). However, this comparison may be statistically unstable since less than fifty black Tennesseans were diagnosed with melanoma during 2012 to 2016.

Data Source

PANCREATIC CANCER

Incidence

- TN had the thirty-first highest pancreatic cancer incidence rate (tied with Florida and Missouri) in the US from 2012 to 2016. A mere 14.8% of cases with known stage are diagnosed in the early stages when treatment is more effective.
- From 2012 to 2016 in TN, pancreatic cancer accounted for 2.7% (4,830 cases) of all new cancer cases, was the twelfth leading cause of cancer incidence. Tennesseans had a 1.3% lifetime risk of developing pancreatic cancer during 2014-2016.
- Pancreatic cancer occurs with increased frequency among persons with long-standing (i.e., over 5 years) diabetes (Everhart, 1995). According to the 2016 US Diabetes Surveillance System, roughly one out of every nine (age-adjusted prevalence, 11.2%) Tennesseans had diabetes, which ranked TN as the state with the eighth largest proportion of individuals with diabetes compared to other US states (CDC, 2018). The relationship between high blood sugar levels/diabetes and pancreatic cancer is complex. While some patients with long-standing diabetes may be at elevated risk for the development of pancreatic cancer, many individuals may develop diabetes during the pre-clinical stages of pancreatic cancer before it is diagnosed in the clinical setting.

Mortality

- TN had the twentieth highest pancreatic cancer mortality rate (tied with Alaska, Iowa, Missouri, New Jersey, New York, and Vermont) in the US from 2012-2016.
- From 2012 to 2016, pancreatic cancer was responsible for 4,317 deaths or 6.1% of all cancer deaths in TN making it the fourth leading cause of cancer-related deaths. Tennesseans had a 1.2% lifetime risk of dying from pancreatic cancer. Pancreatic cancer was the deadliest form of cancer in TN with a mortality-to-incidence ratio of 0.90.
- From 2012 to 2016, pancreatic cancer incidence and mortality rates increased 1.2% and 0.1%, respectively, but these changes were not statistically significant. Tennesseans, who died of pancreatic cancer, died on average 7.5 years earlier than expected.

Survival

- Based on 2010-2016 data in TN, over three quarters (82.6%) of pancreatic cancer patients diagnosed at the in situ stage survived 5 years or more after their initial diagnosis, while only about a third (34.4%) of patients diagnosed in the localized stage survived 5 years or more after their initial diagnosis. Overall, only 10.4% of Tennesseans survived 5 years or more after their initial diagnosis.

Health Disparities

- Black Tennesseans display statistically significantly higher pancreatic cancer incidence and mortality rates when compared to white Tennesseans
- Men display statistically significantly higher rates than women.

Screening

- The US Preventive Services Task Force recommends against routine screening for pancreatic cancer using abdominal palpation, ultrasonography, or serologic markers as the harms of screening exceed any potential benefits.

Data Source

TABLE 11. CANCER INCIDENCE AND MORTALITY, PANCREAS, TENNESSEE, 2012-2016

		Incidence				Mortality				M:I
Gender	Race	Count**	Rate***	Lower CI	Upper CI	Count**	Rate***	Lower CI	Upper CI	Ratio ‡
Both*	All Races †	4,830	12.4	12.0	12.7	4,317	11.1	10.8	11.4	0.90
	Black	748	15.9	14.7	17.1	641	13.9	12.8	15.0	0.87
	White	4,025	11.9	11.6	12.3	3,619	10.7	10.4	11.1	0.90
Female	All Races †	2,349	11.0	10.5	11.4	2,097	9.7	9.3	10.1	0.88
	Black	393	14.6	13.1	16.1	331	12.3	11.0	13.8	0.84
	White	1,928	10.5	10.0	11.0	1,736	9.3	8.9	9.8	0.89
Male	All Races †	2,481	14.1	13.5	14.7	2,220	12.7	12.2	13.3	0.90
	Black	355	17.6	15.7	19.8	310	16.0	14.1	18.1	0.91
	White	2,097	13.6	13.0	14.3	1,883	12.4	11.8	13.0	0.91
Age at Diagnosis or Death										
	0-19	^	^	^	^	^	^	^	^	^
	20-44	127	1.3	1.1	1.5	64	0.7	0.5	0.8	0.54
	45-64	1,633	16.8	16.0	17.7	1,317	13.3	12.6	14.1	0.79
	65+	3,066	64.5	62.2	66.9	2,934	62.3	60.1	64.7	0.97
Year of Diagnosis or Death										
	2012	878	11.8	11.0	12.6	786	10.6	9.8	11.3	0.90
	2013	945	12.5	11.7	13.3	853	11.3	10.6	12.2	0.90
	2014	978	12.4	11.6	13.2	917	11.7	11.0	12.5	0.94
	2015	996	12.5	11.7	13.3	874	10.9	10.2	11.7	0.87
	2016	1,033	12.6	11.8	13.4	887	10.9	10.2	11.7	0.87

^Statistic not displayed due to fewer than 11 cases. Adjacent counts are offset so suppressed counts cannot be derived.

*Excludes hermaphrodites and transsexuals.

**Total counts are from 2012 to 2016.

***Rates are age-adjusted to the 2000 US standard population (19 age groups: <1, 1-4, 5-,…, 80-84, 85+).

Rates are cases per 100,000 population.

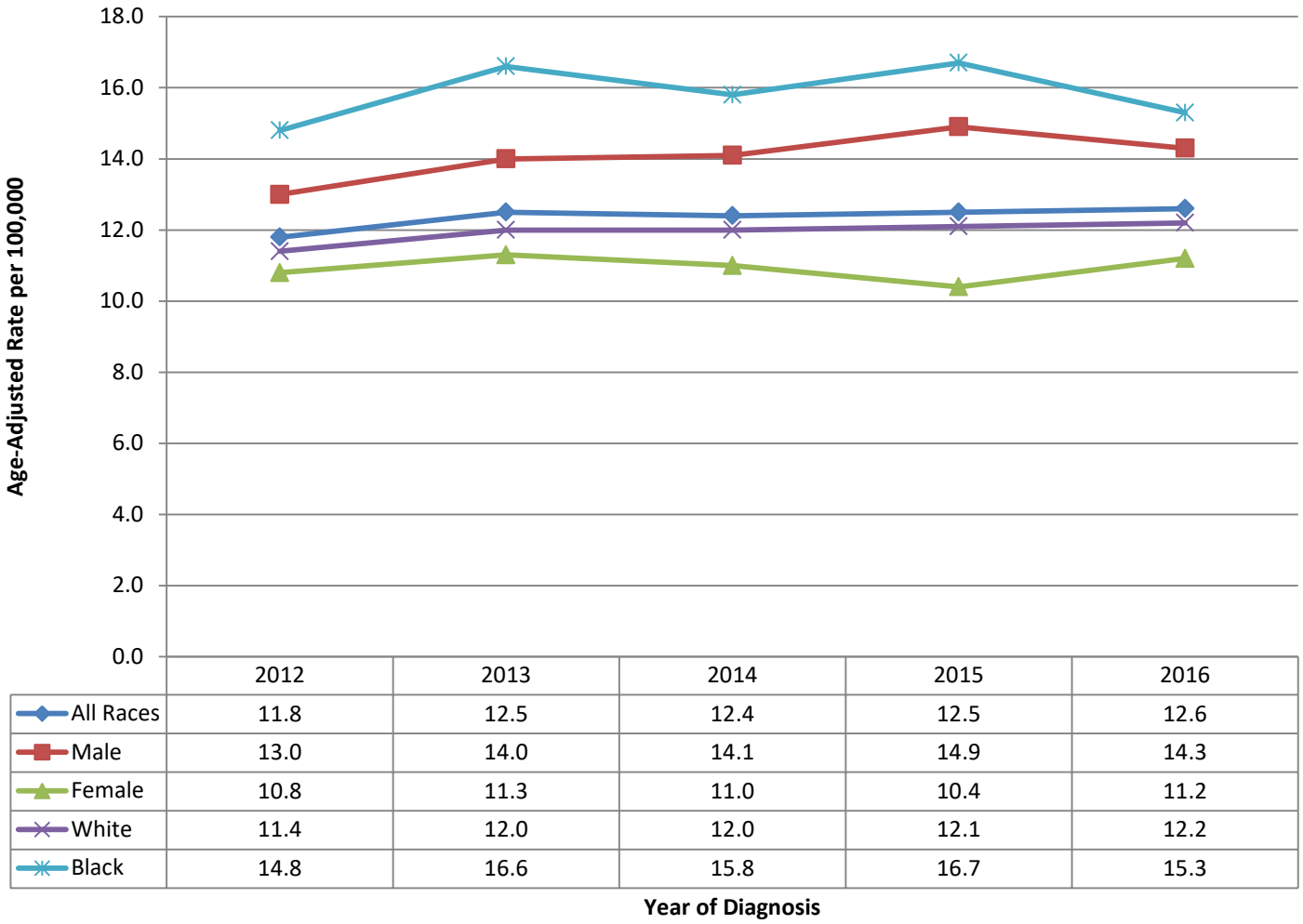
Rates are for invasive cancer only.

†Includes blacks, whites, other races, and those missing race information.

‡Mortality incidence ratio. See Technical Notes for details.

Data Source

Figure 54. Cancer Incidence, Pancreas, By Gender and Race, Tennessee, 2012-2016



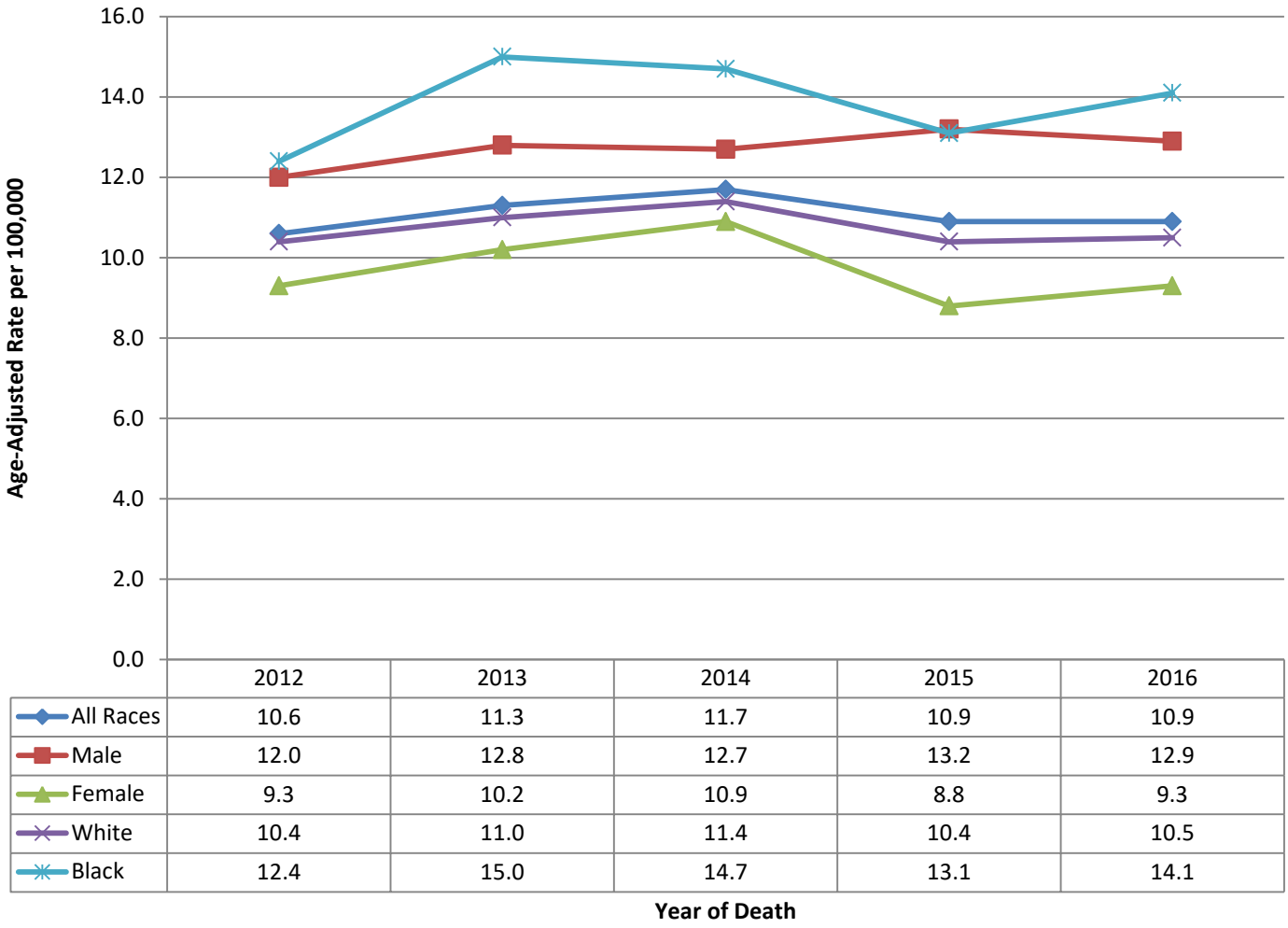
	2012	2013	2014	2015	2016
All Races	11.8	12.5	12.4	12.5	12.6
Male	13.0	14.0	14.1	14.9	14.3
Female	10.8	11.3	11.0	10.4	11.2
White	11.4	12.0	12.0	12.1	12.2
Black	14.8	16.6	15.8	16.7	15.3

From 2012 to 2016 in TN, the pancreatic cancer incidence rate (Figure 54):

- *Increased* by 1.2% per year in all races.
- *Increased* among men by 2.5% per year and *decreased* among women by 0.2% per year.
- *Increased* among black Tennesseans by 0.5% per year and *increased* among whites by 1.2% per year.

Data Source

Figure 55. Cancer Mortality, Pancreas, By Gender and Race, Tennessee, 2012-2016



	2012	2013	2014	2015	2016
All Races	10.6	11.3	11.7	10.9	10.9
Male	12.0	12.8	12.7	13.2	12.9
Female	9.3	10.2	10.9	8.8	9.3
White	10.4	11.0	11.4	10.4	10.5
Black	12.4	15.0	14.7	13.1	14.1

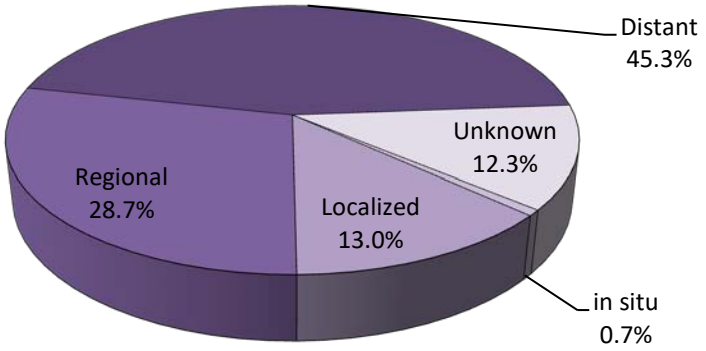
From 2012-2016 the pancreatic cancer mortality rate in TN (Figure 55):

- *Increased* by 0.1% per year for all races.
- *Decreased* by 0.1% per year in men and *increased* in women by 0.2% per year.
- *Decreased* in blacks by 0.7%* per year and *increased* in whites by 0.24% per year.

*statistically significant

Data Source

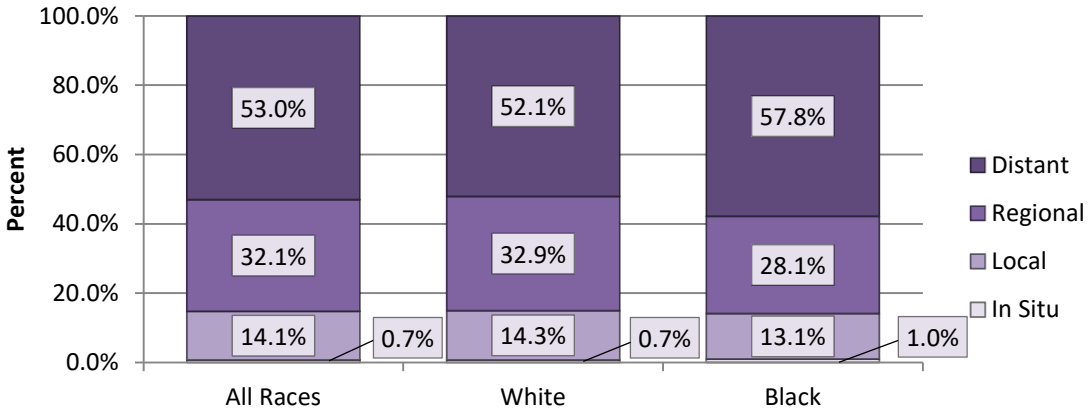
Figure 56. Cancer Stage, Pancreas, Tennessee, 2012-2016



In TN from 2012-2016 (Figure 56):

- Less than 50 cases of pancreatic cancer (0.7%) were diagnosed at the in situ stage.
- 13.0% of cases were diagnosed at the localized stage, 28.7% at the regional stage and 45.3% at the distant stage.
- 12.3% of cases had unknown stage information.

Figure 57. Cancer Stage, Pancreas, By Race, Tennessee, 2012-2016



Cases with unknown stage were excluded. Numbers may not sum to 100% due to rounding errors.

- Among cases with known stage, 85.1% of Tennesseans were diagnosed at late stages (i.e., regional or distant stage).
- There was no significant difference in percentage of cases diagnosed at late stages between blacks (85.9%) and whites (85.02%).

Data Source

CHILDHOOD CANCER

The distribution of cancers developing in children is often quite different compared to the distribution of cancers in adults. Childhood cancers are the result of DNA changes in cells that take place very early in life, including before birth. Unlike many cancers in adults, childhood cancers are not strongly linked to lifestyle or environmental risk factors (American Cancer Society, 2017). The early diagnosis of childhood cancer has often been hampered by nonspecific symptoms that are similar to those of more common childhood diseases.

Incidence

- Among children less than 20 years of age, TN had the twenty-ninth highest childhood cancer incidence rate in the US, 50 states and D.C., from 2012 to 2016.
- There were 1,527 new invasive cancer cases in children less than 20 years of age in TN during 2012-2016 and the age-adjusted incidence rate for childhood cancers was 183.6 per 1,000,000 children.
- The leading causes of cancer incidence among children less than twenty years of age in TN were leukemias and myeloproliferative & myelodysplastic diseases, central nervous system tumors, lymphomas & reticuloendothelial cancers, other epithelial cancers & melanomas, and soft tissue sarcomas. These five causes of cancer incidence represented 74.4% of all childhood cancer cases from 2012 to 2016.

Mortality

- TN had the eighth highest childhood cancer mortality rate (tied with California, Hawaii, and Iowa) in the US from 2012 to 2016.
- There were 205 deaths due to cancer in children less than 20 years of age in TN and the mortality rate was 24.7 per 1,000,000 children.
- Only 44.1% of all new cases with known stage information are diagnosed at early stages of cancer.

Survival

- Based on 2010-2016 data, approximately 85.7% of children in TN diagnosed with cancer survived 5 years or more. This means that about 86 out of 100 children in TN are alive 5 years after being diagnosed with cancer.

Health Disparities

- The cancer incidence rate among white children was statistically significantly higher than the rate among black children. Of the 1,527 new invasive cancer cases in children less than twenty years of age in TN from 2012 to 2016, black children accounted for roughly one out of every five (17.6%) childhood cancer cases, while white children accounted for almost four out of every five childhood cancer cases (78.2%).

Screening

- No effective screening methods for childhood-related cancers have been discovered.

Data Source

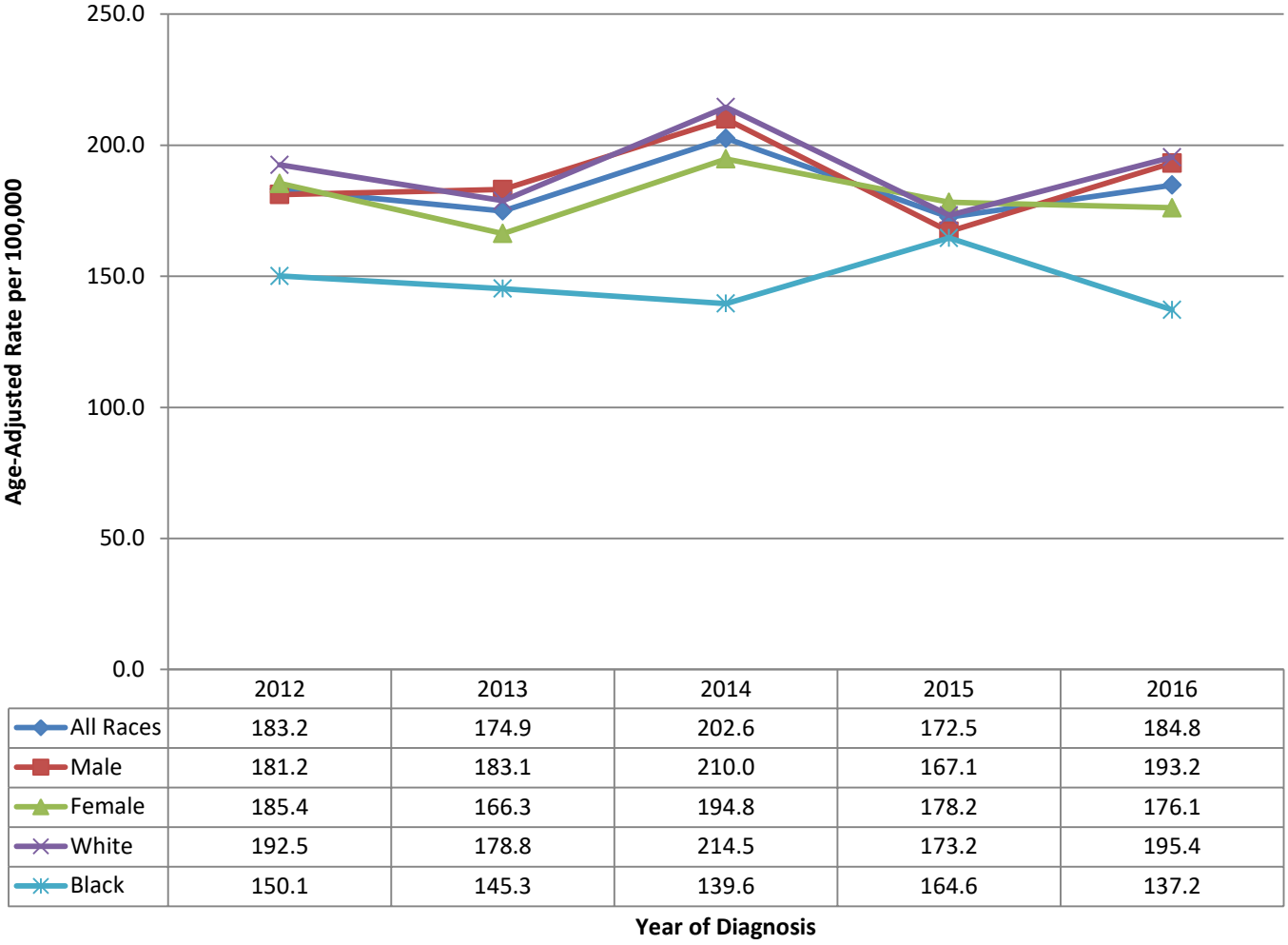
TABLE 12. CANCER INCIDENCE AND MORTALITY, CHILDREN BELOW 20 YEARS OF AGE, TENNESSEE, 2012-2016

		Incidence				Mortality				M:I
Gender	**Race**	**Count****	**Rate*****	**Lower CI**	**Upper CI**	**Count****	**Rate*****	**Lower CI**	**Upper CI**	**Ratio ‡**
Both*	All Races †	1,527	183.6	174.5	193.1	205	24.7	21.4	28.3	0.13
	Black	269	147.2	130.2	166.0	39	21.6	15.4	29.6	0.15
	White	1,194	190.8	180.1	201.9	158	25.2	21.4	29.5	0.13
Female	All Races †	733	180.2	167.4	193.7	97	23.9	19.4	29.1	0.13
	Black	130	144.2	120.4	171.2	22	24.7	15.5	37.4	0.17
	White	575	188.5	173.4	204.5	73	23.9	18.7	30.1	0.13
Male	All Races †	794	186.9	174.1	200.4	108	25.4	20.9	30.7	0.14
	Black	139	150.2	126.2	177.3	17	18.6	10.8	29.7	0.12
	White	619	193.0	178.1	208.8	85	26.5	21.2	32.7	0.14
Year of Diagnosis or Death										
2012		305	183.2	163.2	205.0	44	26.4	19.2	35.4	0.14
2013		290	174.9	155.3	196.2	41	24.7	17.7	33.5	0.14
2014		336	202.6	181.5	225.5	41	24.7	17.7	33.5	0.12
2015		287	172.5	153.1	193.7	40	24.1	17.2	32.8	0.14
2016		309	184.8	164.8	206.6	39	23.4	16.6	32.0	0.13

*Excludes hermaphrodites and transsexuals.
**Total counts are from 2012 to 2016.
***Rates are age-adjusted to the 2000 US standard population (19 age groups: <1, 1-4, 5-9, …, 80-84, 85+).
Rates are cases per 1,000,000 population.
Rates are for invasive cancer only (except for bladder cancer which is invasive or in situ) or unless otherwise specified.
†Includes blacks, whites, other races, and those missing race information.
‡Mortality incidence ratio. See Technical Notes for details.

Data Source

Figure 58. Childhood Cancer Incidence, By Gender and Race, Tennessee, 2012-2016



	2012	2013	2014	2015	2016
All Races	183.2	174.9	202.6	172.5	184.8
Male	181.2	183.1	210.0	167.1	193.2
Female	185.4	166.3	194.8	178.2	176.1
White	192.5	178.8	214.5	173.2	195.4
Black	150.1	145.3	139.6	164.6	137.2

Year of Diagnosis

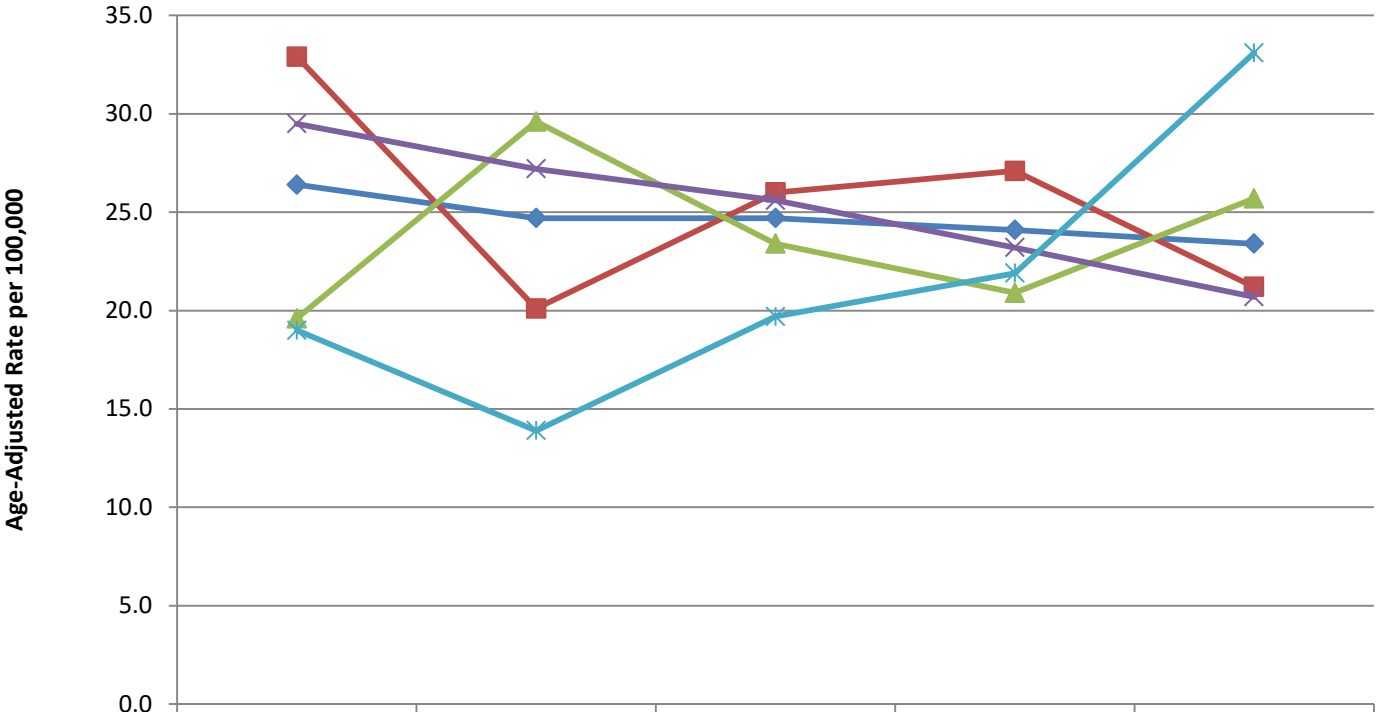
The cancer incidence rate among children less than 20 years of age from 2012-2016 (Figure 58):

- *Increased* by 0.2% per year in all races.
- *Increased* by 1.1% per year among boys and *decreased* 0.9% per year among girls.
- *Increased* by 2.0% per year in black children and *decreased* by 0.4% per year in white children.

Results not statistically significant

Data Source

Figure 59. Childhood Cancer Mortality, By Gender and Race, Tennessee, 2012-2016



	2012	2013	2014	2015	2016
All Races	26.4	24.7	24.7	24.1	23.4
Male	32.9	20.1	26.0	27.1	21.2
Female	19.6	29.6	23.4	20.9	25.7
White	29.5	27.2	25.6	23.2	20.7
Black	19.0	13.9	19.7	21.9	33.1

Year of Death

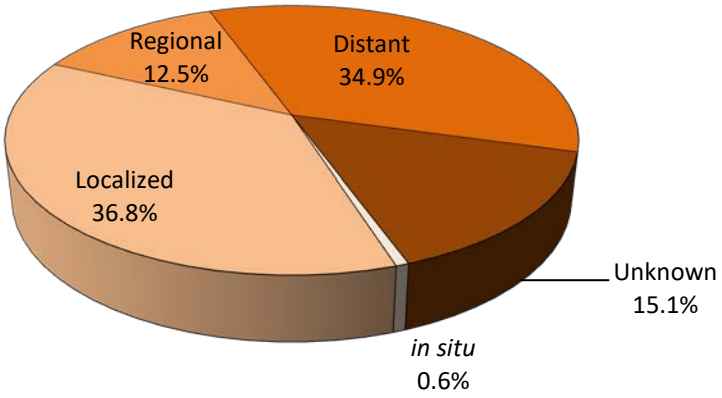
From 2012-2016 TN, the cancer mortality rate among children less than 20 years of age (Figure 59):

- *Decreased* by 1.2%* per year in all races.
- *Decreased* by 1.8%* per year among boys and *decreased* by 0.4% per year among girls.
- The annual percent changes could not be computed for black children, due to the small number of black children affected.
- *Decreased* by 1.3% per year among white children.

*Statistically significant

Data Source

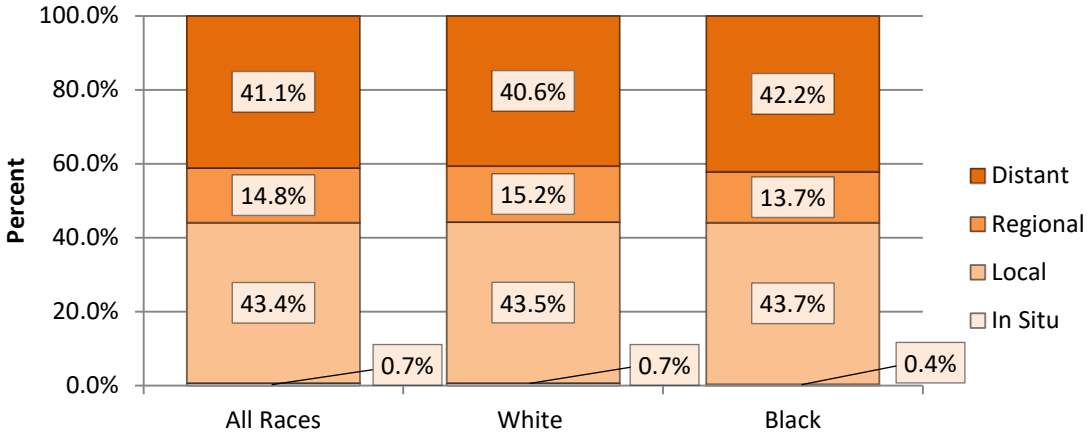
Figure 60. Cancer Stage, All Sites Combined, Children 0-19 Years of Age, Tennessee, 2012-2016



In TN from 2012-016 (Figure 60):

- Less than 50 (0.6%) of all childhood cancer cases were diagnosed at the *in situ* stage.
- 36.8% of cases were diagnosed at the localized stage, 12.5% of cases at the regional stage, and 34.9% at the distant stage.
- 15.1% of cases had unknown stage information.

Figure 61. Cancer Stage, All Sites Combined, Children 0-19 Years of Age, Tennessee, 2012-2016



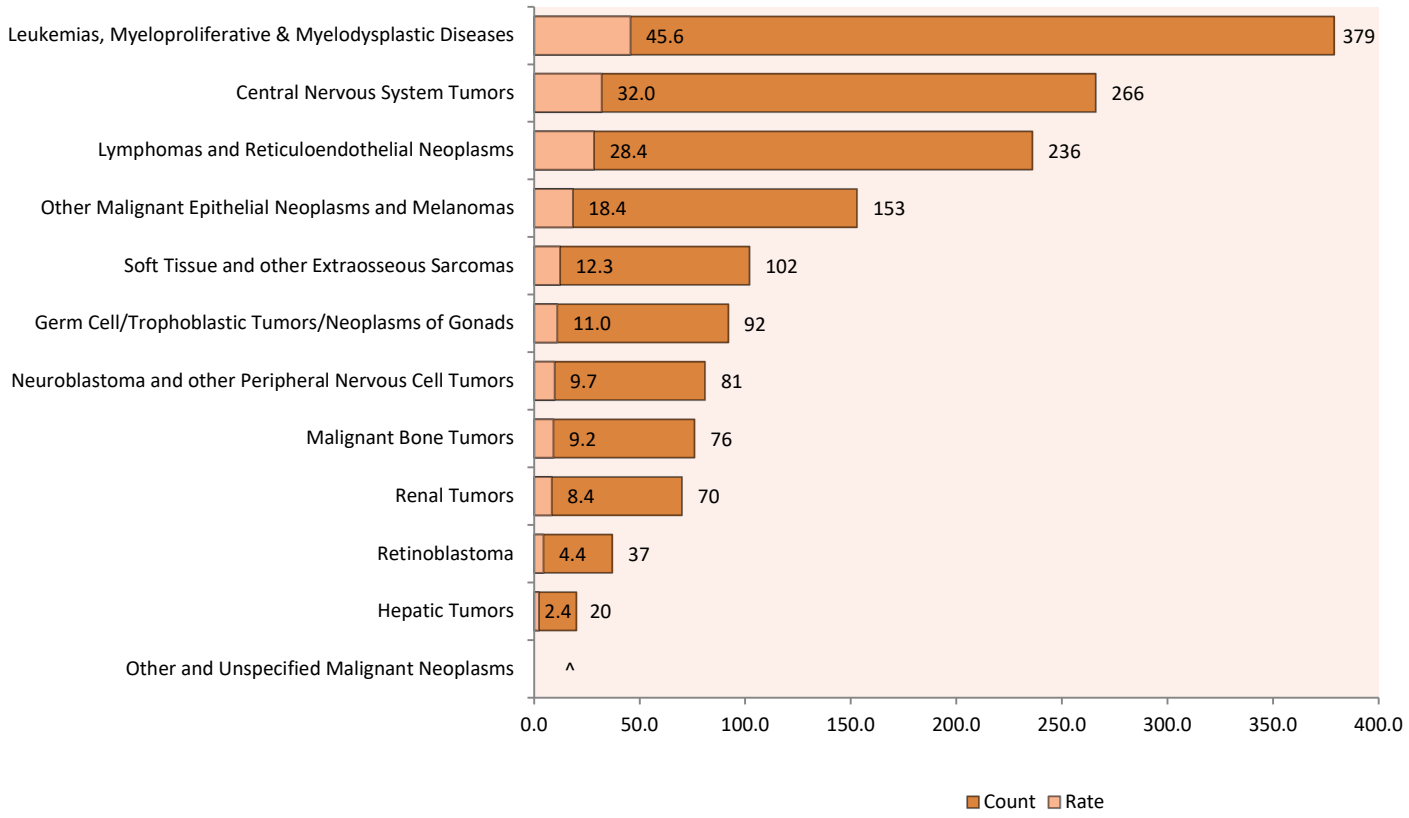
Cases with unknown stage were excluded. Numbers may not sum to 100% due to rounding errors.

From 2012 to 2016 (Figure 61):

- There was no statistically significant difference in the percentage of cases diagnosed at late stages (i.e., regional or distant stage) between black and white children.
- Overall, 55.9% of children diagnosed with cancer in TN were diagnosed at late stages.

Data Source

Figure 62. Leading Causes of Cancer Incidence, Children 0-19 Years of Age, Tennessee, 2012-2019



Note: Rates are per 1,000,000. Excludes 6 cases not classified by the International Classification of Childhood Cancers (ICCC) or in situ.
^Statistic not displayed due to fewer than 11 cases.

In TN from 2012 to 2016 (Figure 62):

- Leukemia was the leading cause of cancer incidence among children less than 20 years of age, representing approximately a quarter (24.8%) of the childhood cancer cases.
- The second leading cause of childhood cancer incidence was cancer of the central nervous system, followed by lymphomas, other malignant epithelial neoplasms and melanomas, and soft tissue sarcomas.
- The five leading causes of cancer, described above, accounted for 74.4% of all new childhood cancer diagnoses between 2012 and 2016.

Data Source

APPENDICES

APPENDICES

APPENDIX I. CANCER INCIDENCE AND MORTALITY, BY SITE

TABLE 13. BY CANCER SITE, TENNESSEE, 2012-2016

	Incidence				Mortality				M:I
Primary Cancer Site	Count*	Rate**	Lower CI	Upper CI	Count*	Rate**	Lower CI	Upper CI	Ratio †
All Sites	179,227	464.6	462.4	466.8	70,361	183.5	182.1	184.8	0.39
Oral Cavity and Pharynx	5,092	12.9	12.6	13.3	1,166	3.0	2.8	3.2	0.23
Lip	204	0.6	0.5	0.6	^	^	^	^	^
Tongue	1,613	4.0	3.8	4.2	278	0.7	0.6	0.8	0.18
Salivary Gland	478	1.3	1.2	1.4	103	0.3	0.2	0.3	0.23
Floor of Mouth	220	0.5	0.5	0.6	11	0.0	0.0	0.1	0.00
Gum and Other Mouth	733	1.9	1.8	2.1	176	0.5	0.4	0.5	0.26
Nasopharynx	200	0.5	0.5	0.6	79	0.2	0.2	0.3	0.40
Tonsil	1037	2.6	2.4	2.7	120	0.3	0.2	0.4	0.12
Oropharynx	251	0.6	0.5	0.7	118	0.3	0.2	0.4	0.50
Hypopharynx	252	0.6	0.5	0.7	50	0.1	0.1	0.2	0.17
Other Oral Cavity and Pharynx	104	0.3	0.2	0.3	221	0.6	0.5	0.6	2.00
Digestive System	31,080	80.3	79.4	81.2	16,536	42.7	42.1	43.4	0.53
Esophagus	1,853	4.7	4.4	4.9	1,624	4.1	3.9	4.3	0.87
Stomach	2,263	5.9	5.7	6.2	1,095	2.9	2.7	3.1	0.49
Small Intestine	1002	2.6	2.4	2.8	147	0.4	0.3	0.5	0.15
Colon and Rectum	15,493	40.6	40.0	41.3	5,941	15.7	15.3	16.1	0.39
Colon excluding Rectum	11,163	29.3	28.8	29.9	4,845	12.9	12.5	13.2	0.44
Cecum	2,511	6.6	6.3	6.8	^	^	^	^	^
Appendix	431	1.2	1.1	1.3	^	^	^	^	^
Ascending Colon	2,131	5.6	5.4	5.8	^	^	^	^	^
Hepatic Flexure	542	1.4	1.3	1.5	^	^	^	^	^
Transverse Colon	1,040	2.7	2.6	2.9	^	^	^	^	^
Splenic Flexure	311	0.8	0.7	0.9	^	^	^	^	^
Descending Colon	700	1.8	1.7	2.0	^	^	^	^	^
Sigmoid Colon	2,682	7.0	6.7	7.3	^	^	^	^	^
Large Intestine, NOS	815	2.1	2.0	2.3	^	^	^	^	^
Rectum and Rectosigmoid Junction	4,330	11.3	10.9	11.6	1,096	2.9	2.7	3.0	0.26
Rectosigmoid Junction	999	2.6	2.4	2.8	^	^	^	^	^
Rectum	3,331	8.7	8.4	9.0	^	^	^	^	^
Anus, Anal Canal and Anorectum	840	2.2	2.0	2.3	112	0.3	0.2	0.4	0.14
Liver and Intrahepatic Bile Duct	3,300	8.1	7.8	8.3	2,728	6.8	6.5	7.0	0.84
Liver	2,910	7.1	6.8	7.3	2,161	5.3	5.1	5.6	0.75
Intrahepatic Bile Duct	390	1.0	0.9	1.1	567	1.5	1.3	1.6	1.50
Gallbladder	319	0.8	0.7	0.9	149	0.4	0.3	0.4	0.50
Other Biliary	608	1.6	1.5	1.7	172	0.5	0.4	0.5	0.31
Pancreas	4,830	12.4	12.0	12.7	4,317	11.1	10.8	11.4	0.90
Retroperitoneum	133	0.4	0.3	0.4	17	0.1	0.0	0.1	0.25
Peritoneum, Omentum and Mesentery	223	0.6	0.5	0.7	80	0.2	0.2	0.3	0.33
Other Digestive Organs	216	0.6	0.5	0.6	154	0.4	0.3	0.5	0.67
Respiratory System	31,874	80.7	79.8	81.6	22,360	57.3	56.5	58.0	0.71
Nose, Nasal Cavity and Middle Ear	267	0.7	0.6	0.8	60	0.2	0.1	0.2	0.29
Larynx	1,747	4.3	4.1	4.5	531	1.3	1.2	1.4	0.30
Lung and Bronchus	29,788	75.4	74.6	76.3	21,740	55.7	55.0	56.5	0.74
Pleura	^	^	^	^	^	^	^	^	^
Trachea, Mediastinum and Other Respiratory Organs	65	0.2	0.1	0.2	24	0.1	0.0	0.1	0.50
Bones and Joints	305	0.9	0.8	1.0	140	0.4	0.3	0.5	0.44
Soft Tissue including Heart	1,185	3.3	3.1	3.5	489	1.3	1.2	1.4	0.39
Skin excluding Basal and Squamous	8,101	21.8	21.3	22.2	^	^	^	^	^
Melanoma of the Skin	7,577	20.3	19.8	20.8	1,122	3.0	2.8	3.2	0.15
Other Non-Epithelial Skin	524	1.4	1.3	1.6	^	^	^	^	^

APPENDIX I. CANCER INCIDENCE AND MORTALITY, BY SITE, TENNESSEE, CONTINUED

Breast	25,291	66.6	65.7	67.4	4,688	12.4	12.0	12.7	0.19
Female Genital System	9,742	25.8	25.2	26.3	3,266	8.6	8.3	8.9	0.33
Cervix Uteri	1,504	4.4	4.2	4.7	532	1.5	1.3	1.6	0.34
Corpus and Uterus, NOS	5,059	12.8	12.4	13.2	921	2.4	2.2	2.5	0.19
Corpus Uteri	4,861	12.3	11.9	12.6	340	0.9	0.8	1.0	0.07
Uterus, NOS	198	0.5	0.5	0.6	581	1.5	1.4	1.6	3.00
Ovary	2,199	5.9	5.6	6.2	1,570	4.2	3.9	4.4	0.71
Vagina	149	0.4	0.3	0.5	52	0.1	0.1	0.2	0.25
Vulva	629	1.7	1.6	1.8	126	0.3	0.3	0.4	0.18
Other Female Genital Organs	202	0.5	0.5	0.6	62	0.2	0.1	0.2	0.40
Male Genital System	22,125	53.6	52.9	54.3	3,006	8.1	7.9	8.4	0.15
Prostate	21,109	50.5	49.8	51.2	2,916	7.9	7.6	8.2	0.16
Testis	810	2.6	2.4	2.8	45	0.1	0.1	0.2	0.04
Penis	179	0.5	0.4	0.5	40	0.1	0.1	0.1	0.20
Other Male Genital Organs	27	0.1	0.0	0.1	^	^	^	^	^
Urinary System	15,047	39.0	38.4	39.7	3,332	8.8	8.5	9.1	0.23
Urinary Bladder	7,630	19.8	19.4	20.3	1,621	4.3	4.1	4.6	0.22
Kidney and Renal Pelvis	7,048	18.2	17.8	18.7	1,621	4.2	4.0	4.4	0.23
Ureter	242	0.6	0.6	0.7	47	0.1	0.1	0.2	0.17
Other Urinary Organs	127	0.3	0.3	0.4	43	0.1	0.1	0.2	0.33
Eye and Orbit	368	1.0	0.9	1.1	44	0.1	0.1	0.2	0.10
Brain and Other Nervous System	2,310	6.4	6.1	6.7	1,776	4.7	4.5	5.0	0.73
Brain	2,187	6.0	5.8	6.3	^	^	^	^	^
Cranial Nerves Other Nervous System	123	0.4	0.3	0.4	^	^	^	^	^
Endocrine System	4,687	13.6	13.2	14.0	238	0.6	0.6	0.7	0.04
Thyroid	4,457	12.9	12.5	13.3	151	0.4	0.3	0.5	0.03
Other Endocrine including Thymus	230	0.6	0.6	0.7	87	0.2	0.2	0.3	0.33
Lymphoma	7,587	20.3	19.9	20.8	2,450	6.6	6.4	6.9	0.33
Hodgkin Lymphoma	869	2.6	2.4	2.8	132	0.4	0.3	0.4	0.15
Hodgkin - Nodal	859	2.6	2.4	2.8	^	^	^	^	^
Hodgkin - Extranodal	^	^	^	^	^	^	^	^	^
Non-Hodgkin Lymphoma	6,718	17.7	17.3	18.1	2,318	6.3	6.0	6.5	0.36
NHL - Nodal	4,729	12.4	12.1	12.8	^	^	^	^	^
NHL - Extranodal	1,989	5.3	5.0	5.5	^	^	^	^	^
Myeloma	2,551	6.6	6.3	6.8	1,429	3.8	3.6	4.0	0.58
Leukemia	5,063	13.8	13.4	14.2	2,578	7.0	6.7	7.3	0.51
Lymphocytic Leukemia	2,403	6.5	6.2	6.8	680	1.9	1.7	2.0	0.29
Acute Lymphocytic Leukemia	475	1.5	1.4	1.6	132	0.4	0.3	0.5	0.27
Chronic Lymphocytic Leukemia	1,796	4.6	4.4	4.9	502	1.4	1.3	1.5	0.30
Other Lymphocytic Leukemia	132	0.4	0.3	0.4	46	0.1	0.1	0.2	0.25
Myeloid and Monocytic Leukemia	2,392	6.6	6.3	6.9	1,350	3.6	3.4	3.8	0.55
Acute Myeloid Leukemia	1,532	4.2	4.0	4.4	1,106	2.9	2.8	3.1	0.69
Acute Monocytic Leukemia	68	0.2	0.1	0.2	^	^	^	^	^
Chronic Myeloid Leukemia	703	2.0	1.8	2.1	145	0.4	0.3	0.5	0.20
Other Myeloid/Monocytic Leukemia	89	0.2	0.2	0.3	94	0.3	0.2	0.3	1.50
Other Leukemia	268	0.7	0.6	0.8	548	1.5	1.4	1.6	2.14
Other Acute Leukemia	89	0.2	0.2	0.3	184	0.5	0.4	0.6	2.50
Aleukemic, Subleukemic and NOS	179	0.5	0.4	0.6	364	1.0	0.9	1.1	2.00
Mesothelioma	274	0.7	0.6	0.8	229	0.6	0.5	0.7	0.86
Kaposi Sarcoma	67	0.2	0.2	0.3	^	^	^	^	^
Miscellaneous	6,478	17.2	16.8	17.6	5,001	13.1	12.7	13.4	0.76

^Statistic not displayed due to fewer than 11 cases.

*Total counts exclude hermaphrodites and transexuals.

**Rates are per 100,000 population and age-adjusted to the 2000 Std Population (19 ages groups: <1, 1-4,5-9, …,80-84, 85+)

Confidence intervals (Tiwari mod) are 95% for rates.

Rates are for invasive cancer (except for bladder cancer which is invasive and in situ) or unless otherwise specified.

†Mortality incidence ratio. See Technical Notes for details.

Data Source

APPENDIX II. CANCER INCIDENCE AND MORTALITY, ALL SITES COMBINED, BY GENDER, RACE AND RESIDENT REGION

TABLE 14. ALL SITES COMBINED, BY GENDER, RACE, AND RESIDENT REGION, TENNESSEE, 2012-2016

	Incidence				Mortality				M:I
	Count*	Rate**	Lower CI	Upper CI	Count*	Rate**	Lower CI	Upper CI	Ratio †
Total Population									
Tennessee	179,227	464.6	462.4	466.8	70,360	183.4	182.1	184.8	0.39
East Region	36,862	477.9	472.9	483.0	14,316	183.5	180.5	186.6	0.38
Mid-Cumberland Region	42,839	458.0	453.5	462.4	15,381	173.2	170.4	176	0.38
Northeast Region	16,199	464.1	456.7	471.6	6,650	184.2	179.7	188.8	0.40
Northwest Region	7,898	473.5	462.8	484.4	3,462	201.4	194.6	208.4	0.43
South Central Region	11,329	464.1	455.4	473.0	4,647	189.2	183.7	194.8	0.41
Southeast Region	20,062	465.7	459.1	472.4	7,897	180.4	176.4	184.5	0.39
Southwest Region	33,016	459.8	454.7	464.9	13,331	190.1	186.8	193.4	0.41
Upper-Cumberland Region	10,928	462.6	453.6	471.7	4,676	193.8	188.2	199.6	0.42
Male									
Tennessee	92,650	522.3	518.8	525.8	38,189	227.8	225.4	230.2	0.44
East Region	19,124	530.1	522.4	537.9	7,851	226.8	221.6	232	0.43
Mid-Cumberland Region	21,709	512.9	505.7	520.1	8,184	212.6	207.8	217.5	0.41
Northeast Region	8,391	509.3	498.1	520.7	3,618	223.8	216.3	231.4	0.44
Northwest Region	4,179	540.6	523.9	557.8	1,906	254.9	243.3	266.9	0.47
South Central Region	5,960	523.8	510.2	537.7	2,586	237.5	228.1	247.1	0.45
Southeast Region	10,469	522.8	512.6	533.3	4,322	225.9	219	233	0.43
Southwest Region	16,911	529.9	521.6	538.3	7,067	238.1	232.3	244	0.45
Upper-Cumberland Region	5,848	522.6	508.8	536.6	2,655	244	234.6	253.8	0.47
Female									
Tennessee	86,577	423.8	420.9	426.7	32,171	151.3	149.6	153	0.36
East Region	17,738	440.8	434.1	447.6	6,465	151.2	147.5	155.1	0.34
Mid-Cumberland Region	21,130	420.4	414.7	426.2	7,197	145.1	141.7	148.6	0.35
Northeast Region	7,808	433.1	423.1	443.3	3,032	154.9	149.3	160.7	0.36
Northwest Region	3,719	425.4	411.2	440.0	1,556	162.9	154.6	171.5	0.38
South Central Region	5,369	420.8	409.2	432.6	2,061	153.9	147.1	160.8	0.37
Southeast Region	9,593	424.8	416.0	433.7	3,575	147.2	142.3	152.2	0.35
Southwest Region	16,105	411.4	404.9	417.9	6,264	157.1	153.1	161.1	0.38
Upper-Cumberland Region	5,080	417.3	405.4	429.6	2,021	155	148.1	162.2	0.37
Black									
Tennessee	23,275	461.8	455.6	468.1	9,879	212.7	208.3	217.2	0.46
East Region	1,243	444.8	419.6	471.2	535	204	186.5	222.7	0.46
Mid-Cumberland Region	5,623	453.6	441.0	466.4	2,229	201.3	192.4	210.4	0.44
Northeast Region	215	333.3	288.6	382.9	112	182.4	148.8	221	0.55
Northwest Region	781	482.6	448.3	518.8	352	223.3	200	248.6	0.46
South Central Region	631	415.8	383.1	450.6	282	197	174.1	222.1	0.47
Southeast Region	1,918	453.2	432.3	474.7	770	191.2	177.4	205.7	0.42
Southwest Region	12,692	472.9	464.2	481.6	5,552	224.3	218.1	230.6	0.47
Upper-Cumberland Region	144	503.7	422.7	595.3	47	172.1	125.2	230	0.34
White									
Tennessee	153,334	465.8	463.4	468.2	59,688	179.8	178.3	181.3	0.39
East Region	35,194	479.5	474.4	484.7	13,646	183	179.9	186.2	0.38
Mid-Cumberland Region	36,254	460.6	455.7	465.4	12,875	169.9	166.9	172.9	0.37
Northeast Region	15,860	466.8	459.3	474.4	6,485	184	179.5	188.7	0.39
Northwest Region	7,043	470.8	459.5	482.4	3,085	198.9	191.8	206.2	0.42
South Central Region	10,587	466.4	457.3	475.6	4,321	188.4	182.7	194.2	0.40
Southeast Region	17,883	467.9	460.8	475.0	7,048	179.9	175.6	184.2	0.38
Southwest Region	19,760	452.0	445.6	458.6	7,635	172.5	168.6	176.5	0.38
Upper-Cumberland Region	10,694	462.2	453.2	471.4	4,593	194	188.3	199.8	0.42

^Statistic not displayed due to fewer than 11 cases.
*Total counts exclude hermaphrodites and transexuals.
**Rates are per 100,000 population and age-adjusted to the 2000 US standard population (19 age groups: <1, 1-4, 5-9, ..., 80-84, 85+).
Rates are for invasive cancer (except for bladder cancer which is invasive and in situ) or unless otherwise specified.
Confidence intervals (Tiwari mod) are 95% for rates.
†Mortality incidence ratio. See Technical Notes for details.
Note the case totals for each region may not sum to the state total due to records missing resident county information.

Data Source

APPENDIX III. CANCER INCIDENCE AND MORTALITY, ALL SITES COMBINED, BY RESIDENT COUNTY

TABLE 15. ALL SITES COMBINED, BY RESIDENT COUNTY, TENNESSEE, 2012-2016

	Incidence				Mortality				M:I
State | Region | County	Count*	Rate**	Lower CI	Upper CI	Count*	Rate**	Lower CI	Upper CI	Ratio †
Tennessee	179,227	464.6	462.4	466.8	70,360	183.4	182.1	184.8	0.39
East Region	36,862	477.9	472.9	483.0	14,316	183.5	180.5	186.6	0.38
Anderson County	2,416	467.2	448.1	487.0	938	173.4	162.1	185.2	0.37
Blount County	4,060	482.9	467.7	498.6	1,446	167.7	159.0	176.8	0.35
Campbell County	1,444	513.3	486.4	541.5	635	220.4	203.2	238.8	0.43
Claiborne County	1,133	533.3	501.5	566.8	494	231.6	211.2	253.8	0.43
Cocke County	1,167	476.6	448.4	506.3	551	218.1	199.7	237.8	0.46
Grainger County	797	504.9	469.0	543.0	341	218.5	195.2	244.1	0.43
Hamblen County	1,894	468.9	447.5	491.0	758	183.4	170.4	197.2	0.39
Jefferson County	1,671	473.4	450.2	497.7	616	171.5	157.9	186.0	0.36
Knox County	11,972	466.7	458.2	475.3	4,436	173.4	168.2	178.6	0.37
Loudon County	2,009	499.1	475.8	523.4	767	183.4	170.1	197.7	0.37
Monroe County	1,457	465.6	440.9	491.3	609	195.0	179.3	211.8	0.42
Morgan County	653	474.3	437.7	513.4	256	188.6	165.6	214.0	0.40
Roane County	1,840	459.5	437.7	482.2	780	186.8	173.6	201.0	0.41
Scott County	666	511.1	472.1	552.5	305	232.4	206.5	260.7	0.45
Sevier County	3,078	492.7	474.9	511.1	1,131	184.0	173.1	195.4	0.37
Union County	605	502.8	462.0	546.4	253	215.5	189.0	244.9	0.43
Mid-Cumberland Region	42,839	458.0	453.5	462.4	15,381	173.2	170.4	176.0	0.38
Cheatham County	1,142	509.7	479.2	541.7	478	232.1	210.8	254.9	0.46
Davidson County	14,791	450.8	443.4	458.4	5,666	178.8	174.0	183.6	0.40
Dickson County	1,554	512.5	486.8	539.2	612	206.2	189.9	223.6	0.40
Houston County	279	497.7	438.6	563.2	123	213.4	176.3	256.7	0.43
Humphreys County	636	488.3	449.9	529.5	262	199.6	175.6	226.3	0.41
Montgomery County	3,374	453.9	438.2	470.0	1,275	188.9	178.3	199.8	0.42
Robertson County	1,828	477.0	454.8	500.0	678	183.7	169.8	198.5	0.39
Rutherford County	5,792	454.5	442.5	466.8	1,958	167.7	160.1	175.6	0.37
Stewart County	456	499.1	452.7	549.4	188	205.0	176.1	237.7	0.41
Sumner County	4,672	467.8	454.2	481.7	1,619	166.3	158.2	174.8	0.36
Trousdale County	259	515.5	453.2	584.3	119	253.4	208.9	304.8	0.49
Williamson County	4,751	444.6	431.5	457.9	1,240	127.0	119.7	134.5	0.29
Wilson County	3,305	451.8	436.1	468.0	1,163	167.8	158.0	178.1	0.37
Northeast Region	16,199	464.1	456.7	471.6	6,650	184.2	179.7	188.8	0.40
Carter County	1,660	418.1	397.5	439.6	725	174.0	161.3	187.6	0.42
Greene County	2,256	466.6	446.8	487.1	916	183.8	171.8	196.4	0.39
Hancock County	251	543.3	475.1	619.3	106	227.5	184.9	278.1	0.42
Hawkins County	1,890	489.8	467.1	513.3	787	203.3	189.0	218.5	0.42
Johnson County	581	447.6	410.6	487.4	295	222.7	197.5	250.7	0.50
Sullivan County	5,265	467.8	454.8	481.1	2,106	178.1	170.4	186.1	0.38
Unicoi County	650	482.0	443.8	522.9	279	190.8	168.6	215.6	0.40
Washington County	3,646	465.2	449.8	480.9	1,436	179.9	170.5	189.6	0.39
Northwest Region	7,898	473.5	462.8	484.4	3,462	201.4	194.6	208.4	0.43
Benton County	655	530.8	488.8	575.9	305	238.3	211.3	268.2	0.45
Carroll County	1,012	525.1	492.1	559.9	449	224.1	203.5	246.5	0.43
Crockett County	434	465.9	421.9	513.5	158	162.5	137.8	190.7	0.35
Dyer County	1,036	451.2	423.5	480.3	472	200.8	182.8	220.2	0.45
Gibson County	1,456	460.3	436.5	485.2	636	196.0	180.8	212.2	0.43
Henry County	1,178	482.4	454.0	512.3	503	200.1	182.5	219.1	0.41
Lake County	207	464.3	402.3	533.6	90	201.1	161.3	248.4	0.43
Obion County	993	463.9	434.6	494.8	449	206.0	187.0	226.6	0.44
Weakley County	927	445.5	416.4	476.2	400	183.3	165.4	202.7	0.41

APPENDIX III. ALL SITES COMBINED CANCER INCIDENCE AND MORTALITY, BY RESIDENT COUNTY, CONTINUED

South Central Region	11,329	464.1	455.4	473.0	4,647	189.2	183.7	194.8	0.41
Bedford County	1,185	453.3	427.3	480.4	473	185.2	168.6	203.1	0.41
Coffee County	1,606	479.3	455.6	503.9	645	188.3	173.9	203.7	0.39
Giles County	890	445.2	415.3	476.9	396	195.4	176.1	216.4	0.44
Hickman County	680	448.0	414.2	484.0	289	190.5	168.8	214.5	0.43
Lawrence County	1,235	456.5	430.8	483.4	542	195.7	179.3	213.3	0.43
Lewis County	393	481.4	432.7	534.5	161	192.4	162.9	226.2	0.40
Lincoln County	886	392.2	366.0	420.0	422	185.3	167.7	204.5	0.47
Marshall County	928	491.3	459.4	525.1	355	192.8	172.8	214.6	0.39
Maury County	2,560	499.7	480.0	520.1	939	185.0	173.1	197.6	0.37
Moore County	180	392.7	335.2	458.4	63	131.0	100.1	170.1	0.33
Perry County	282	507.0	446.6	574.0	132	232.9	193.6	278.6	0.46
Wayne County	504	452.2	412.7	494.8	230	201.6	176.1	230.2	0.45
Southeast Region	20,062	465.7	459.1	472.4	7,897	180.4	176.4	184.5	0.39
Bledsoe County	387	411.7	370.7	456.6	147	158.1	133.0	187.1	0.38
Bradley County	2,781	451.1	434.2	468.5	1,095	177.3	166.8	188.2	0.39
Franklin County	1,349	487.7	461.1	515.6	537	187.6	171.7	204.7	0.38
Grundy County	458	490.0	444.3	539.5	219	235.8	204.7	270.8	0.48
Hamilton County	9,972	459.8	450.6	469.1	3,689	166.4	161.0	172.0	0.36
McMinn County	1,585	445.0	422.6	468.4	666	182.0	168.2	196.8	0.41
Marion County	1,005	520.0	487.1	554.7	469	239.2	217.4	262.7	0.46
Meigs County	409	506.8	456.0	562.1	179	221.1	188.3	258.5	0.44
Polk County	571	492.0	450.9	536.0	254	209.5	183.9	238.0	0.43
Rhea County	1,047	499.4	468.7	531.8	435	205.0	185.9	225.8	0.41
Sequatchie County	498	510.0	464.4	559.3	207	216.6	187.1	249.7	0.42
Southwest Region	33,016	459.8	454.7	464.9	13,331	190.1	186.8	193.4	0.41
Chester County	456	451.4	409.9	496.1	192	184.1	158.6	212.8	0.41
Decatur County	424	464.8	419.7	514.0	193	205.2	176.5	237.9	0.44
Fayette County	1,173	423.5	398.4	449.8	415	153.8	138.9	170.1	0.36
Hardeman County	824	500.4	466.0	536.7	318	195.8	174.4	219.2	0.39
Hardin County	876	461.5	430.0	495.0	366	185.6	166.5	206.7	0.40
Haywood County	520	458.0	418.0	500.9	214	188.1	163.0	216.1	0.41
Henderson County	815	461.4	429.4	495.2	374	210.7	189.4	233.8	0.46
Lauderdale County	745	483.7	448.9	520.7	322	213.1	190.0	238.4	0.44
McNairy County	860	473.0	440.9	507.2	386	207.8	187.2	230.3	0.44
Madison County	2,607	447.5	430.0	465.5	1,030	177.5	166.6	188.9	0.40
Shelby County	22,167	461.5	455.2	467.8	8,854	191.0	186.9	195.1	0.41
Tipton County	1,549	461.9	438.6	486.1	667	205.8	190.1	222.5	0.45
Upper-Cumberland Region	10,928	462.6	453.6	471.7	4,676	193.8	188.2	199.6	0.42
Cannon County	422	459.9	416.0	507.5	171	185.3	158.1	216.1	0.40
Clay County	251	416.4	364.2	475.0	119	188.6	155.6	227.8	0.45
Cumberland County	2,301	452.1	432.0	473.1	915	171.0	159.4	183.4	0.38
DeKalb County	526	416.1	380.2	454.7	222	178.0	154.8	204.0	0.43
Fentress County	621	495.5	455.3	538.6	277	220.8	194.6	249.8	0.45
Jackson County	356	409.4	365.3	457.9	163	182.7	154.6	215.2	0.45
Macon County	680	496.7	459.2	536.5	302	221.5	196.8	248.7	0.45
Overton County	775	508.3	472.0	546.9	365	238.9	214.5	265.6	0.47
Pickett County	168	412.2	346.7	488.2	72	157.5	122.0	202.9	0.38
Putnam County	2,089	476.1	455.4	497.5	898	202.5	189.3	216.5	0.43
Smith County	528	446.5	408.1	487.7	205	178.4	154.2	205.5	0.40
Van Buren County	172	409.3	346.9	480.9	73	171.7	132.7	220.1	0.42
Warren County	1,163	464.2	437.3	492.4	486	191.6	174.7	209.8	0.41
White County	876	487.9	455.1	522.6	408	218.7	197.7	241.6	0.45

^Statistic not displayed due to fewer than 11 cases.

*Total counts exclude hermaphrodites and transexuals.

**Rates are per 100,000 population and age-adjusted to the 2000 US standard population (19 age groups: <1, 1-4, 5-9, ..., 80-84, 85+).

Rates are for invasive cancer only (except for bladder cancer which is invasive and in situ) or unless otherwise specified.

†Mortality incidence ratio. See Technical Notes for details.

Note the case totals for each region may not sum up to the state total due to records missing resident county information.

Data Source

APPENDIX IV. LUNG CANCER INCIDENCE AND MORTALITY, BY RESIDENT COUNTY

TABLE 16. LUNG AND BRONCHUS CANCER, BY RESIDENT COUNTY, TENNESSEE, 2012-2016

	Incidence				Mortality				M:I
	Count*	Rate**	Lower CI	Upper CI	Count*	Rate**	Lower CI	Upper CI	Ratio †
Tennessee	**29,788**	**75.4**	**74.6**	**76.3**	**21,740**	**55.7**	**55.0**	**56.5**	**0.74**
East Region	6,505	80.7	78.7	82.7	4,693	58.8	57.1	60.6	0.73
Anderson County	380	70.4	63.4	78.1	294	54.0	47.9	60.8	0.77
Blount County	708	78.9	73.1	85.1	475	53.7	48.9	58.9	0.68
Campbell County	342	116.0	103.8	129.4	240	81.1	71.0	92.5	0.70
Claiborne County	264	116.8	102.8	132.4	184	84.2	72.2	97.8	0.72
Cocke County	272	104.5	92.1	118.2	207	81.0	70.1	93.3	0.78
Grainger County	158	93.4	79.0	110.1	120	73.9	61.0	89.2	0.79
Hamblen County	365	87.0	78.2	96.6	286	68.6	60.8	77.3	0.79
Jefferson County	276	74.4	65.7	84.1	192	51.8	44.6	60.0	0.70
Knox County	1,793	68.9	65.7	72.2	1,270	49.2	46.5	52.0	0.71
Loudon County	324	73.3	65.2	82.3	235	54.8	47.8	62.8	0.75
Monroe County	322	96.8	86.2	108.4	233	72.3	63.1	82.7	0.75
Morgan County	146	98.8	83.1	116.9	95	66.4	53.4	81.9	0.67
Roane County	344	80.0	71.6	89.3	266	62.0	54.7	70.3	0.78
Scott County	141	104.0	87.2	123.2	109	79.8	65.2	96.7	0.77
Sevier County	526	80.2	73.3	87.6	381	58.7	52.8	65.1	0.73
Union County	144	114.8	96.2	136.1	106	87.4	71.1	106.6	0.76
Mid-Cumberland Region	6,384	69.8	68.1	71.6	4,546	50.9	49.4	52.5	0.73
Cheatham County	205	91.5	78.8	105.7	170	79.9	67.8	93.5	0.87
Davidson County	2,233	70.2	67.3	73.3	1,622	51.4	48.9	54.1	0.73
Dickson County	275	89.4	78.9	100.8	202	65.7	56.8	75.6	0.73
Houston County	60	101.5	76.9	132.4	43	73.1	52.5	100.0	0.72
Humphreys County	114	82.5	67.8	99.8	91	66.0	53.0	81.7	0.80
Montgomery County	567	79.9	73.3	87.0	402	58.7	52.9	64.9	0.73
Robertson County	312	81.2	72.2	91.0	230	60.6	52.8	69.2	0.75
Rutherford County	877	72.7	67.8	77.9	596	51.6	47.4	56.1	0.71
Stewart County	86	86.4	68.8	107.7	53	54.8	40.9	72.7	0.63
Sumner County	687	67.6	62.5	72.9	490	49.4	45.1	54.1	0.73
Trousdale County	59	117.3	88.7	152.8	35	71.8	49.5	101.0	0.61
Williamson County	413	41.9	37.8	46.3	276	29.0	25.6	32.8	0.69
Wilson County	496	67.2	61.3	73.7	336	47.8	42.6	53.3	0.71
Northeast Region	2,960	80.2	77.3	83.2	2,170	58.7	56.2	61.2	0.73
Carter County	311	73.5	65.4	82.4	236	55.5	48.6	63.4	0.76
Greene County	432	84.3	76.3	92.9	339	65.6	58.7	73.3	0.78
Hancock County	51	105.9	77.9	141.9	40	80.0	56.5	111.4	0.76
Hawkins County	422	103.7	93.8	114.4	282	70.2	62.1	79.3	0.68
Johnson County	124	90.7	75.1	109.2	102	75.4	61.1	92.5	0.83
Sullivan County	920	76.8	71.9	82.1	653	54.3	50.2	58.8	0.71
Unicoi County	101	66.7	54.2	81.9	82	55.4	43.8	69.7	0.83
Washington County	599	73.5	67.6	79.8	436	53.3	48.4	58.7	0.73
Northwest Region	1,459	83.6	79.3	88.1	1,118	64.1	60.3	68.0	0.77
Benton County	131	98.2	81.7	117.7	116	88.1	72.4	106.8	0.90
Carroll County	215	107.2	93.1	123.1	149	73.9	62.3	87.2	0.69
Crockett County	76	79.1	61.9	99.8	49	49.4	36.4	65.9	0.62
Dyer County	201	84.1	72.7	96.9	162	66.9	56.8	78.3	0.80
Gibson County	263	79.5	70.1	89.9	180	54.5	46.7	63.2	0.69
Henry County	192	73.5	63.3	85.1	172	67.6	57.8	79.0	0.92
Lake County	53	114.7	85.5	151.4	30	64.5	43.3	93.5	0.56
Obion County	163	74.4	63.1	87.3	138	63.9	53.5	76.0	0.86
Weakley County	165	75.7	64.4	88.6	122	54.4	45.0	65.2	0.72

APPENDIX IV. LUNG CANCER INCIDENCE AND MORTALITY, BY RESIDENT COUNTY, CONTINUED

South Central Region	1,989	79.7	76.1	83.3	1,495	60.1	57.1	63.3	0.75
Bedford County	197	73.9	63.8	85.2	132	50.5	42.1	60.1	0.68
Coffee County	271	78.3	69.1	88.4	197	56.5	48.8	65.1	0.72
Giles County	162	78.8	67.0	92.3	115	56.1	46.2	67.7	0.71
Hickman County	148	94.7	79.8	111.8	114	73.6	60.5	88.9	0.78
Lawrence County	232	81.6	71.3	93.0	189	66.6	57.4	77.1	0.82
Lewis County	90	105.3	84.2	130.6	64	73.9	56.6	95.6	0.70
Lincoln County	139	58.1	48.7	69.0	116	48.5	40.0	58.5	0.83
Marshall County	173	91.7	78.2	106.9	129	67.1	55.7	80.2	0.73
Maury County	385	77.8	70.1	86.2	290	59.0	52.3	66.4	0.76
Moore County	32	67.2	45.7	97.1	13	25.2	13.3	46.0	0.38
Perry County	62	101.9	77.8	132.3	51	83.9	62.3	111.9	0.82
Wayne County	98	81.4	65.9	99.9	85	73.3	58.3	91.3	0.90
Southeast Region	3,405	77.7	75.1	80.4	2,454	56.1	53.8	58.4	0.72
Bledsoe County	85	91.9	73.0	114.8	46	51.1	37.1	69.2	0.56
Bradley County	501	79.9	72.9	87.3	345	55.7	49.9	62.0	0.70
Franklin County	214	72.2	62.7	82.9	166	56.8	48.3	66.4	0.79
Grundy County	87	85.2	67.9	106.1	65	64.6	49.6	83.4	0.76
Hamilton County	1,506	69.7	66.1	73.3	1,062	49.0	46.0	52.1	0.70
McMinn County	292	78.2	69.4	88.0	229	61.3	53.5	70.0	0.78
Marion County	198	97.1	83.7	112.2	143	68.0	57.1	80.6	0.70
Meigs County	83	94.4	74.3	118.9	55	61.6	45.8	82.0	0.65
Polk County	127	102.6	85.1	123.0	105	86.1	70.2	105.2	0.84
Rhea County	213	98.8	85.8	113.5	153	71.9	60.7	84.6	0.73
Sequatchie County	99	98.2	79.3	120.7	85	85.0	67.5	106.2	0.87
Southwest Region	4,900	70.0	68.0	72.1	3,651	53.0	51.2	54.8	0.76
Chester County	81	74.7	59.1	93.4	56	51.4	38.7	67.3	0.69
Decatur County	86	93.7	74.2	117.5	67	71.2	54.7	91.8	0.76
Fayette County	167	58.2	49.5	68.2	107	38.3	31.1	46.7	0.66
Hardeman County	170	103.3	88.0	120.6	103	61.7	50.1	75.3	0.60
Hardin County	182	91.0	77.9	106.1	136	68.2	57.0	81.2	0.75
Haywood County	72	61.4	47.7	78.2	51	44.6	33.0	59.2	0.73
Henderson County	166	91.3	77.7	106.8	122	67.6	56.0	81.2	0.74
Lauderdale County	140	88.2	73.9	104.5	102	66.7	54.2	81.4	0.76
McNairy County	187	97.3	83.6	112.8	145	75.8	63.8	89.7	0.78
Madison County	427	73.8	66.8	81.3	286	50.3	44.5	56.6	0.68
Shelby County	2,935	64.6	62.2	67.1	2,236	49.9	47.8	52.0	0.77
Tipton County	287	83.9	74.3	94.5	240	73.1	64.0	83.3	0.87
Upper-Cumberland Region	1,997	81.3	77.7	85.0	1,556	63.6	60.5	67.0	0.78
Cannon County	53	56.4	42.1	74.5	50	53.5	39.6	71.3	0.95
Clay County	46	71.8	52.0	98.2	35	53.3	36.9	76.3	0.74
Cumberland County	400	76.4	68.6	84.9	315	58.8	52.2	66.2	0.77
DeKalb County	100	81.8	66.2	100.1	88	71.3	56.9	88.6	0.87
Fentress County	129	95.9	79.6	115.0	95	73.7	59.3	91.1	0.77
Jackson County	84	91.1	72.2	114.3	65	72.1	55.0	93.6	0.79
Macon County	128	91.2	75.8	109.0	100	72.2	58.5	88.3	0.79
Overton County	176	106.9	91.4	124.6	127	80.4	66.8	96.3	0.75
Pickett County	41	94.5	66.0	133.6	35	78.5	53.5	114.0	0.83
Putnam County	341	76.3	68.3	85.0	264	59.7	52.6	67.5	0.78
Smith County	93	78.5	63.0	97.0	75	65.7	51.3	83.1	0.84
Van Buren County	31	71.1	47.2	104.8	17	35.1	20.1	59.9	0.49
Warren County	206	80.6	69.9	92.7	167	64.7	55.1	75.5	0.80
White County	169	89.6	76.4	104.7	123	66.3	54.9	79.6	0.74

^Statistic not displayed due to fewer than 11 cases.

*Total counts exclude hermaphrodites and transexuals.

**Rates are per 100,000 population and age-adjusted to the 2000 US standard population (19 age groups: <1, 1-4, 5-9, …, 80-84, 85+).

Rates are for invasive cancer only (except bladder cancer which is invasive and in situ) or unless otherwise specified.

Note the case totals for each region may not sum up to the state total due to records missing resident county information.

†Mortality incidence ratio. See Technical Notes for details.

Data Source

APPENDIX V. PROSTATE CANCER INCIDENCE AND MORTALITY, BY RESIDENT COUNTY

TABLE 17. PROSTATE CANCER, BY RESIDENT COUNTY, TENNESSEE, 2012-2016

	Incidence				Mortality				M:I
	Count*	Rate**	Lower CI	Upper CI	Count*	Rate**	Lower CI	Upper CI	Ratio †
Tennessee	**21,109**	**110.7**	**109.1**	**112.2**	**2,916**	**19.8**	**19.0**	**20.5**	**0.18**
East Region	4,123	104.6	101.4	108.0	531	17.2	15.7	18.8	0.16
Anderson County	298	112.1	99.5	126.1	31	12.8	8.6	18.5	0.11
Blount County	433	99.2	89.9	109.3	38	10.8	7.6	15.0	0.11
Campbell County	135	97.3	81.2	116.0	28	23.8	15.5	35.0	0.24
Claiborne County	108	99.7	81.0	121.8	14	15.9	8.4	27.6	0.16
Cocke County	102	79.7	64.4	98.0	24	24.5	15.3	37.2	0.31
Grainger County	91	106.1	84.9	131.9	^	^	^	^	^
Hamblen County	203	103.0	89.1	118.6	30	18.5	12.3	26.7	0.18
Jefferson County	164	85.8	72.9	100.6	18	11.9	6.9	19.4	0.14
Knox County	1,451	115.9	109.9	122.2	174	17.7	15.1	20.5	0.15
Loudon County	234	102.8	89.5	117.8	32	18.1	12.1	26.2	0.18
Monroe County	144	87.1	72.8	103.6	26	23.8	15.2	35.3	0.27
Morgan County	81	107.2	84.4	134.7	^	^	^	^	^
Roane County	192	89.5	76.9	103.9	24	14.1	9.0	21.5	0.16
Scott County	79	117.8	92.6	148.1	17	28.5	16.2	46.7	0.24
Sevier County	345	106.3	95.1	118.6	50	21.2	15.5	28.3	0.20
Union County	63	94.8	71.9	123.5	^	^	^	^	^
Mid-Cumberland Region	5,291	117.2	113.9	120.5	604	18.4	16.9	20.0	0.16
Cheatham County	124	108.5	88.9	131.3	14	18.3	9.3	31.6	0.17
Davidson County	1,767	117.5	111.8	123.4	239	20.8	18.1	23.6	0.18
Dickson County	164	111.2	94.2	130.6	28	23.2	15.2	34.0	0.21
Houston County	24	79.6	50.5	122.1	^	^	^	^	^
Humphreys County	88	133.5	106.5	166.2	14	24.1	13.1	41.6	0.18
Montgomery County	398	114.7	103.2	127.0	44	17.1	12.2	23.1	0.15
Robertson County	211	110.7	95.7	127.4	23	18.0	11.2	27.0	0.16
Rutherford County	691	112.7	104.0	121.9	79	18.9	14.8	23.8	0.17
Stewart County	35	71.4	49.2	101.6	^	^	^	^	^
Sumner County	574	114.5	105.0	124.7	47	13.0	9.5	17.4	0.11
Trousdale County	29	104.8	69.1	154.1	^	^	^	^	^
Williamson County	764	140.6	130.3	151.6	60	16.1	12.1	20.9	0.11
Wilson County	422	110.0	99.3	121.5	41	15.7	11.0	21.6	0.14
Northeast Region	1,496	83.8	79.5	88.3	251	17.3	15.2	19.7	0.21
Carter County	130	62.3	51.8	74.6	26	15.7	10.2	23.2	0.25
Greene County	210	87.0	75.2	100.2	38	18.0	12.5	25.2	0.21
Hancock County	28	111.0	71.8	167.0	^	^	^	^	^
Hawkins County	165	79.7	67.7	93.6	25	16.3	10.4	24.6	0.20
Johnson County	53	74.0	54.9	98.6	17	29.4	16.7	48.6	0.40
Sullivan County	494	86.8	79.2	95.1	75	15.9	12.5	20.1	0.18
Unicoi County	68	98.7	76.2	126.9	11	18.8	9.3	35.0	0.19
Washington County	348	87.3	78.2	97.3	56	18.1	13.6	23.6	0.21
Northwest Region	1,017	123.9	116.2	132.0	155	22.7	19.2	26.7	0.18
Benton County	93	148.2	118.6	184.3	12	24.1	12.4	43.2	0.16
Carroll County	134	140.6	117.4	167.6	20	25.1	15.1	39.4	0.18
Crockett County	49	114.9	84.1	153.7	^	^	^	^	^
Dyer County	103	93.6	75.8	114.5	25	28.8	18.4	42.8	0.31
Gibson County	181	117.9	101.1	136.8	31	23.2	15.6	33.1	0.20
Henry County	189	152.6	131.1	177.2	18	17.8	10.3	29.0	0.12
Lake County	12	49.0	24.7	89.1	^	^	^	^	^
Obion County	130	124.0	102.9	148.5	18	22.0	12.6	35.6	0.18
Weakley County	126	123.0	102.1	147.3	22	24.5	15.2	37.6	0.20

APPENDIX V. PROSTATE CANCER INCIDENCE AND MORTALITY, BY RESIDENT COUNTY, CONTINUED

South Central Region	1,206	97.2	91.7	103.0	180	19.2	16.4	22.3	0.20
Bedford County	131	101.4	84.3	121.0	20	22.5	13.5	34.8	0.22
Coffee County	171	99.8	85.2	116.4	36	25.8	18.0	35.9	0.26
Giles County	89	84.6	67.5	105.3	11	13.2	6.5	24.5	0.16
Hickman County	56	71.9	53.9	94.4	^	^	^	^	^
Lawrence County	116	85.6	70.5	103.3	20	17.3	10.4	27.1	0.20
Lewis County	31	74.5	50.1	108.2	^	^	^	^	^
Lincoln County	89	80.7	64.4	100.3	20	24.6	14.8	38.4	0.30
Marshall County	112	119.7	97.7	145.5	^	^	^	^	^
Maury County	298	114.5	101.4	129.0	39	21.8	15.3	30.1	0.19
Moore County	24	92.1	58.7	142.2	^	^	^	^	^
Perry County	34	111.1	76.1	159.1	^	^	^	^	^
Wayne County	55	96.2	72.1	126.5	^	^	^	^	^
Southeast Region	2,312	107.3	102.8	111.9	341	19.8	17.7	22.0	0.18
Bledsoe County	36	68.5	47.5	96.9	^	^	^	^	^
Bradley County	257	84.0	73.8	95.3	44	18.1	13.0	24.5	0.22
Franklin County	140	97.0	81.3	115.2	28	24.0	15.7	35.4	0.25
Grundy County	43	86.3	61.8	118.7	^	^	^	^	^
Hamilton County	1,348	129.2	122.2	136.5	181	21.3	18.3	24.7	0.16
McMinn County	143	77.5	65.0	91.9	35	23.5	16.2	33.1	0.30
Marion County	110	107.4	87.6	131.0	11	14.4	6.9	26.6	0.13
Meigs County	39	91.7	63.6	129.4	^	^	^	^	^
Polk County	49	75.5	55.5	101.7	^	^	^	^	^
Rhea County	98	88.1	71.1	108.4	11	11.5	5.5	21.4	0.13
Sequatchie County	49	94.3	68.7	127.4	^	^	^	^	^
Southwest Region	4,522	133.1	129.1	137.3	672	26.2	24.2	28.3	0.20
Chester County	46	94.7	68.9	127.6	^	^	^	^	^
Decatur County	34	70.1	48.3	100.7	11	28.2	13.8	52.8	0.40
Fayette County	181	123.8	105.8	144.6	17	16.6	9.4	27.0	0.13
Hardeman County	117	142.1	116.8	171.6	15	24.1	13.2	40.1	0.17
Hardin County	97	100.7	81.1	124.3	12	14.5	7.2	26.6	0.14
Haywood County	64	117.2	89.4	151.6	13	28.3	14.8	49.5	0.24
Henderson County	79	90.2	70.8	113.7	^	^	^	^	^
Lauderdale County	91	127.2	101.5	157.4	13	25.2	13.1	43.1	0.20
McNairy County	93	99.2	79.5	122.8	13	19.3	10.0	33.6	0.19
Madison County	356	126.3	113.1	140.6	53	22.0	16.4	29.1	0.17
Shelby County	3,169	142.5	137.3	147.8	492	30.4	27.7	33.4	0.21
Tipton County	195	121.5	104.4	140.8	21	18.0	10.9	27.8	0.15
Upper-Cumberland Region	1,133	93.7	88.2	99.5	182	18.7	16.0	21.7	0.20
Cannon County	54	115.0	85.8	151.9	^	^	^	^	^
Clay County	24	76.2	48.1	118.2	^	^	^	^	^
Cumberland County	302	108.8	96.4	122.9	40	15.1	10.8	21.3	0.14
DeKalb County	52	82.1	60.5	109.6	^	^	^	^	^
Fentress County	60	95.6	71.7	125.9	14	29.4	15.1	51.5	0.31
Jackson County	30	61.1	40.4	91.0	^	^	^	^	^
Macon County	57	90.1	67.2	118.5	^	^	^	^	^
Overton County	70	86.6	67.1	110.8	^	^	^	^	^
Pickett County	13	54.9	28.6	104.1	^	^	^	^	^
Putnam County	181	84.7	72.6	98.4	44	25.1	18.2	33.9	0.30
Smith County	64	109.1	82.6	141.8	^	^	^	^	^
Van Buren County	22	93.3	57.2	148.6	^	^	^	^	^
Warren County	125	101.1	83.7	121.2	12	11.8	6.0	20.8	0.12
White County	79	84.3	66.4	106.1	19	25.7	15.3	40.8	0.30

^Statistic not displayed due to fewer than 11 cases.

*Total counts exclude females, hermaphrodites, and transexuals.

**Rates are per 100,000 population and age-adjusted to the 2000 US standard population (19 age groups: <1, 1-4, 5-9, ..., 80-84, 85+).

Rates are for invasive cancer only (except for bladder cancer which is invasive and in situ) or unless otherwise specified.

†Mortality incidence ratio. See Technical Notes for details.

Note the case totals for each region may not sum up to the state total due to records missing resident county information.

Data Source

APPENDIX VI. FEMALE BREAST CANCER INCIDENCE AND MORTALITY, BY RESIDENT COUNTY

TABLE 18. FEMALE BREAST CANCER, BY RESIDENT COUNTY, TENNESSEE, 2012-2016

	Incidence				Mortality				M:I
	Count*	Rate**	Lower CI	Upper CI	Count*	Rate**	Lower CI	Upper CI	Ratio †
Tennessee	**25,014**	**123.1**	**121.6**	**124.7**	**4,629**	**22.0**	**21.4**	**22.7**	**0.18**
East Region	5,057	126.1	122.5	129.8	848	20.3	18.9	21.7	0.16
Anderson County	366	135.3	121.1	150.8	68	22.0	16.9	28.5	0.16
Blount County	528	122.3	111.7	133.8	67	15.3	11.8	19.7	0.13
Campbell County	171	113.8	96.8	133.3	33	22.8	15.5	32.7	0.20
Claiborne County	141	133.6	111.5	159.0	31	27.8	18.7	40.4	0.21
Cocke County	136	109.3	90.8	130.7	31	24.8	16.6	36.1	0.23
Grainger County	85	103.6	82.0	129.9	20	25.8	15.1	41.6	0.25
Hamblen County	254	115.9	101.7	131.7	37	15.9	11.1	22.3	0.14
Jefferson County	225	126.1	109.3	144.9	33	17.5	11.9	25.2	0.14
Knox County	1,761	129.6	123.4	135.9	297	20.8	18.4	23.4	0.16
Loudon County	278	136.9	119.9	155.9	48	22.0	15.9	30.3	0.16
Monroe County	159	97.3	82.1	114.8	35	22.4	15.4	31.8	0.23
Morgan County	92	146.2	116.7	181.3	12	17.8	9.0	32.7	0.12
Roane County	268	134.3	117.6	152.8	41	19.5	13.7	27.2	0.15
Scott County	83	125.7	99.5	157.0	19	27.4	16.3	43.5	0.22
Sevier County	447	134.4	121.7	148.1	64	19.5	14.9	25.1	0.15
Union County	63	99.0	75.4	128.2	12	19.3	9.9	34.7	0.19
Mid-Cumberland Region	6,505	128.6	125.4	131.8	1,109	22.0	20.7	23.4	0.17
Cheatham County	166	138.2	117.4	161.9	22	18.0	11.1	28.0	0.13
Davidson County	2,278	127.2	121.9	132.7	435	23.7	21.5	26.1	0.19
Dickson County	200	128.3	110.7	147.9	35	20.8	14.4	29.3	0.16
Houston County	38	133.6	92.6	188.0	^	^	^	^	^
Humphreys County	72	111.9	86.4	143.2	17	25.8	14.8	42.9	0.23
Montgomery County	475	115.3	105.0	126.3	87	23.0	18.3	28.4	0.20
Robertson County	269	131.4	115.8	148.6	50	24.6	18.2	32.7	0.19
Rutherford County	907	129.9	121.4	138.8	144	21.4	18.0	25.2	0.16
Stewart County	55	122.7	90.8	163.0	^	^	^	^	^
Sumner County	660	124.1	114.7	134.2	102	18.9	15.3	23.0	0.15
Trousdale County	22	81.0	50.1	125.5	^	^	^	^	^
Williamson County	896	152.6	142.5	163.3	116	20.2	16.6	24.3	0.13
Wilson County	467	120.5	109.5	132.3	80	21.1	16.7	26.5	0.18
Northeast Region	2,142	119.7	114.5	125.2	382	19.7	17.7	21.8	0.16
Carter County	230	112.9	98.1	129.5	43	18.1	13.0	24.9	0.16
Greene County	283	113.1	99.6	128.1	48	18.5	13.5	25.0	0.16
Hancock County	32	126.4	85.0	183.7	^	^	^	^	^
Hawkins County	215	105.6	91.4	121.5	45	20.7	15.0	28.1	0.20
Johnson County	60	103.1	76.9	136.1	^	^	^	^	^
Sullivan County	740	126.0	116.7	136.0	127	19.3	16.0	23.3	0.15
Unicoi County	81	122.4	95.7	155.1	14	18.9	10.1	33.9	0.15
Washington County	501	127.1	115.8	139.2	89	21.1	16.9	26.2	0.17
Northwest Region	1,026	118.7	111.3	126.6	214	23.0	19.9	26.5	0.19
Benton County	73	120.4	93.1	154.3	18	26.5	15.2	44.7	0.22
Carroll County	105	98.4	79.9	120.4	22	20.0	12.4	31.3	0.20
Crockett County	61	122.6	92.6	159.7	^	^	^	^	^
Dyer County	146	123.5	103.7	146.2	30	22.3	15.0	32.4	0.18
Gibson County	200	123.3	106.1	142.6	45	25.7	18.5	34.9	0.21
Henry County	152	115.2	96.8	136.5	30	21.5	14.1	32.1	0.19
Lake County	24	119.9	75.0	184.9	^	^	^	^	^
Obion County	145	131.3	110.0	156.0	30	27.5	18.3	40.2	0.21
Weakley County	120	106.1	87.2	128.1	26	22.0	14.0	33.3	0.21

APPENDIX VI. FEMALE BREAST CANCER INCIDENCE AND MORTALITY, BY RESIDENT COUNTY, CONTINUED

South Central Region	1,461	115.0	109.0	121.3	270	20.6	18.2	23.3	0.18
Bedford County	161	115.8	98.2	135.8	20	13.6	8.3	21.4	0.12
Coffee County	205	116.7	100.8	134.6	37	20.5	14.3	28.7	0.18
Giles County	117	106.2	87.2	128.6	22	21.0	12.7	33.2	0.20
Hickman County	88	117.8	93.8	146.5	27	34.9	22.6	52.1	0.30
Lawrence County	157	113.5	95.8	133.5	27	17.8	11.6	26.5	0.16
Lewis County	36	85.2	58.3	121.2	^	^	^	^	^
Lincoln County	120	102.8	84.4	124.3	36	29.7	20.5	42.1	0.29
Marshall County	126	129.1	106.9	154.7	20	21.0	12.7	33.0	0.16
Maury County	345	125.9	112.6	140.5	52	18.5	13.7	24.6	0.15
Moore County	28	122.3	79.6	182.9	^	^	^	^	^
Perry County	25	100.3	62.6	153.4	^	^	^	^	^
Wayne County	53	92.9	68.5	124.2	12	20.4	10.3	37.9	0.22
Southeast Region	2,603	115.4	110.9	120.1	511	21.7	19.8	23.8	0.19
Bledsoe County	35	84.3	57.8	120.1	^	^	^	^	^
Bradley County	367	112.8	101.3	125.3	80	25.1	19.8	31.5	0.22
Franklin County	166	115.9	98.0	136.3	33	22.3	15.0	32.3	0.19
Grundy County	62	129.1	97.2	169.0	18	34.8	20.1	57.7	0.27
Hamilton County	1,350	117.0	110.6	123.6	263	21.5	18.9	24.4	0.18
McMinn County	201	108.6	93.5	125.6	32	16.6	11.1	24.0	0.15
Marion County	127	125.4	103.6	150.8	29	27.8	18.3	41.0	0.22
Meigs County	40	95.6	67.1	133.6	^	^	^	^	^
Polk County	61	107.1	81.2	139.5	16	25.4	14.4	42.9	0.24
Rhea County	130	124.0	102.7	148.6	16	13.6	7.7	22.7	0.11
Sequatchie County	64	118.7	90.2	154.3	12	24.1	12.0	44.1	0.20
Southwest Region	4,806	123.5	120.0	127.2	1,038	26.0	24.4	27.6	0.21
Chester County	48	93.1	67.8	125.1	^	^	^	^	^
Decatur County	40	85.5	59.8	120.2	^	^	^	^	^
Fayette County	169	120.2	101.8	141.1	28	20.4	13.4	30.2	0.17
Hardeman County	99	125.1	100.5	154.2	21	25.7	15.4	40.8	0.21
Hardin County	100	103.3	82.9	127.7	15	13.4	7.3	23.5	0.13
Haywood County	80	134.5	105.6	169.3	17	26.3	15.2	43.4	0.20
Henderson County	91	96.2	76.9	119.3	34	35.1	24.1	49.9	0.36
Lauderdale County	82	99.6	78.5	124.9	16	19.3	10.9	32.2	0.19
McNairy County	98	99.9	80.3	123.3	23	26.9	16.5	41.7	0.27
Madison County	367	120.1	107.7	133.5	62	20.0	15.2	25.9	0.17
Shelby County	3,448	129.4	125.0	133.9	761	27.9	25.9	30.0	0.22
Tipton County	184	104.1	89.3	120.7	41	22.7	16.2	31.1	0.22
Upper-Cumberland Region	1,404	116.0	109.7	122.6	257	20.1	17.7	22.8	0.17
Cannon County	52	111.8	82.6	148.8	^	^	^	^	^
Clay County	35	124.0	83.7	178.9	^	^	^	^	^
Cumberland County	289	120.4	105.1	137.6	40	15.4	10.6	22.0	0.13
DeKalb County	78	110.4	86.7	139.4	15	20.5	11.4	35.2	0.19
Fentress County	80	120.9	94.5	153.1	13	19.2	10.0	34.6	0.16
Jackson County	44	99.2	70.7	137.1	^	^	^	^	^
Macon County	76	105.5	82.6	133.1	15	20.7	11.5	34.6	0.20
Overton County	85	107.4	85.1	134.5	19	25.5	15.0	41.0	0.24
Pickett County	18	101.8	56.2	172.4	^	^	^	^	^
Putnam County	301	131.0	116.0	147.3	49	20.2	14.8	27.1	0.15
Smith County	64	102.4	78.3	132.0	^	^	^	^	^
Van Buren County	21	88.7	54.2	142.3	^	^	^	^	^
Warren County	153	117.1	98.7	138.2	30	21.3	14.2	30.9	0.18
White County	108	117.5	95.3	143.6	31	31.5	21.1	45.9	0.27

^Statistic not displayed due to fewer than 11 cases.

*Total counts exclude males, hermaphrodites, and transexuals.

**Rates are per 100,000 population and age-adjusted to the 2000 US standard population (19 age groups: <1, 1-4, 5-9, ..., 80-84, 85+).

Rates are for invasive cancer only (except for bladder cancer which is invasive and in situ) or unless otherwise specified.

†Mortality incidence ratio. See Technical Notes for details.

Note the case totals for each region may not sum up to the state total due to records missing resident county information.

Data Source

APPENDIX VII. COLORECTAL CANCER INCIDENCE AND MORTALITY, BY RESIDENT COUNTY

TABLE 19. COLON AND RECTUM CANCER, BY RESIDENT COUNTY, TENNESSEE, 2012-2016

	Incidence				Mortality				M:I
	Count*	Rate**	Lower CI	Upper CI	Count*	Rate**	Lower CI	Upper CI	Ratio †
Tennessee	**15,493**	**40.6**	**40.0**	**41.3**	**5,941**	**15.7**	**15.3**	**16.1**	**0.39**
East Region	2,895	38.2	36.8	39.6	1,136	14.8	13.9	15.7	0.39
Anderson County	205	39.5	34.1	45.5	75	14.4	11.2	18.3	0.36
Blount County	303	37.5	33.3	42.2	123	14.9	12.3	17.9	0.40
Campbell County	132	48.3	40.2	57.7	56	19.5	14.7	25.7	0.40
Claiborne County	94	46.2	37.0	57.1	37	17.5	12.2	24.6	0.38
Cocke County	92	37.0	29.6	45.9	38	14.2	10	19.9	0.38
Grainger County	67	43.7	33.5	56.3	35	23	15.8	32.7	0.53
Hamblen County	183	44.9	38.5	52.1	58	14.1	10.7	18.3	0.31
Jefferson County	138	39.6	33.1	47.2	44	12.5	9.1	17.1	0.32
Knox County	920	36.4	34.0	38.9	367	14.4	12.9	15.9	0.40
Loudon County	115	28.8	23.5	35.1	40	8.8	6.2	12.3	0.31
Monroe County	107	33.5	27.2	40.8	35	11.1	7.7	15.7	0.33
Morgan County	48	37.4	27.4	50.1	19	14	8.3	22.3	0.37
Roane County	148	37.4	31.4	44.5	56	13.3	10	17.6	0.36
Scott County	54	42.5	31.7	55.9	24	18	11.4	27.2	0.42
Sevier County	249	40.7	35.6	46.3	108	18	14.7	21.9	0.44
Union County	40	35.0	24.7	48.3	21	19.6	12	30.4	0.56
Mid-Cumberland Region	3,553	38.7	37.4	40.0	1,319	15	14.1	15.8	0.39
Cheatham County	78	34.7	27.1	43.8	25	11.5	7.3	17.3	0.33
Davidson County	1,216	37.9	35.8	40.2	491	15.8	14.4	17.3	0.42
Dickson County	159	53.9	45.7	63.2	59	20.7	15.7	26.9	0.38
Houston County	28	52.7	34.0	78.5	14	24.4	12.9	43	0.46
Humphreys County	62	47.0	35.7	61.1	22	17.5	10.8	27.2	0.37
Montgomery County	281	39.2	34.7	44.3	132	19.9	16.6	23.7	0.51
Robertson County	165	43.6	37.0	51.0	54	14.7	10.9	19.3	0.34
Rutherford County	494	39.2	35.7	43.0	164	14	11.9	16.4	0.36
Stewart County	50	56.8	41.6	76.2	21	22.3	13.7	35	0.39
Sumner County	395	39.4	35.5	43.5	132	13.6	11.3	16.2	0.35
Trousdale County	37	76.4	53.3	106.4	14	33.4	18.1	56.4	0.44
Williamson County	338	32.2	28.7	36.0	99	9.8	7.9	12	0.30
Wilson County	250	34.3	30.1	39.0	92	13	10.4	16	0.38
Northeast Region	1,336	38.2	36.1	40.4	549	15.3	14	16.7	0.40
Carter County	151	37.6	31.7	44.4	59	14.6	11	19.1	0.39
Greene County	202	42.0	36.2	48.6	77	15.5	12.2	19.5	0.37
Hancock County	14	31.6	16.8	55.1	^	^	^	^	^
Hawkins County	164	43.2	36.6	50.7	49	13	9.5	17.4	0.30
Johnson County	57	44.2	33.1	58.3	28	20.8	13.7	30.9	0.47
Sullivan County	402	35.8	32.2	39.6	175	14.7	12.6	17.2	0.41
Unicoi County	56	40.5	30.3	53.7	27	18.3	12	27.7	0.45
Washington County	290	36.3	32.2	40.9	126	15.9	13.2	19.1	0.44
Northwest Region	750	44.2	41.0	47.6	287	16.7	14.8	18.8	0.38
Benton County	58	43.2	32.3	57.1	21	15.5	9.6	24.7	0.36
Carroll County	88	45.4	36.1	56.5	35	16.8	11.7	23.8	0.37
Crockett County	48	49.7	36.3	66.8	15	14.7	8.2	25	0.30
Dyer County	103	44.5	36.2	54.2	33	14.5	9.9	20.5	0.33
Gibson County	145	45.0	37.9	53.2	57	17.3	13.1	22.6	0.38
Henry County	107	44.2	35.9	54.1	44	18.1	13	24.9	0.41
Lake County	20	45.3	27.5	71.1	^	^	^	^	^
Obion County	99	44.9	36.3	55.2	34	15.3	10.5	21.7	0.34
Weakley County	82	38.9	30.7	48.7	41	19	13.5	26.2	0.49

APPENDIX VII. COLORECTAL CANCER INCIDENCE AND MORTALITY, BY RESIDENT COUNTY, CONTINUED

South Central Region	1,050	43.5	40.9	46.3	408	16.9	15.3	18.7	0.39
Bedford County	116	44.5	36.6	53.6	52	20.4	15.1	26.9	0.46
Coffee County	153	45.5	38.5	53.5	67	19.8	15.3	25.4	0.44
Giles County	91	45.1	36.1	56.0	44	22.8	16.4	31.0	0.51
Hickman County	50	34.6	25.5	46.1	17	11.4	6.6	18.5	0.33
Lawrence County	105	39.4	32.1	48.1	37	13.2	9.3	18.4	0.34
Lewis County	36	40.9	28.2	58.0	12	14.3	7.2	26.2	0.35
Lincoln County	107	48.2	39.3	58.8	47	21.9	15.9	29.6	0.45
Marshall County	88	46.4	37.0	57.6	25	14.3	9.2	21.3	0.31
Maury County	217	44.1	38.3	50.6	71	14.0	10.9	17.8	0.32
Moore County	17	35.4	20.4	59.3	^	^	^	^	^
Perry County	26	49.2	30.9	75.0	^	^	^	^	^
Wayne County	44	39.2	28.4	53.2	20	17.7	10.8	28.0	0.45
Southeast Region	1,736	40.7	38.7	42.7	574	13.4	12.3	14.6	0.33
Bledsoe County	29	31.7	21.0	46.5	^	^	^	^	^
Bradley County	263	42.0	37.0	47.5	80	13.0	10.3	16.3	0.31
Franklin County	130	47.0	39.0	56.2	47	16.9	12.3	22.9	0.36
Grundy County	53	60.7	44.8	80.7	25	30.6	19.4	46.1	0.50
Hamilton County	808	37.3	34.7	40.0	250	11.4	10.0	13.0	0.31
McMinn County	149	42.5	35.8	50.3	43	11.6	8.3	15.8	0.27
Marion County	81	42.7	33.7	53.7	46	25.8	18.7	34.9	0.60
Meigs County	37	48.0	33.2	67.8	11	15.3	7.3	28.7	0.32
Polk County	38	37.2	26.1	51.9	12	11.5	5.9	20.8	0.31
Rhea County	92	45.1	36.2	55.7	34	16.8	11.5	23.8	0.37
Sequatchie County	56	57.7	43.1	76.0	16	17.9	10.1	29.8	0.31
Southwest Region	3,145	44.2	42.6	45.8	1,268	18.3	17.2	19.3	0.41
Chester County	45	44.2	31.9	60.0	16	15.7	8.8	26.1	0.36
Decatur County	49	54.6	39.8	73.8	15	16.4	9.0	28.6	0.30
Fayette County	119	43.5	35.7	52.6	43	15.5	11.1	21.3	0.36
Hardeman County	77	46.4	36.5	58.4	35	21.0	14.5	29.5	0.45
Hardin County	81	39.8	31.5	50.1	33	16.2	11.1	23.3	0.41
Haywood County	61	49.3	37.3	64.1	27	24.5	15.9	36.3	0.50
Henderson County	89	51.3	40.9	63.6	23	13.0	8.2	19.9	0.25
Lauderdale County	91	59.8	47.9	73.9	33	22.3	15.2	31.6	0.37
McNairy County	77	43.8	34.2	55.4	31	16.7	11.3	24.2	0.38
Madison County	259	44.3	39.0	50.3	87	14.8	11.8	18.3	0.33
Shelby County	2,059	43.4	41.5	45.4	860	18.7	17.5	20.1	0.43
Tipton County	138	41.1	34.4	48.8	65	21.2	16.2	27.1	0.52
Upper-Cumberland Region	1023	44.1	41.3	47.0	400	17.1	15.4	18.9	0.39
Cannon County	42	48.4	34.5	66.3	13	14.3	7.4	25.4	0.30
Clay County	28	48.7	32.0	72.5	14	22.8	12.3	40.5	0.47
Cumberland County	197	40.4	34.3	47.3	76	14.8	11.5	19.0	0.37
DeKalb County	54	43.2	32.2	57.1	24	20.7	13.2	31.4	0.48
Fentress County	61	48.7	36.6	63.8	21	15.8	9.6	25.0	0.32
Jackson County	32	38.1	25.2	56.0	20	24.9	14.6	40.4	0.65
Macon County	49	35.9	26.4	47.8	22	16.1	10.0	24.7	0.45
Overton County	90	59.6	47.6	74.1	29	20.9	13.8	30.6	0.35
Pickett County	23	56.2	34.9	88.5	^	^	^	^	^
Putnam County	183	42.2	36.2	49.0	73	16.5	12.9	20.9	0.39
Smith County	60	51.7	39.2	67.3	22	21.6	13.4	33.1	0.42
Van Buren County	17	43.3	24.3	72.9	^	^	^	^	^
Warren County	108	44.2	36.0	53.7	36	14.2	9.9	19.9	0.32
White County	79	44.6	35.1	56.0	36	19.6	13.7	27.5	0.44

^Statistic not displayed due to fewer than 11 cases.
*Total counts exclude males, hermaphrodites, and transexuals.
**Rates are per 100,000 population and age-adjusted to the 2000 US standard population (19 age groups: <1, 1-4, 5-9, ..., 80-84, 85+).
Rates are for invasive cancer (except for bladder cancer which is invasive and in situ) or unless otherwise specified.
Confidence intervals (Tiwari mod) are 95% for rates.
†Mortality incidence ratio. See Technical Notes for details.
Note the case totals for each region may not sum up to the state total due to records missing resident county information.

Data Source

APPENDIX VIII. MELANOMA OF THE SKIN INCIDENCE AND MORTALITY, BY RESIDENT COUNTY

TABLE 20. MELANOMA OF THE SKIN CANCER, BY RESIDENT COUNTY, TENNESSEE, 2012-2016

	Incidence				Mortality				M:I
	Count*	Rate**	Lower CI	Upper CI	Count*	Rate**	Lower CI	Upper CI	Ratio †
Tennessee	**7,577**	**20.3**	**19.8**	**20.8**	**1,122**	**3.0**	**2.8**	**3.2**	**0.15**
East Region	1,932	26.2	25.0	27.4	249	3.3	2.9	3.8	0.13
Anderson County	122	25.6	21.0	30.8	17	3.3	1.9	5.5	0.13
Blount County	242	30.5	26.7	34.8	32	3.8	2.5	5.5	0.12
Campbell County	44	17.1	12.2	23.3	^	^	^	^	^
Claiborne County	42	20.6	14.7	28.4	^	^	^	^	^
Cocke County	50	22.1	16.1	29.7	^	^	^	^	^
Grainger County	43	28.5	20.4	39.1	^	^	^	^	^
Hamblen County	115	30.4	25.0	36.7	^	^	^	^	^
Jefferson County	109	33.0	26.8	40.2	^	^	^	^	^
Knox County	628	25.0	23.0	27.1	79	3.1	2.5	3.9	0.12
Loudon County	131	31.8	26.2	38.5	15	3.8	2.0	6.7	0.12
Monroe County	67	22.3	17.1	28.6	^	^	^	^	^
Morgan County	27	21.0	13.7	31.1	^	^	^	^	^
Roane County	75	19.3	14.9	24.6	15	3.8	2.1	6.6	0.20
Scott County	18	14.3	8.3	23.1	^	^	^	^	^
Sevier County	185	30.5	26.1	35.4	23	4.1	2.5	6.3	0.13
Union County	34	32.7	22.2	46.4	^	^	^	^	^
Mid-Cumberland Region	1,717	18.6	17.7	19.5	260	2.9	2.6	3.3	0.16
Cheatham County	46	19.7	14.2	26.8	^	^	^	^	^
Davidson County	481	14.7	13.4	16.1	81	2.5	2.0	3.1	0.17
Dickson County	63	21.3	16.2	27.4	^	^	^	^	^
Houston County	12	21.1	10.5	38.9	^	^	^	^	^
Humphreys County	23	19.7	12.3	30.3	^	^	^	^	^
Montgomery County	123	16.1	13.3	19.3	23	3.4	2.1	5.2	0.21
Robertson County	70	19.3	14.9	24.5	^	^	^	^	^
Rutherford County	223	17.5	15.2	20.0	33	2.8	1.9	4.0	0.16
Stewart County	15	16.6	9.1	28.6	^	^	^	^	^
Sumner County	242	25.8	22.6	29.4	33	3.6	2.4	5.0	0.14
Trousdale County	^	^	^	^	^	^	^	^	^
Williamson County	254	24.4	21.4	27.7	32	3.6	2.4	5.1	0.15
Wilson County	163	23.6	20.0	27.6	26	3.6	2.3	5.4	0.15
Northeast Region	989	29.9	28.0	31.9	119	3.4	2.8	4.1	0.11
Carter County	98	26.5	21.3	32.7	^	^	^	^	^
Greene County	117	25.5	20.9	30.9	24	4.9	3.1	7.5	0.19
Hancock County	11	25.5	12.1	48.2	^	^	^	^	^
Hawkins County	103	27.8	22.4	34.1	16	4.7	2.6	7.7	0.17
Johnson County	16	13.8	7.7	23.2	^	^	^	^	^
Sullivan County	346	32.5	29.0	36.4	35	2.9	2.0	4.1	0.09
Unicoi County	45	33.1	23.7	45.5	^	^	^	^	^
Washington County	253	33.9	29.7	38.5	20	2.8	1.7	4.4	0.08
Northwest Region	252	16.5	14.5	18.8	55	3.2	2.4	4.3	0.19
Benton County	17	18.5	10.3	30.7	^	^	^	^	^
Carroll County	28	15.7	10.2	23.2	^	^	^	^	^
Crockett County	16	16.8	9.4	28.1	^	^	^	^	^
Dyer County	30	14.1	9.4	20.4	^	^	^	^	^
Gibson County	35	11.8	8.1	16.6	14	4.1	2.2	7.1	0.35
Henry County	43	19.8	14.0	27.3	^	^	^	^	^
Lake County	^	^	^	^	^	^	^	^	^
Obion County	40	19.9	14.0	27.5	^	^	^	^	^
Weakley County	35	19.1	13.0	27.2	^	^	^	^	^

APPENDIX VIII. MELANOMA OF THE SKIN INCIDENCE AND MORTALITY, BY RESIDENT COUNTY, CONTINUED

South Central Region	391	16.7	15.0	18.5	87	3.7	3.0	4.6	0.22
Bedford County	42	16.7	12.0	22.7	^	^	^	^	^
Coffee County	64	20.4	15.6	26.3	14	4.2	2.3	7.3	0.21
Giles County	34	18.5	12.5	26.4	^	^	^	^	^
Hickman County	20	13.4	8.0	21.2	^	^	^	^	^
Lawrence County	46	17.3	12.6	23.3	17	6.9	4.0	11.2	0.40
Lewis County	13	18.6	9.4	33.2	^	^	^	^	^
Lincoln County	31	12.9	8.7	18.8	^	^	^	^	^
Marshall County	25	13.8	8.8	20.7	^	^	^	^	^
Maury County	87	17.8	14.2	22.2	18	3.5	2.0	5.6	0.20
Moore County	^	^	^	^	^	^	^	^	^
Perry County	^	^	^	^	^	^	^	^	^
Wayne County	16	14.0	7.9	23.6	^	^	^	^	^
Southeast Region	976	23.5	22.0	25.1	133	3.2	2.6	3.8	0.14
Bledsoe County	19	21.1	12.6	33.8	^	^	^	^	^
Bradley County	103	17.4	14.1	21.2	20	3.3	2.0	5.2	0.19
Franklin County	62	22.4	17.0	29.2	^	^	^	^	^
Grundy County	^	^	^	^	^	^	^	^	^
Hamilton County	561	26.7	24.5	29.1	56	2.6	1.9	3.4	0.10
McMinn County	78	23.9	18.7	30.2	14	4.3	2.3	7.4	0.18
Marion County	44	23.1	16.5	31.6	^	^	^	^	^
Meigs County	18	21.5	12.2	35.9	^	^	^	^	^
Polk County	19	17.1	10.0	27.6	^	^	^	^	^
Rhea County	43	21.6	15.3	29.6	^	^	^	^	^
Sequatchie County	20	22.8	13.6	36.1	^	^	^	^	^
Southwest Region	779	11.2	10.4	12.0	140	2.0	1.7	2.4	0.18
Chester County	^	^	^	^	^	^	^	^	^
Decatur County	15	17.7	9.3	31.2	^	^	^	^	^
Fayette County	34	13.9	9.4	20.0	^	^	^	^	^
Hardeman County	16	9.8	5.6	16.3	^	^	^	^	^
Hardin County	30	16.0	10.5	23.6	^	^	^	^	^
Haywood County	12	9.9	5.0	18.0	^	^	^	^	^
Henderson County	25	16.2	10.3	24.3	^	^	^	^	^
Lauderdale County	18	12.2	7.2	19.5	^	^	^	^	^
McNairy County	26	15.7	10.0	23.7	^	^	^	^	^
Madison County	74	13.5	10.5	17.1	^	^	^	^	^
Shelby County	480	10.2	9.3	11.2	86	1.9	1.5	2.3	0.19
Tipton County	39	12.2	8.6	16.9	^	^	^	^	^
Upper-Cumberland Region	533	23.7	21.6	25.9	79	3.4	2.7	4.3	0.14
Cannon County	21	22.4	13.7	35.0	^	^	^	^	^
Clay County	^	^	^	^	^	^	^	^	^
Cumberland County	142	28.8	23.7	34.8	18	3.6	2.0	6.2	0.13
DeKalb County	24	20.3	12.7	31.0	^	^	^	^	^
Fentress County	28	26.6	17.1	39.7	^	^	^	^	^
Jackson County	13	16.3	8.3	29.7	^	^	^	^	^
Macon County	30	22.3	14.9	32.2	^	^	^	^	^
Overton County	28	20.9	13.7	30.6	^	^	^	^	^
Pickett County	^	^	^	^	^	^	^	^	^
Putnam County	94	22.3	17.9	27.5	^	^	^	^	^
Smith County	19	16.9	10.0	26.9	^	^	^	^	^
Van Buren County	11	24.2	11.8	46.9	^	^	^	^	^
Warren County	65	27.7	21.2	35.6	14	6.0	3.2	10.2	0.22
White County	44	25.5	18.2	34.8	^	^	^	^	^

^Statistic not displayed due to fewer than 11 cases.

*Total counts exclude males, hermaphrodites, and transexuals.

**Rates are per 100,000 population and age-adjusted to the 2000 US standard population (19 age groups: <1, 1-4, 5-9, ..., 80-84, 85+).

Rates are for invasive cancer (except for bladder cancer which is invasive and in situ) or unless otherwise specified.

Confidence intervals (Tiwari mod) are 95% for rates.

†Mortality incidence ratio. See Technical Notes for details.

Note the case totals for each region may not sum up to the state total due to records missing resident county information.

Data Source

APPENDIX IX. PANCREATIC CANCER INCIDENCE AND MORTALITY, BY RESIDENT COUNTY

TABLE 21. PANCREATIC CANCER, BY RESIDENT COUNTY, TENNESSEE, 2012-2016

	Incidence				Mortality				M:I
	Count*	Rate**	Lower CI	Upper CI	Count*	Rate**	Lower CI	Upper CI	Ratio †
Tennessee	**4,830**	**12.4**	**12.0**	**12.7**	**4,317**	**11.1**	**10.8**	**11.4**	**0.90**
East Region	1001	12.7	11.9	13.5	878	11.0	10.3	11.8	0.87
Anderson County	47	8.6	6.2	11.6	45	8.0	5.8	10.8	0.93
Blount County	112	12.7	10.5	15.4	89	10.0	8.0	12.4	0.79
Campbell County	26	8.9	5.8	13.4	25	8.6	5.5	12.9	0.97
Claiborne County	29	14.7	9.7	21.5	28	12.9	8.5	19.1	0.88
Cocke County	41	15.5	11.0	21.6	33	12.5	8.5	18.0	0.81
Grainger County	24	16.1	10.1	24.5	20	13.4	8.1	21.3	0.83
Hamblen County	51	12.3	9.1	16.3	34	7.8	5.4	11.1	0.63
Jefferson County	44	11.7	8.4	16.0	39	10.4	7.4	14.5	0.89
Knox County	345	13.1	11.7	14.6	316	12.1	10.8	13.5	0.92
Loudon County	61	13.6	10.3	17.9	63	14.0	10.7	18.3	1.03
Monroe County	62	20.5	15.5	26.7	45	14.5	10.5	19.8	0.71
Morgan County	^	^	^	^	^	^	^	^	^
Roane County	43	10.8	7.7	14.9	44	10.8	7.8	14.9	1.00
Scott County	14	10.4	5.6	17.9	^	^	^	^	^
Sevier County	75	11.8	9.2	14.9	62	9.6	7.3	12.5	0.81
Union County	18	16.2	9.4	26.2	17	14.9	8.5	24.4	0.92
Mid-Cumberland Region	1,105	12.1	11.4	12.8	956	10.6	9.9	11.3	0.88
Cheatham County	34	15.7	10.6	22.3	31	14.4	9.6	20.9	0.92
Davidson County	401	12.5	11.3	13.8	364	11.4	10.3	12.7	0.91
Dickson County	43	14.2	10.2	19.3	38	12.9	9.1	17.9	0.91
Houston County	^	^	^	^	^	^	^	^	^
Humphreys County	^	^	^	^	^	^	^	^	^
Montgomery County	92	13.2	10.6	16.2	80	12.2	9.6	15.2	0.92
Robertson County	47	12.9	9.4	17.4	37	9.8	6.8	13.7	0.76
Rutherford County	133	10.8	8.9	12.8	109	9.0	7.4	11.0	0.83
Stewart County	17	18.2	10.5	30.1	11	11.9	5.8	22.3	0.65
Sumner County	117	11.4	9.4	13.8	96	9.4	7.6	11.5	0.82
Trousdale County	^	^	^	^	^	^	^	^	^
Williamson County	103	9.8	7.9	12.0	85	8.2	6.5	10.3	0.84
Wilson County	96	13.4	10.8	16.5	84	12.2	9.6	15.2	0.91
Northeast Region	475	13.0	11.8	14.3	423	11.6	10.5	12.8	0.89
Carter County	49	12.0	8.8	16.1	50	11.9	8.8	15.9	0.99
Greene County	45	8.8	6.4	12.0	47	9.4	6.9	12.7	1.07
Hancock County	^	^	^	^	^	^	^	^	^
Hawkins County	58	14.2	10.7	18.6	48	11.9	8.7	16.0	0.84
Johnson County	20	14.4	8.7	23.1	16	11.9	6.7	20.2	0.83
Sullivan County	158	13.3	11.3	15.7	130	10.9	9.1	13.0	0.82
Unicoi County	24	17.1	10.9	26.4	24	16.7	10.6	25.8	0.98
Washington County	114	13.9	11.4	16.8	101	12.5	10.1	15.3	0.90
Northwest Region	213	12.3	10.7	14.2	209	11.9	10.3	13.7	0.97
Benton County	20	15.2	9.1	24.7	17	13.4	7.6	22.8	0.88
Carroll County	28	13.1	8.6	19.4	29	13.4	8.9	19.7	1.02
Crockett County	^	^	^	^	^	^	^	^	^
Dyer County	27	11.8	7.7	17.4	23	10.3	6.5	15.6	0.87
Gibson County	44	13.2	9.5	17.9	48	14.2	10.4	19.0	1.08
Henry County	34	13.8	9.4	19.9	35	14.1	9.7	20.2	1.02
Lake County	^	^	^	^	^	^	^	^	^
Obion County	30	13.8	9.2	20.1	30	13.0	8.7	18.9	0.94
Weakley County	18	8.8	5.2	14.2	17	7.7	4.4	12.6	0.88

APPENDIX IX. PANCREATIC CANCER INCIDENCE AND MORTALITY, BY RESIDENT COUNTY, CONTINUED

South Central Region	289	11.5	10.1	12.9	269	10.8	9.5	12.2	0.94
Bedford County	29	10.9	7.2	15.8	29	11.5	7.7	16.7	1.06
Coffee County	38	11.2	7.8	15.5	32	9.2	6.3	13.1	0.82
Giles County	24	12.5	7.8	19.2	22	10.9	6.7	17.0	0.87
Hickman County	22	14.1	8.8	21.8	16	9.7	5.5	16.3	0.69
Lawrence County	20	6.7	4.1	10.6	21	7.3	4.5	11.4	1.09
Lewis County	^	^	^	^	^	^	^	^	^
Lincoln County	29	12.6	8.3	18.4	26	11.5	7.5	17.2	0.91
Marshall County	23	12.2	7.7	18.7	25	13.1	8.4	19.7	1.07
Maury County	71	13.1	10.2	16.7	60	11.4	8.6	14.8	0.87
Moore County	^	^	^	^	^	^	^	^	^
Perry County	^	^	^	^	^	^	^	^	^
Wayne County	12	10.4	5.3	18.9	15	13.2	7.3	22.4	1.27
Southeast Region	547	12.3	11.3	13.4	493	11.0	10.0	12.0	0.89
Bledsoe County	15	14.1	7.8	24.3	11	11.0	5.4	20.8	0.78
Bradley County	63	9.6	7.3	12.4	54	8.4	6.3	11.0	0.88
Franklin County	35	12.3	8.5	17.5	32	11.0	7.4	15.8	0.89
Grundy County	17	18.4	10.4	30.7	^	^	^	^	^
Hamilton County	279	12.6	11.1	14.2	251	11.2	9.8	12.7	0.89
McMinn County	44	12.1	8.7	16.5	41	10.9	7.8	15.0	0.90
Marion County	39	19.2	13.5	26.8	39	18.6	13.1	26.0	0.97
Meigs County	^	^	^	^	^	^	^	^	^
Polk County	16	13.0	7.4	22.1	15	12.9	7.2	22.1	0.99
Rhea County	26	11.8	7.6	17.6	24	11.0	7.0	16.6	0.93
Sequatchie County	^	^	^	^	^	^	^	^	^
Southwest Region	917	12.9	12.0	13.7	820	11.6	10.8	12.5	0.90
Chester County	14	14.7	7.9	25.1	13	13.1	6.8	22.8	0.89
Decatur County	^	^	^	^	^	^	^	^	^
Fayette County	34	12.1	8.3	17.3	25	8.5	5.4	13.0	0.70
Hardeman County	19	11.5	6.8	18.4	14	8.7	4.7	15.0	0.76
Hardin County	23	12.3	7.6	19.1	23	12.1	7.5	18.7	0.98
Haywood County	19	16.5	9.7	26.4	15	12.5	6.9	21.2	0.76
Henderson County	19	10.8	6.4	17.2	23	13.1	8.2	20.1	1.21
Lauderdale County	21	13.0	7.9	20.1	18	11.4	6.7	18.4	0.88
McNairy County	31	17.0	11.4	24.6	29	15.7	10.4	23.1	0.92
Madison County	63	11.5	8.8	14.8	60	10.6	8.0	13.7	0.92
Shelby County	628	13.3	12.3	14.4	561	12.1	11.1	13.2	0.91
Tipton County	38	10.7	7.5	14.9	31	9.4	6.3	13.5	0.88
Upper-Cumberland Region	281	11.6	10.2	13.0	269	11.0	9.7	12.5	0.95
Cannon County	^	^	^	^	^	^	^	^	^
Clay County	^	^	^	^	^	^	^	^	^
Cumberland County	60	11.7	8.7	15.6	56	10.2	7.5	13.8	0.87
DeKalb County	14	9.5	5.1	16.8	12	9.0	4.5	16.5	0.95
Fentress County	16	11.8	6.6	20.1	16	11.6	6.5	19.9	0.98
Jackson County	^	^	^	^	^	^	^	^	^
Macon County	16	11.7	6.6	19.3	17	12.5	7.2	20.4	1.07
Overton County	21	13.9	8.5	21.7	18	12.3	7.2	19.9	0.88
Pickett County	^	^	^	^	^	^	^	^	^
Putnam County	58	13.1	9.9	17.0	52	11.6	8.6	15.3	0.89
Smith County	^	^	^	^	11	9.3	4.5	17.3	^
Van Buren County	^	^	^	^	^	^	^	^	^
Warren County	38	15.3	10.8	21.2	38	15.2	10.7	21.1	0.99
White County	18	10.2	6.0	16.6	18	9.4	5.6	15.4	0.92

^Statistic not displayed due to fewer than 11 cases.

*Total counts exclude males, hermaphrodites, and transexuals.

**Rates are per 100,000 population and age-adjusted to the 2000 US standard population (19 age groups: <1, 1-4, 5-9, ..., 80-84, 85+).

Rates are for invasive cancer (except for bladder cancer which is invasive and in situ) or unless otherwise specified.

Confidence intervals (Tiwari mod) are 95% for rates.

†Mortality incidence ratio. See Technical Notes for details.

Note the case totals for each region may not sum up to the state total due to records missing resident county information.

Data Source

APPENDIX X. CHILDHOOD CANCER INCIDENCE AND MORTALITY, BY RESIDENT COUNTY

TABLE 22. CHILDHOOD CANCER, BY RESIDENT COUNTY, TENNESSEE, 2012-2016

	Incidence				Mortality				M:I
	Count*	Rate**	Lower CI	Upper CI	Count*	Rate**	Lower CI	Upper CI	Ratio †
Tennessee	**1,527**	**183.6**	**174.5**	**193.1**	**205**	**24.7**	**21.4**	**28.3**	**0.13**
East Region	268	187.9	166.0	211.8	37	25.8	18.1	35.5	0.14
Anderson County	15	170.5	95.4	281.6	^	^	^	^	^
Blount County	32	223.9	153.0	316.3	^	^	^	^	^
Campbell County	^	^	^	^	^	^	^	^	^
Claiborne County	11	317.8	158.1	570.3	^	^	^	^	^
Cocke County	^	^	^	^	^	^	^	^	^
Grainger County	^	^	^	^	^	^	^	^	^
Hamblen County	20	251.0	153.3	387.6	^	^	^	^	^
Jefferson County	^	^	^	^	^	^	^	^	^
Knox County	93	168.3	135.8	206.2	17	30.6	17.8	49.1	0.18
Loudon County	16	289.6	165.5	470.3	^	^	^	^	^
Monroe County	^	^	^	^	^	^	^	^	^
Morgan County	^	^	^	^	^	^	^	^	^
Roane County	12	217.0	111.7	380.1	^	^	^	^	^
Scott County	^	^	^	^	^	^	^	^	^
Sevier County	22	199.9	125.3	302.6	^	^	^	^	^
Union County	^	^	^	^	^	^	^	^	^
Mid-Cumberland Region	438	176.0	159.9	193.3	56	22.8	17.2	29.6	0.13
Cheatham County	12	235.2	121.4	412.0	^	^	^	^	^
Davidson County	128	153.6	127.9	182.8	20	25.5	15.5	39.3	0.17
Dickson County	13	199.1	106.0	340.5	^	^	^	^	^
Houston County	^	^	^	^	^	^	^	^	^
Humphreys County	^	^	^	^	^	^	^	^	^
Montgomery County	50	174.0	128.7	230.0	^	^	^	^	^
Robertson County	14	152.3	83.2	255.6	^	^	^	^	^
Rutherford County	73	178.7	140.1	224.8	^	^	^	^	^
Stewart County	^	^	^	^	^	^	^	^	^
Sumner County	39	171.3	121.8	234.2	^	^	^	^	^
Trousdale County	^	^	^	^	^	^	^	^	^
Williamson County	65	218.1	167.7	279.0	^	^	^	^	^
Wilson County	31	188.7	128.1	268.0	^	^	^	^	^
Northeast Region	122	217.2	180.3	259.4	^	^	^	^	^
Carter County	15	252.2	141.0	416.6	^	^	^	^	^
Greene County	16	208.4	118.8	339.6	^	^	^	^	^
Hancock County	^	^	^	^	^	^	^	^	^
Hawkins County	11	164.7	82.1	296.5	^	^	^	^	^
Johnson County	^	^	^	^	^	^	^	^	^
Sullivan County	39	224.6	159.7	307.3	^	^	^	^	^
Unicoi County	^	^	^	^	^	^	^	^	^
Washington County	32	226.0	154.4	319.2	^	^	^	^	^
Northwest Region	49	157.1	116.2	207.8	^	^	^	^	^
Benton County	^	^	^	^	^	^	^	^	^
Carroll County	^	^	^	^	^	^	^	^	^
Crockett County	^	^	^	^	^	^	^	^	^
Dyer County	11	218.7	109.1	391.5	^	^	^	^	^
Gibson County	^	^	^	^	^	^	^	^	^
Henry County	^	^	^	^	^	^	^	^	^
Lake County	^	^	^	^	^	^	^	^	^
Obion County	^	^	^	^	^	^	^	^	^
Weakley County	^	^	^	^	^	^	^	^	^

APPENDIX X. CHILDHOOD CANCER INCIDENCE AND MORTALITY, BY RESIDENT COUNTY, CONTINUED

South Central Region	107	216.4	177.3	261.5	14	28.4	15.5	47.6	0.13
Bedford County	13	201.1	107.0	343.8	^	^	^	^	^
Coffee County	12	170.1	87.9	297.2	^	^	^	^	^
Giles County	^	^	^	^	^	^	^	^	^
Hickman County	^	^	^	^	^	^	^	^	^
Lawrence County	19	325.8	196.1	509.2	^	^	^	^	^
Lewis County	^	^	^	^	^	^	^	^	^
Lincoln County	^	^	^	^	^	^	^	^	^
Marshall County	^	^	^	^	^	^	^	^	^
Maury County	28	247.9	164.5	358.9	^	^	^	^	^
Moore County	^	^	^	^	^	^	^	^	^
Perry County	^	^	^	^	^	^	^	^	^
Wayne County	^	^	^	^	^	^	^	^	^
Southeast Region	144	176.2	148.6	207.4	18	21.9	13.0	34.7	0.12
Bledsoe County	^	^	^	^	^	^	^	^	^
Bradley County	27	207.1	136.4	301.6	^	^	^	^	^
Franklin County	^	^	^	^	^	^	^	^	^
Grundy County	^	^	^	^	^	^	^	^	^
Hamilton County	62	147.9	113.4	189.6	^	^	^	^	^
McMinn County	14	222.5	121.5	373.8	^	^	^	^	^
Marion County	^	^	^	^	^	^	^	^	^
Meigs County	^	^	^	^	^	^	^	^	^
Polk County	^	^	^	^	^	^	^	^	^
Rhea County	^	^	^	^	^	^	^	^	^
Sequatchie County	^	^	^	^	^	^	^	^	^
Southwest Region	317	174.9	156.2	195.3	53	29.3	22.0	38.4	0.17
Chester County	^	^	^	^	^	^	^	^	^
Decatur County	^	^	^	^	^	^	^	^	^
Fayette County	15	344.0	192.5	567.0	^	^	^	^	^
Hardeman County	^	^	^	^	^	^	^	^	^
Hardin County	^	^	^	^	^	^	^	^	^
Haywood County	^	^	^	^	^	^	^	^	^
Henderson County	^	^	^	^	^	^	^	^	^
Lauderdale County	^	^	^	^	^	^	^	^	^
McNairy County	^	^	^	^	^	^	^	^	^
Madison County	17	130.0	75.7	208.3	^	^	^	^	^
Shelby County	227	170.9	149.3	194.6	41	31.0	22.3	42.1	0.18
Tipton County	15	177.6	99.3	293.3	^	^	^	^	^
Upper-Cumberland Region	82	198.2	157.6	246.1	^	^	^	^	^
Cannon County	^	^	^	^	^	^	^	^	^
Clay County	^	^	^	^	^	^	^	^	^
Cumberland County	^	^	^	^	^	^	^	^	^
DeKalb County	^	^	^	^	^	^	^	^	^
Fentress County	^	^	^	^	^	^	^	^	^
Jackson County	^	^	^	^	^	^	^	^	^
Macon County	11	350.1	174.7	626.9	^	^	^	^	^
Overton County	^	^	^	^	^	^	^	^	^
Pickett County	^	^	^	^	^	^	^	^	^
Putnam County	15	156.9	87.4	260.0	^	^	^	^	^
Smith County	^	^	^	^	^	^	^	^	^
Van Buren County	^	^	^	^	^	^	^	^	^
Warren County	^	^	^	^	^	^	^	^	^
White County	^	^	^	^	^	^	^	^	^

^Statistic not displayed due to fewer than 11 cases.
*Total counts exclude hermaphrodites and transexuals.
**Rates are per 1,000,000 population and age-adjusted to the 2000 US standard population (19 age groups: <1, 1-4, 5-9, ..., 80-84, 85+).
Rates are for invasive cancer (except for bladder cancer which is invasive and in situ) or unless otherwise specified.
Confidence intervals (Tiwari mod) are 95% for rates.
†Mortality incidence ratio. See Technical Notes for details.
Note the case totals for each region may not sum up to the state total due to records missing resident county information.

Data Source

APPENDIX XI. CANCER INCIDENCE AND MORTALITY OF COMMON CANCERS, THREE-YEAR MOVING AVERAGE

TABLE 23. COMMON CANCERS, THREE-YEAR MOVING AVERAGE, TENNESSEE, 2012-2016

		Incidence				Mortality				M:I
Cancer Site	Year	Count*	Rate**	Lower CI	Upper CI	Count*	Rate**	Lower CI	Upper CI	Ratio †
All Sites	2012-2014	105,023	463.2	460.3	466.0	41,723	185.4	183.6	187.2	0.40
	2013-2015	107,233	463.4	460.5	466.2	42,265	183.5	181.8	185.3	0.40
	2014-2016	109,336	463.0	460.2	465.8	42,791	181.9	180.1	183.7	0.39
Lung and Bronchus	2012-2014	17,482	75.7	74.5	76.8	13,058	57.1	56.1	58.1	0.75
	2013-2015	18,030	76.3	75.1	77.4	13,072	55.7	54.7	56.7	0.73
	2014-2016	18,208	75.1	73.9	76.2	13,111	54.7	53.8	55.7	0.73
Female Breast	2012-2014	14,794	123.3	121.3	125.4	2,735	22.0	21.2	22.9	0.18
	2013-2015	15,100	123.9	121.9	125.9	2,765	21.9	21.1	22.7	0.18
	2014-2016	15,066	121.9	119.9	123.9	2,800	21.8	21.0	22.6	0.18
Prostate	2012-2014	12,262	110.0	108.0	112.0	1,666	19.4	18.5	20.4	0.18
	2013-2015	12,352	107.7	105.8	109.7	1,707	19.3	18.4	20.2	0.18
	2014-2016	12,750	108.5	106.6	110.4	1,830	20.1	19.1	21.0	0.19
Colon and Rectum	2012-2014	9,116	40.7	39.9	41.6	3,542	16.0	15.4	16.5	0.39
	2013-2015	9,209	40.2	39.4	41.1	3,554	15.7	15.1	16.2	0.39
	2014-2016	9,539	40.9	40.0	41.7	3,548	15.3	14.8	15.8	0.37
Melanoma of the Skin	2012-2014	4,379	20.0	19.4	20.6	673	3.1	2.8	3.3	0.16
	2013-2015	4,646	20.7	20.1	21.4	705	3.1	2.9	3.4	0.15
	2014-2016	4,646	20.3	19.7	20.9	664	2.9	2.7	3.1	0.14
Pancreas	2012-2014	2,801	12.2	11.8	12.7	2,556	11.2	10.8	11.7	0.92
	2013-2015	2,919	12.5	12.0	12.9	2,644	11.3	10.9	11.8	0.90
	2014-2016	3,007	12.5	12.1	13.0	2,678	11.2	10.7	11.6	0.90

^Statistic not displayed due to fewer than 11 cases.

*Total counts exclude hermaphrodites and transexuals.

**Rates are per 100,000 population and age-adjusted to the 2000 US standard population (19 age groups: <1, 1-4, 5-9, …, 80-84, 85+). Rates are for invasive cancer only (except for bladder cancer which is invasive and in situ) or unless otherwise specified.

†Mortality incidence ratio. See Technical Notes for details.

Data Source

APPENDIX XII. NUMBER OF DEATHS AND YEARS OF POTENTIAL LIFE LOST, BY GENDER AND RACE, TENNESSEE, 2012-2016

TABLE 24. Number of Deaths and Years of Potential Life Lost to Cancer, by Gender and Race

Gender	Race	2012	2013	2014	2015	2016	2012-2016 Total	YPLL*	AYPLL**
Both†	All Races‡	13,632	13,938	14,153	14,174	14,464	70,361	579,309	8.2
	Black	1,935	1,954	2,041	1,925	2,024	9,879	103,506	10.5
	White	11,591	11,876	11,983	11,933	12,306	59,689	466,660	7.8
Female	All Races‡	6,219	6,352	6,512	6,486	6,602	32,171	263,815	8.2
	Black Females	884	980	1,020	905	956	4,745	49,929	10.5
	White Females	5,280	5,313	5,435	5,427	5,573	27,028	209,185	7.7
Male	All Races‡	7,413	7,586	7,641	7,688	7,862	38,190	315,489	8.3
	Black Males	1,051	974	1,021	1,020	1,068	5,134	53,577	10.4
	White Males	6,311	6,563	6,548	6,506	6,733	32,661	257,470	7.9

*YPLL represents Years of Potential Life Lost.

**AYPLL represents Average Years of Potential Life Lost.

† Excludes hermaphrodites and transexuals.

‡ Includes blacks, whites, other races, and those missing race information.

APPENDIX XIII. NUMBER OF DEATHS AND YEARS OF POTENTIAL LIFE LOST, BY CANCER PRIMARY SITE, TENNESSEE, 2012-2016

TABLE 25. Number of Deaths and Years of Potential Life Lost, By Cancer Site

Primary Cancer Site	2012	2013	2014	2015	2016	2012-2016 Total	YPLL*	AYPLL**
Brain & Other CNS	332	383	380	316	365	1,776	25,178	14.2
Female Breast	905	924	906	935	959	4,629	46,072	10.0
Colorectal	1,181	1,212	1,149	1,193	1,206	5,941	44,744	7.5
Corpus and Uterus	166	169	181	206	199	921	7,332	8.0
Esophagus	307	323	336	327	331	1,624	15,901	9.8
Kidney & Renal Pelvis	289	363	312	319	338	1,621	13,155	8.1
Leukemia	542	505	518	450	563	2,578	20,041	7.8
Liver & Intrahepatic Bile Duct	528	503	543	593	561	2,728	27,512	10.1
Lung	4,327	4,302	4,429	4,341	4,341	21,740	160,898	7.4
Melanoma of the Skin	213	245	215	245	204	1,122	10,977	9.8
NH Lymphoma	430	441	471	487	489	2,318	14,009	6.0
Oral Cavity and Pharynx	210	225	251	224	256	1,166	11,924	10.2
Ovary	316	294	318	326	316	1,570	12,951	8.2
Pancreas	786	853	917	874	887	4,317	32,491	7.5
Prostate	545	541	580	586	664	2,916	9,863	3.4
Urinary Bladder	306	324	317	328	346	1,621	7,329	4.5

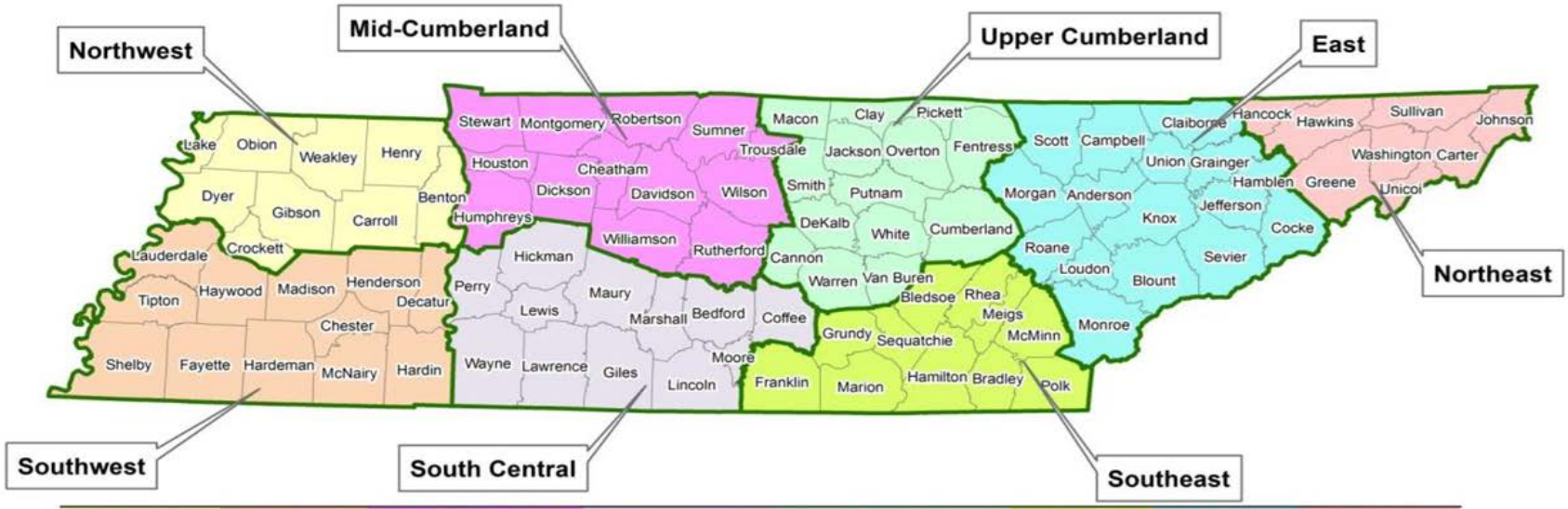
*YPLL represents Years of Potential Life Lost.

**AYPLL represents Average Years of Potential Life Lost.

MAPS

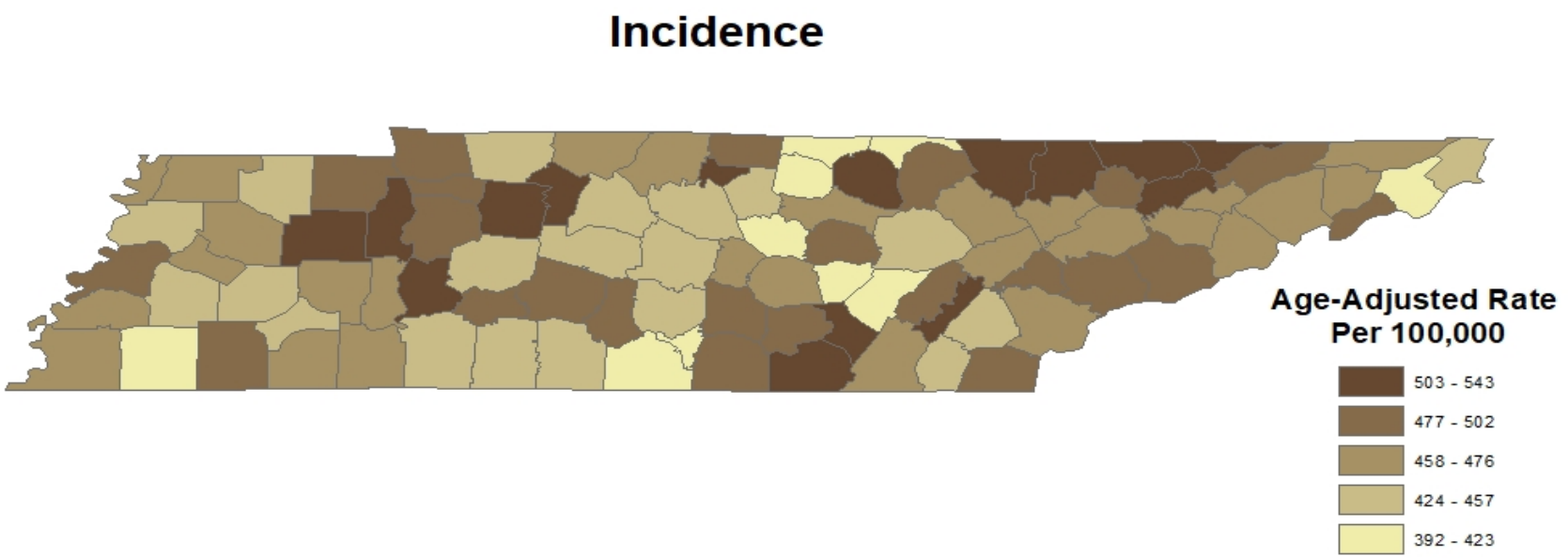
APPENDIX XIV. COUNTY MAPS OF INCIDENCE AND MORTALITY RATES OF ALL CANCER SITES COMBINED AND COMMON CANCERS

1. TENNESSEE COUNTIES AND REGIONAL GROUPINGS



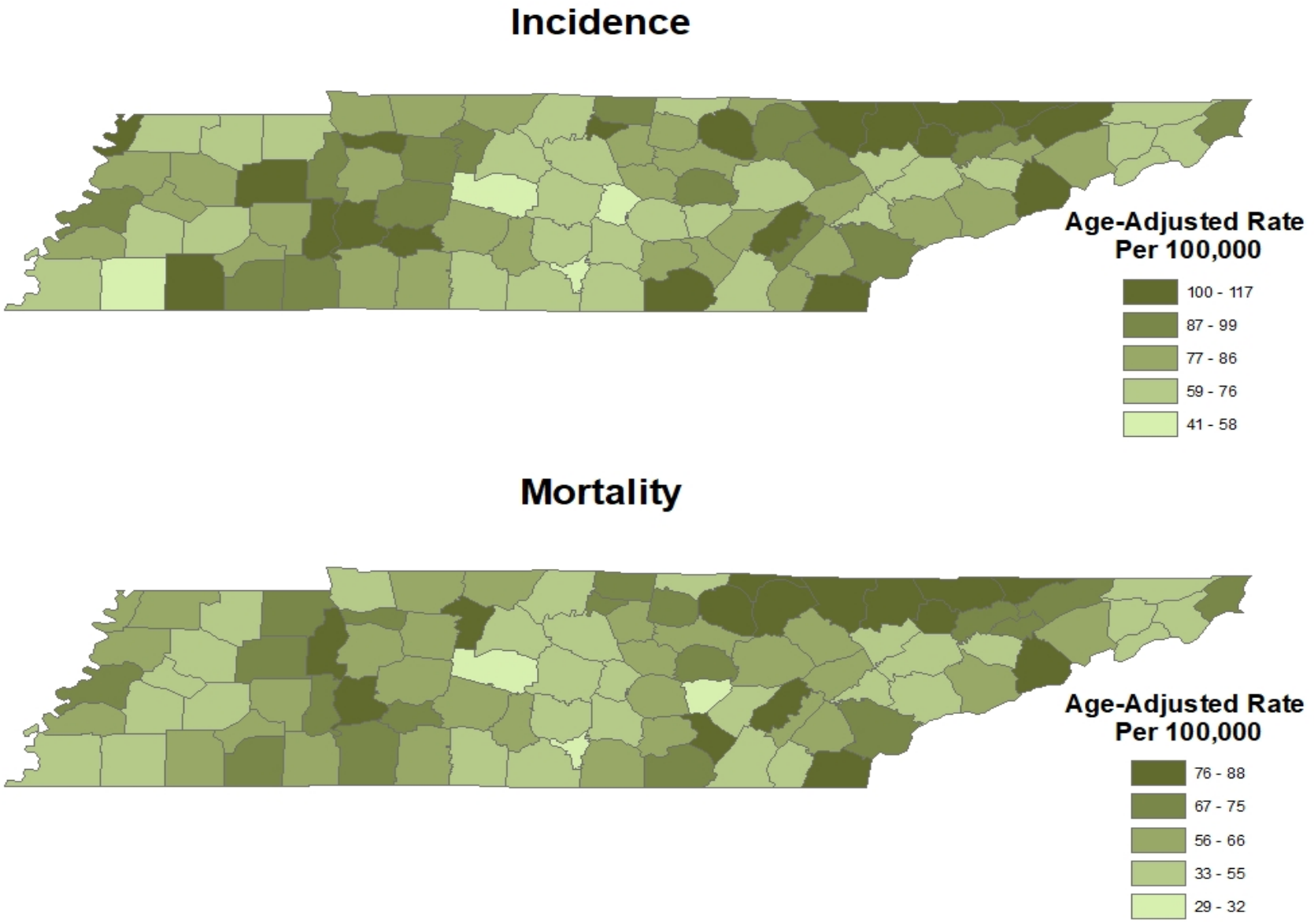
Northwest	Southwest	Mid-Cumberland	South Central	Upper-Cumberland	Southeast	East	Northeast
Benton	Chester	Cheatham	Bedford	Cannon	Bledsoe	Anderson	Carter
Carroll	Decatur	Davidson	Coffee	Clay	Bradley	Blount	Greene
Crockett	Fayette	Dickson	Giles	Cumberland	Franklin	Campbell	Hancock
Dyer	Hardeman	Houston	Hickman	DeKalb	Grundy	Claiborne	Haw kins
Gibson	Hardin	Humphreys	Law rence	Fentress	Hamilton	Cocke	Johnson
Henry	Hayw ood	Montgomery	Lew is	Jackson	McMinn	Grainger	Sullivan
Lake	Henderson	Robertson	Lincoln	Macon	Marion	Hamblen	Unicoi
Obion	Lauderdale	Rutherford	Marshall	Overton	Meigs	Jefferson	Washington
Weakley	McNairy	Stew art	Maury	Pickett	Polk	Knox	
	Madison	Sumner	Moore	Putnam	Rhea	Loudon	
	Shelby	Trousdale	Perry	Smith	Sequatchie	Monroe	
	Tipton	Williamson	Wayne	Van Buren		Morgan	
		Wilson		Warren		Roane	
				White		Scott	
						Sevier	
						Union	

2. AGE-ADJUSTED CANCER INCIDENCE AND MORTALITY RATES BY RESIDENT COUNTY, ALL SITES COMBINED, TENNESSEE, 2012-2016



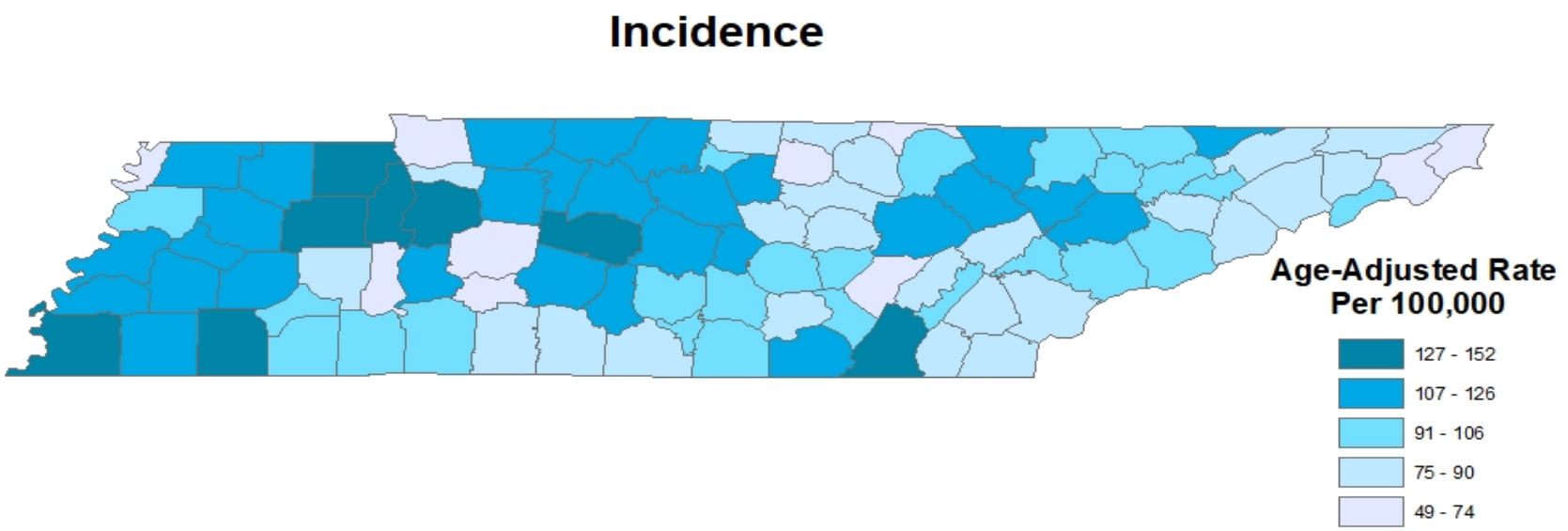
Data Source

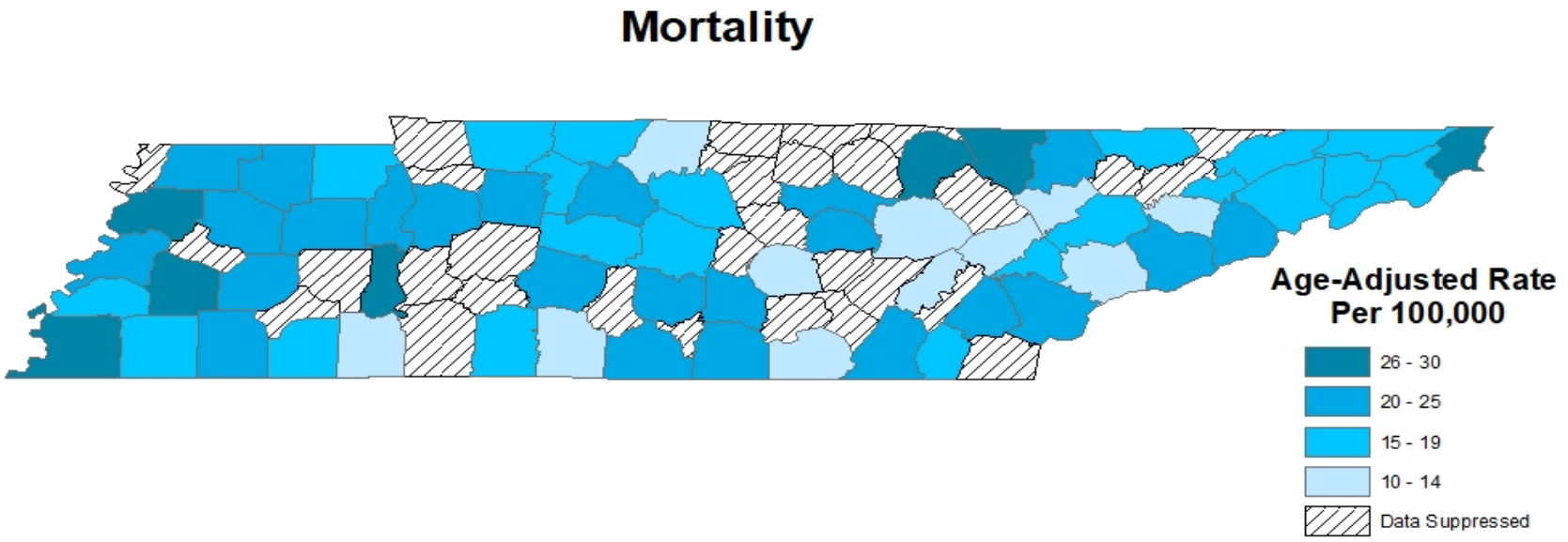
3. AGE-ADJUSTED CANCER INCIDENCE AND MORTALITY RATES BY RESIDENT COUNTY, LUNG, TENNESSEE, 2012-2016



Data Source

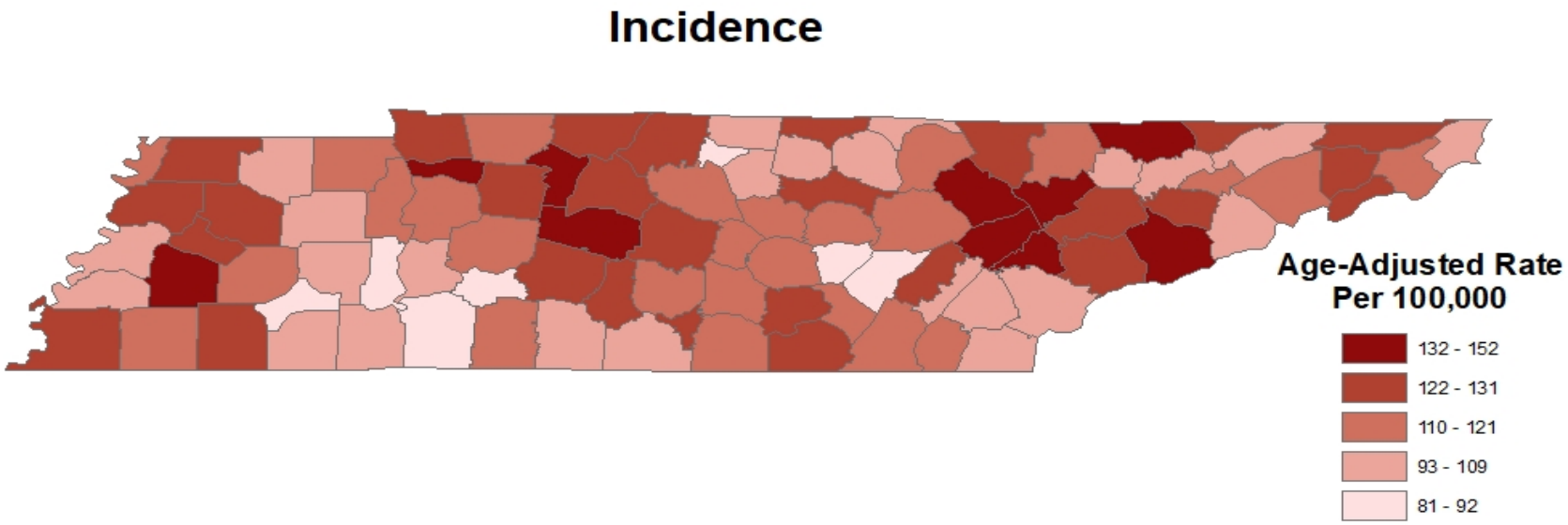
4. AGE-ADJUSTED CANCER INCIDENCE AND MORTALITY RATES BY RESIDENT COUNTY, PROSTATE, TENNESSEE, 2012-2016

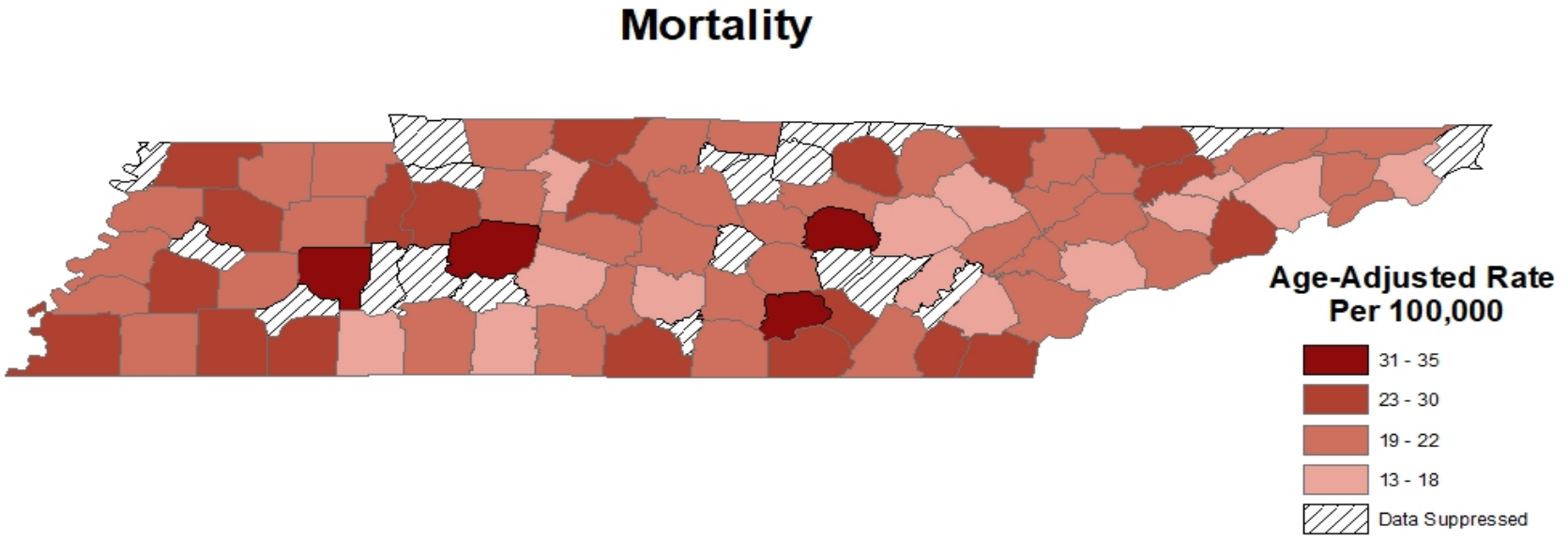




Data Source

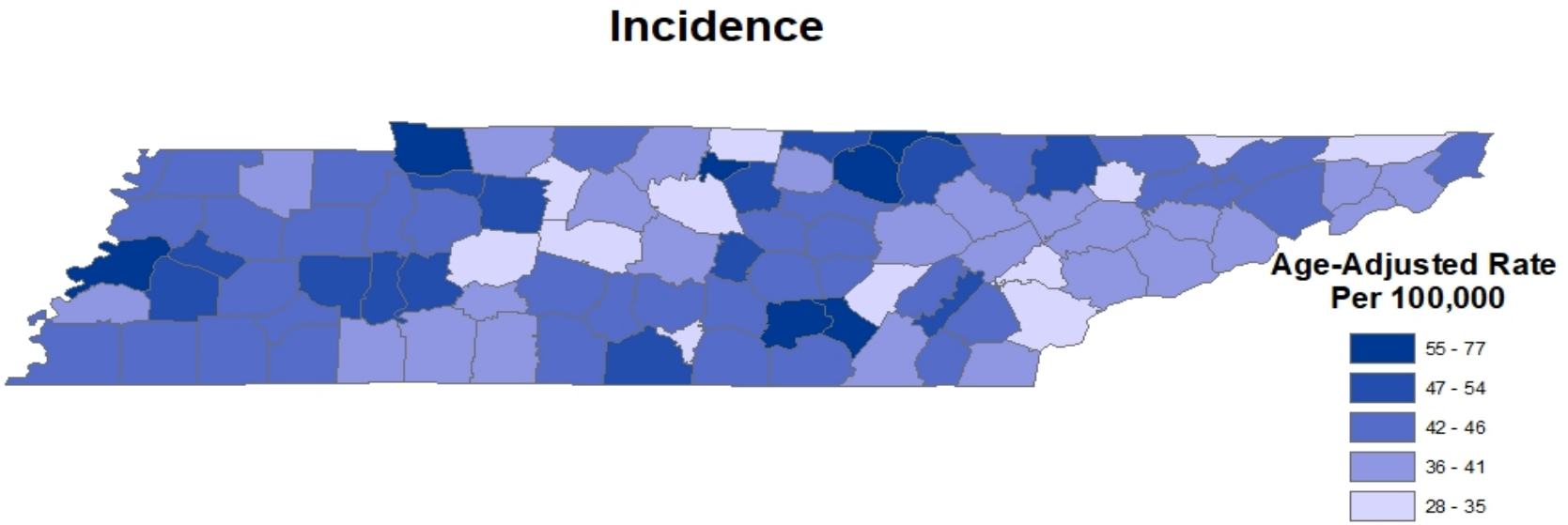
5. AGE-ADJUSTED CANCER INCIDENCE AND MORTALITY RATES BY RESIDENT COUNTY, FEMALE BREAST, TENNESSEE, 2012-2016

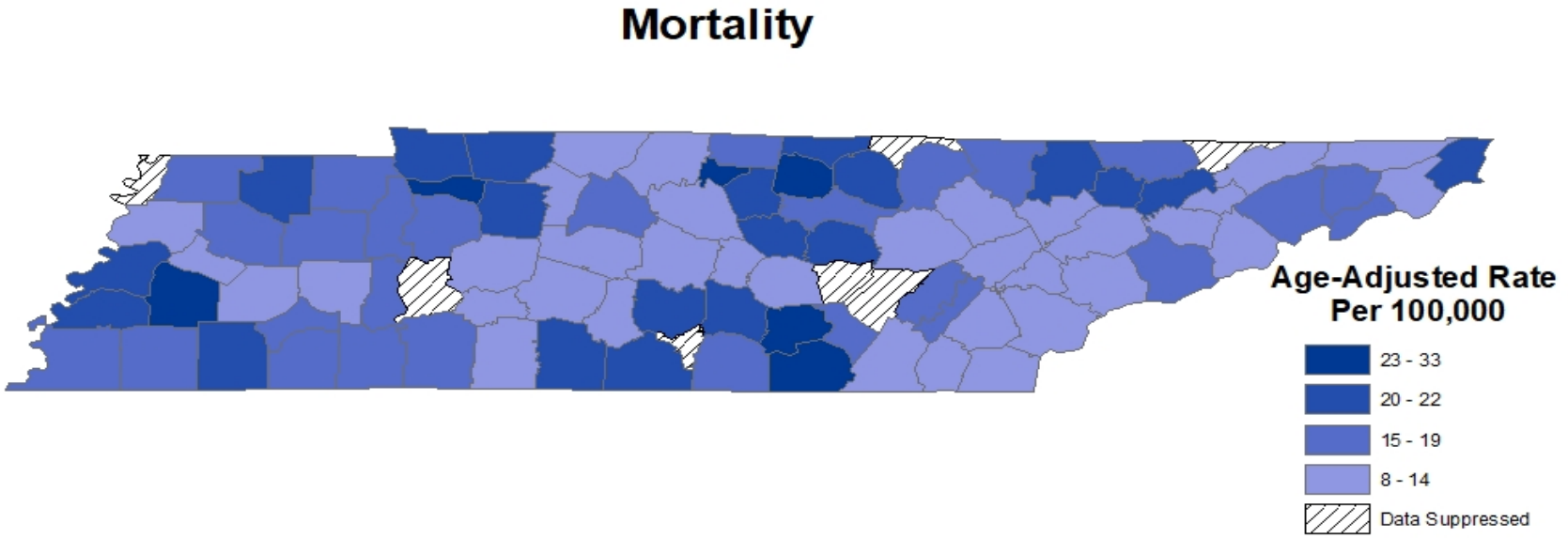




Data Source

6. AGE-ADJUSTED CANCER INCIDENCE AND MORTALITY RATES BY RESIDENT COUNTY, COLON AND RECTUM, TENNESSEE, 2012-2016

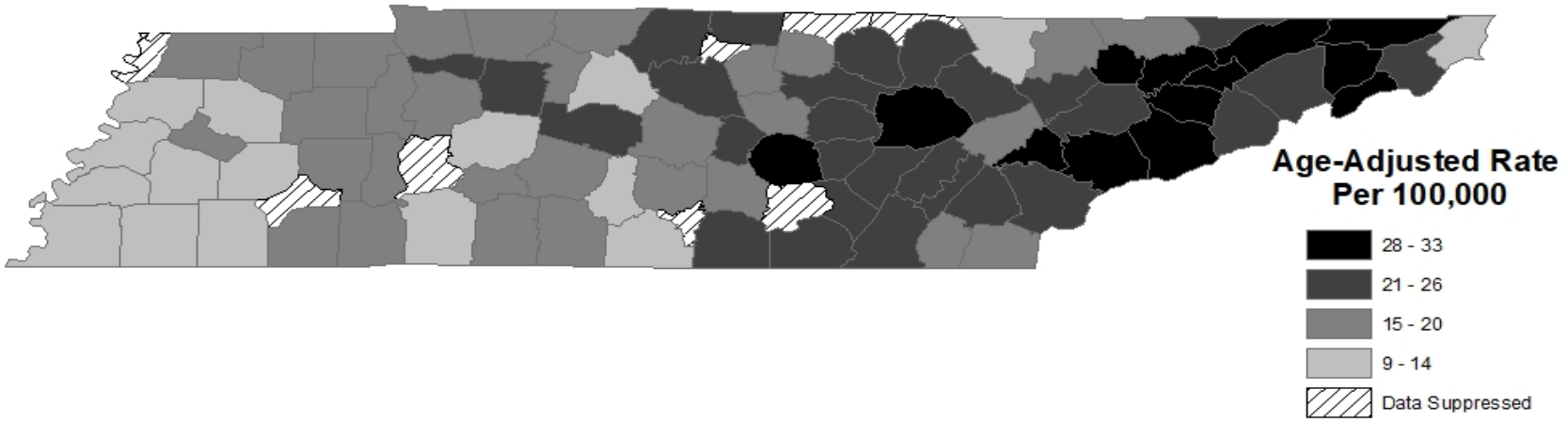




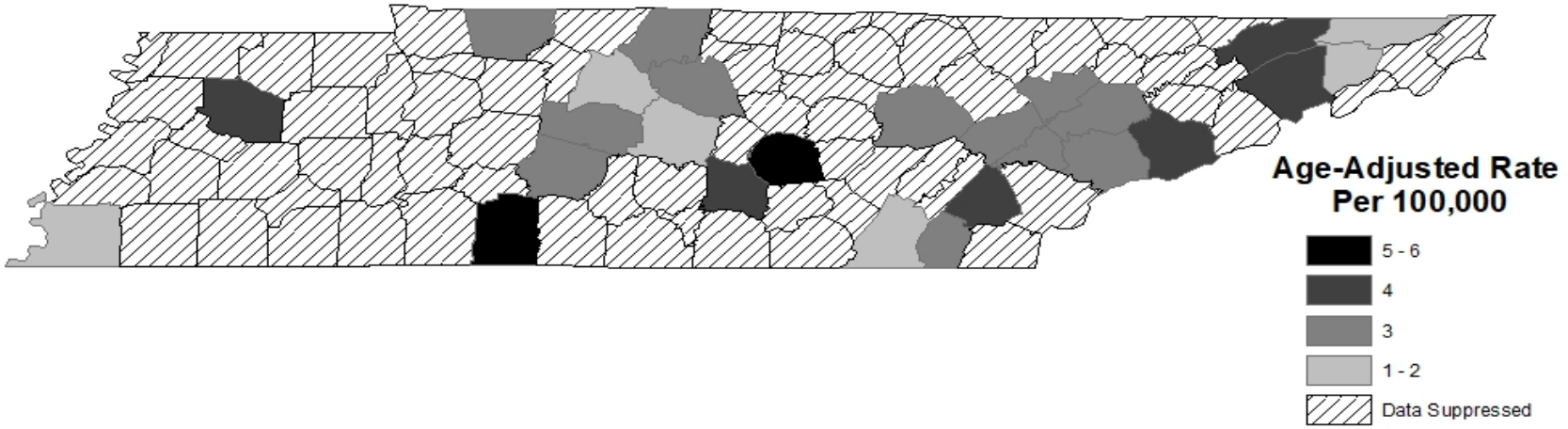
Data Source

7. AGE-ADJUSTED CANCER INCIDENCE AND MORTALITY RATES BY RESIDENT COUNTY, MELANOMA OF THE SKIN, TENNESSEE, 2012-2016

Incidence



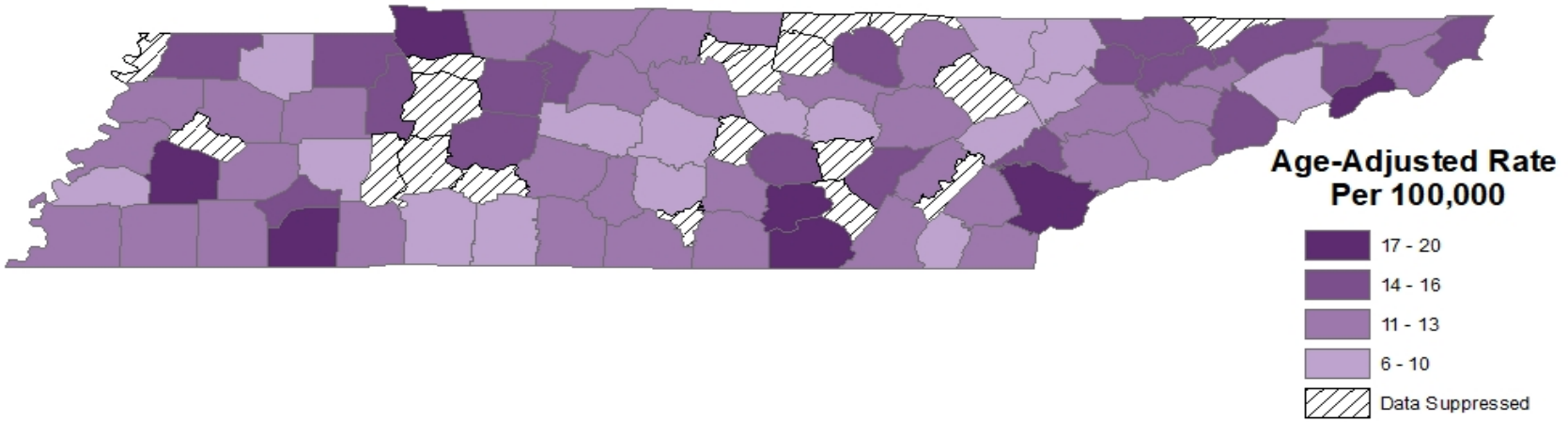
Mortality



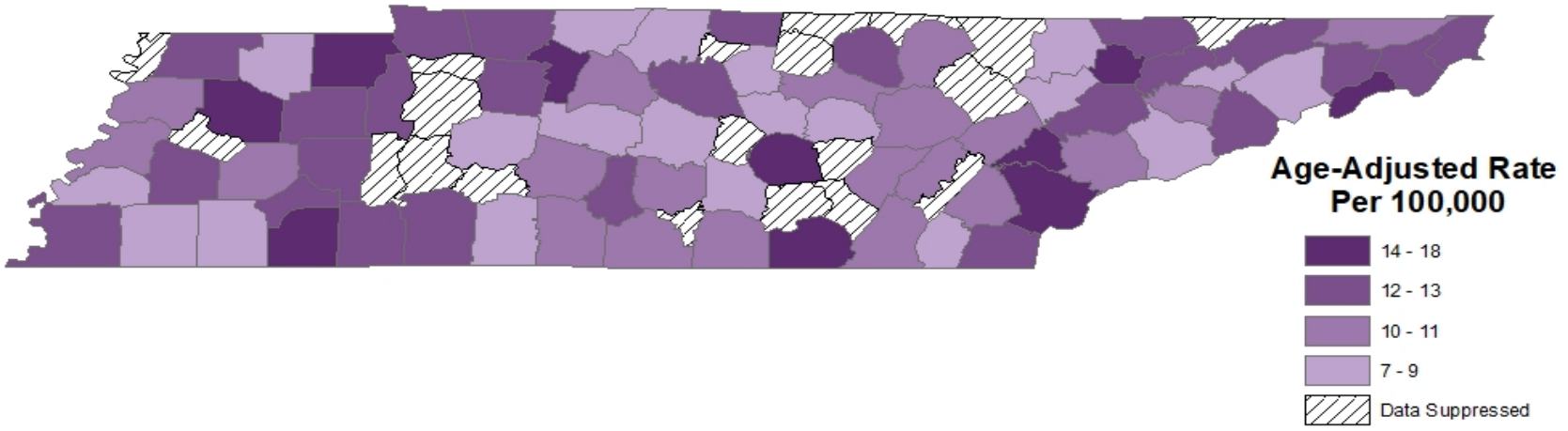
Data Source

8. AGE-ADJUSTED CANCER INCIDENCE AND MORTALITY RATES BY RESIDENT COUNTY, PANCREAS, TENNESSEE, 2012-2016

Incidence



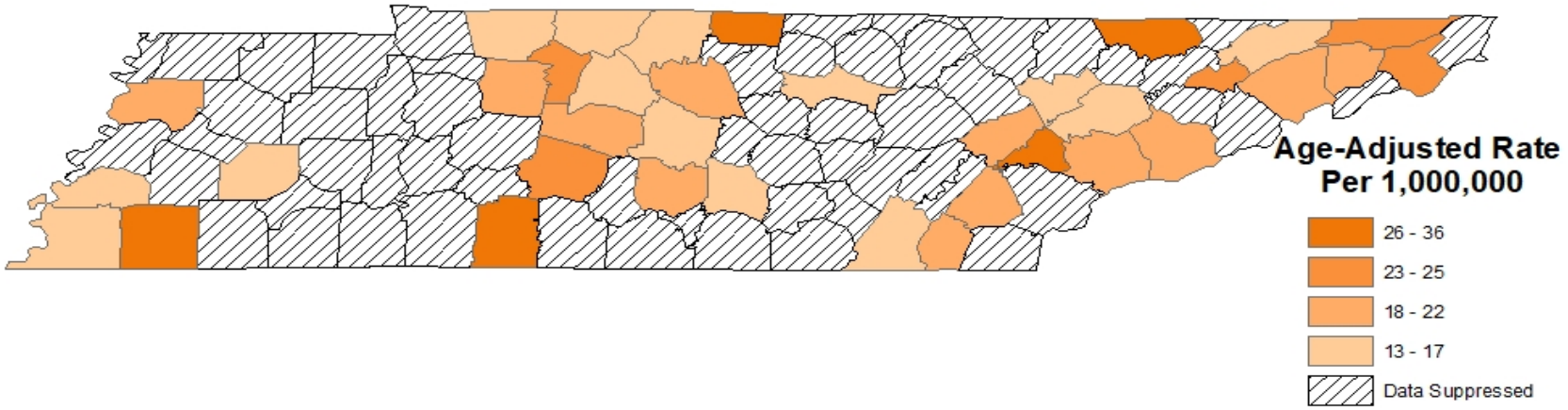
Mortality



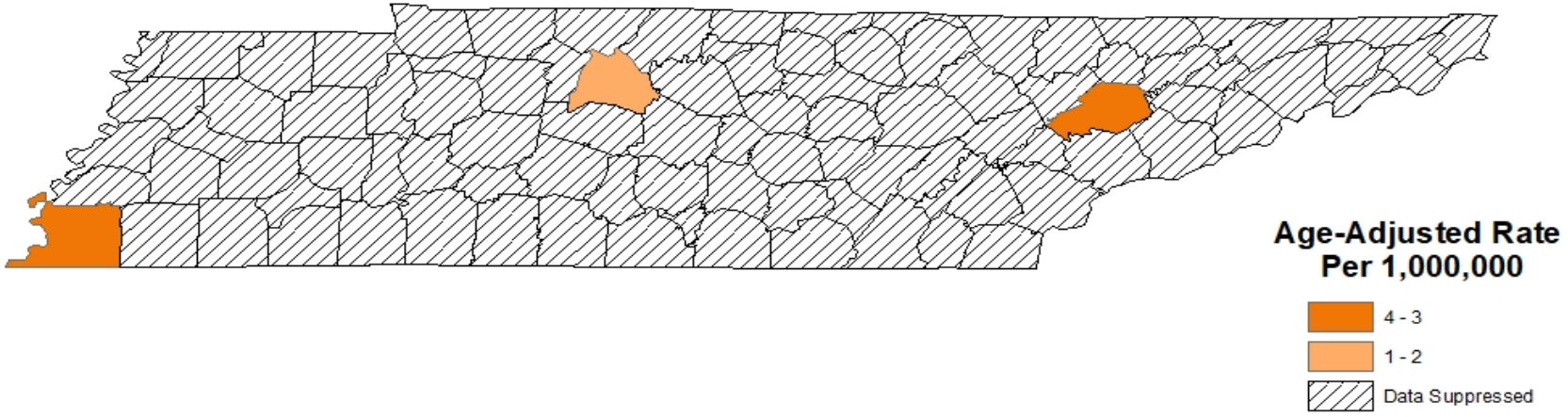
Data Source

9. AGE-ADJUSTED CANCER INCIDENCE AND MORTALITY RATES BY RESIDENT COUNTY, CHILDHOOD CANCER (0-19 YEARS OF AGE), TENNESSEE, 2012-2016

Incidence



Mortality



Data Source

TECHNICAL NOTES

STATISTICAL METHODS

SAS 9.4 was used to calculate the years of potential life lost among Tennesseans. SEER*Prep 2.5.7 was used prepare cancer incidence and mortality data. SEER*Stat 8.3.6 was used for counting numbers of new cancer diagnoses and deaths due to cancer as well as calculating age-adjusted rates, confidence intervals, average annual percent changes, and survival rates. DevCan 6.7.7 was used to compute the probability of being diagnosed or dying of cancer from birth or conditional on a certain age.

Confidence intervals were used to test if the difference in incidence or mortality rates between two groups or two years (e.g. blacks vs. whites or 2012 vs. 2016) was statistically significant. If the 95% confidence intervals did not overlap, the difference was determined to be statistically significant. Therefore, this is a conservative test of significance and there is a greater probability of finding non-significant differences than traditional tests of significance.

Pearson's chi-squared test was used to test the differences in cancer diagnosed in the late stages (i.e., regional and distant) versus early stages (i.e., in situ and localized) between black and white Tennesseans.

Consumers of this data must use caution when interpreting the data in this report and consider that data published in this report is dynamic. It is possible even after the standard reporting delay, some new cases may be reported, which could influence cancer rates. Caution should also be used when interpreting rates based on only a small number of cases. In order to protect patient confidentiality and ensure the integrity of the data, statistics based on counts smaller than eleven (11) have been suppressed. Additionally, the confidence intervals associated with some cancers are very large and caution should be used when interpreting the data.

SOFTWARE USED FOR CALCULATION

The following software was used to develop this report:

Age-Adjusted Rates, Confidence Intervals, and Survival Rates:
Surveillance Research Program, National Cancer Institute SEER*Stat software (http://seer.cancer.gov/seerstat) version 8.3.6.

Probability of Developing or Dying of Cancer:
DevCan: Probability of Developing or Dying of Cancer Software, Version 6.7.7 Surveillance Research Program, Statistical Methodology and Applications, National Cancer Institute, 2019. (http://surveillance.cancer.gov/devcan)

Years of Potential Life Lost Calculation:
SAS Institute Inc. (2016). Base SAS® 9.4. Cary, NC: SAS Institute Inc.

Tennessee Resident County Maps:
Environmental Systems Research Institute (ESRI) (2018). ArcGIS Desktop: Release 10.7. Redlands, CA: ESRI.

EXPLANATION OF TERMS

Age-adjusted Rate

An age-adjusted incidence or mortality rate is a weighted average of the age-specific incidence or mortality rates, where the weights are the counts of persons in the corresponding age groups of a standard million population. Aging is an important risk factor for the development of cancer so, if one population has a significantly greater proportion of older people than another, one would expect a larger number of cancers in the older population. Therefore, rates must be age-adjusted to remove the confounding effect of age before comparisons are made between populations with different age distributions. In this report, incidence and mortality rates are age-adjusted to the 2000 US Standard Population with 19 age groups.

Average years of potential life lost

Average years of life lost is an average derived by dividing Years of Potential Life Lost (YPLL) by the actual number of deaths for each cancer site, over a defined time period. This provides a measure of the burden of cancer to the individual patient rather than the population as a whole. Effectively it shows, on average, how much a patient's life is likely to be shortened by their cancer.

$$\textbf{Average Years of Potential Life Lost} = \frac{\textbf{Years of Potential Life Lost during period}}{\textbf{Actual Number of Deaths during period}}$$

Cancer Coding

The Tennessee Cancer Registry uses the International Classification of Diseases for Oncology, 3rd Edition (ICD-O-3) to code site (topography), histology (morphology), and behavior (e.g. whether malignant or not) of incident cases. Cases are categorized according to the 2003 revised recodes of the Surveillance, Epidemiology and End Results (SEER) program of the National Cancer Institute (NCI). These recodes define standard groupings of primary cancer sites. Following CDC's National Program of Cancer Registries (NPCR) and SEER cancer registries' guidelines, the TCR considers as reportable all incident cases with a behavior code of 2 (in situ, noninvasive) or 3 (invasive, primary site only) in ICD–O–3 terminology with the exception of in situ cancer of the cervix. Benign brain tumors are also reportable but not included in this report. When reporting childhood cancers, the International Classification of Childhood Cancer, 3rd Edition (ICCC-3) is used. For cancer mortality data, the International Classification of Diseases, 10th Revision (ICD-10), is used.

Cancer Staging

Stage provides a measure of disease progression, detailing the degree to which the cancer has advanced. The SEER summary stage method is used in this report, which describes cancers in five stages:

1. *In situ**: Abnormal cells are present only in the layer of cells in which they originated.
2. *Localized*: Cancer is limited to the organ in which it began, without evidence of spread.
3. *Regional*: Cancer has spread beyond the primary site to nearby lymph nodes or organs and tissues.
4. *Distant*: Cancer has spread from the primary site to distant organs or distant lymph nodes.

5. *Unknown*: There is not enough information to determine the stage.

*Although *in situ* cancers are included in analyses of stage at diagnosis, these cancers (with the exception of *in situ* bladder cancer) are not included in incidence counts and rates to be consistent with national reporting.

Confidence Interval

A confidence interval is a range of values that has a specified probability of containing the true rate of interest in the population. The width of a confidence interval reflects the amount of variability in the estimated rate. In this report, 95% confidence intervals were calculated using a gamma distribution method developed by Fay and Feuer and modified by Tiwari, Clegg, and Zou.

Incidence

Incidence is defined as the number of new cancers diagnosed in the population at risk in the reference year. The population considered at risk for cancer in this report is the entire resident population of Tennessee in the reference year.

Incidence Rate

The cancer incidence rate is the number of new cases of cancer diagnosed in a specified population during a specified time period, usually expressed as the number of new cases per 100,000 persons at risk. That is,

$$\textbf{Incidence Rate} = \left(\frac{\textbf{Number of New Cases}}{\textbf{Population at Risk}}\right) * \textbf{100,000}$$

The numerator of the incidence rate is the number of newly diagnosed cancer cases; the denominator of the incidence rate is the size of the population at risk. The number of new cancers may include multiple primary cancers occurring in one patient. The primary site reported is the site of origin and not the metastatic site, the distant site to which the cancer has spread. In general, the incidence rate does not include recurrences. The incidence rate can be computed for a given type of cancer or for all cancers combined. Incidence rates presented in this report are for invasive cancers and both invasive and in situ bladder cancer only, unless otherwise specified. When cancer stage was considered, cases diagnosed at any stage, including the in situ stage, were included in the analyses.

Median

The median is the middle value of an ordered set of numbers: half the values are greater than the median and half are less than the median. The median is less sensitive than the mean to extreme values, and is a better measure of central tendency for data with skewed distributions.

Mortality

Mortality is defined as the number of deaths from cancer in the population at risk in the reference year. A cancer death is defined as a death for which cancer is determined to be the underlying cause of death based on the death certificate.

Mortality Rate

The cancer mortality rate is the number of deaths with cancer as the underlying cause of death in a specified at-risk population in a given time period, usually expressed as the number of deaths due to cancer per 100,000 persons at risk. That is,

$$\textbf{Mortality Rate} = \left(\frac{\textbf{Number of Cancer Deaths}}{\textbf{Population at Risk}}\right) * \textbf{100,000}$$

Mortality-to-Incidence Ratio (M:I Ratio)

In this report, mortality-to-incidence ratio was calculated as the ratio of age-adjusted mortality and incidence rates. In a general sense, the higher the ratio, the higher fatality for the cancer or the lower the survival. However, for some cancers with very high fatality, e.g. pancreatic cancer, the M:I ratio may exceed 1 because the incidence and mortality cohorts are not exactly the same. In addition, the age-adjustment process may also make this possible because the age of a patient at death is likely greater than that at diagnosis; therefore, the patient may be accounted for at one age group for incidence and at an older age group for mortality.

$$\textbf{M:I Ratio} = \frac{\textbf{Mortality Rate}}{\textbf{Incidence Rate}}$$

Prevalence

Current cigarette use and cancer screening prevalence data from the Tennessee BRFSS are presented in this report (See Cancer Screening and Risk Factor Prevalence & Cigarette Smoking Prevalence). Prevalence is defined as the percentage of people exhibiting the behavior out of the total number in the defined population.

Race and Ethnicity

Cancer incidence and mortality can vary greatly by race and ethnicity. According to the 2010 US census (United States Census Bureau, 2010), non-Hispanic Whites account for 78.4 of Tennessee's population, and non-Hispanic Blacks represent 16.7% of Tennessee's population. Given Tennessee's small minority population, displaying detailed information by racial/ethnic group leads to some cell counts that are too small to display publically and rates may be unstable.

Resident County

The resident county is the geographical variable that illustrates the county of residence at diagnosis.

Suppression of Rates and Counts

Due to concerns regarding statistical reliability, statistics were suppressed when there were less than 11 reported cases for any given cohort or cancer site. Counts or rates that were suppressed in this report are denoted by "^".

Tennessee counties and regions

In this report, Tennessee's 95 counties are grouped into eight regions. Metropolitan counties are grouped into the regions where they are located.

Trends

Trend data should be interpreted with caution. Increases and decreases in rates over time may reflect changes in diagnostic methods or case reporting rather than genuine changes in cancer occurrence.

Years of potential life lost

Years of potential life lost (YPLL) is another indicator often used to describe disease burden. It is an estimate of the years a person would have lived if he or she had not died prematurely. YPLL highlights the loss to society as a result of deaths in childhood, adolescence and early adulthood and is calculated as the number of years of potential life lost by each death occurring before a predetermined end point, set at age 75 years in this report.

$$\textbf{Years of Potential Life Lost} = \textbf{Predetermined End Point Age} - \textbf{Age of Decedent Who Died Prior to End Point Age}$$

DATA SOURCES

Tennessee Cancer Registry (TCR) Incidence Data:
The cancer incidence data contains records of primary cancer cases first diagnosed among Tennessee residents between January 1, 2007 and December 31, 2016, and were reported to the TCR as of August 1, 2019. A total of 36 cases with gender reported as hermaphrodite or transsexual were not included in this report. Cases with race other than white or black (2,742 cases) and unknown race (2,465 cases) were included in the "Total Population" category. A total of 7 cases with unknown age of diagnosis were excluded from all analyses except the calculation of the leading causes of cancer incidence and cancer by stage. A total of 5 cases could not be converted into a site recode value using the International Classification of Diseases for Oncology 3rd Edition (ICD-O-3) and World Health Organization (WHO) 2008 Definition and were included in the calculation of statistics concerning all cancer incidence primary sites combined. A total of 282 newly diagnosed cases did not have sufficient information regarding resident county at diagnosis and were excluded in the geographic analyses. These cases were included in the state-level statistics, but excluded from county-level statistics.

Mortality Data:
The cancer mortality data contains records of all mortalities among Tennessee residents. The record-level mortality data were obtained from the Death Statistical System provided by the Office of Vital Records and Statistics, Tennessee Department of Health. There were 35 mortality records missing gender information and 48 records contained invalid or unknown age at death values. These records were excluded from all analyses in this report except the calculation of the leading causes of cancer mortality. It should also be noted 2,552 deaths were of race other than white or black and 2,625 mortality records contained insufficient or unknown race information. These deaths and were included in the "Total Population" category. A total of 8 cases did not have sufficient information regarding resident county at death and were excluded in the geographic analyses. These cases were included in the state-level statistics, but excluded from county-level statistics.

Behavioral Risk Factor Surveillance System (BRFSS) Data:
BRFSS is a CDC-funded, state-administered, random-digit-dialed telephone survey of the US non-institutionalized population, 18 years of age and older that collects information on health risk behaviors, preventive health practices, and health care access primarily related to chronic disease and injury. BRFSS was established in 1984 by the CDC; currently, data are collected monthly in all 50 states, the District of Columbia, Puerto Rico, the US Virgin Islands, and Guam. Nationwide BRFSS data were the median for 50 states and Washington D.C.

State Cancer Profiles:
State Cancer Profiles is a web-based, comprehensive, and interactive data query system provided by the National Cancer Institute (NCI) and the CDC. Tennessee and United States cancer mortality trend data and Tennessee cancer rankings of cancer incidence and mortality were based on age-adjusted rates of 50 states and Washington D.C. obtained online from the following website: https://statecancerprofiles.cancer.gov/.

ADDITIONAL RESOURCES

More information can be found about the cancers discussed in this report at the American Cancer Society:

SPECIFIC CANCER SITE	WEBSITE
Lung Cancer	http://www.cancer.org/cancer/lungcancer/
Prostate Cancer	http://www.cancer.org/cancer/prostatecancer/
Breast Cancer	http://www.cancer.org/cancer/breastcancer/
Colorectal Cancer	http://www.cancer.org/cancer/colonandrectumcancer/
Melanoma Skin Cancer	http://www.cancer.org/cancer/skincancer-melanoma/
Pancreatic Cancer	http://www.cancer.org/cancer/pancreaticcancer/
Childhood Cancer	http://www.cancer.org/cancer/cancerinchildren/index

If interested, other sources of information and support from national cancer organizations include:

ORGANIZATION	WEBSITE
American Association for Cancer Research (AACR)	http://www.aacr.org/Pages/Home.aspx
American Cancer Society (ACS)	http://www.cancer.org/
American Society of Clinical Oncology (ASCO)	http://www.asco.org/
Cancer Research Network (CRN)	http://crn.cancer.gov/
Center for Cancer Research (CCR)	https://ccr.cancer.gov/
Centers for Disease Control & Prevention (CDC)	http://www.cdc.gov/cancer/dcpc/data/index.htm
Commission on Cancer (CoC)	https://www.facs.org/quality-programs/cancer/coc
Conquer Cancer Foundation	https://www.conquercancerfoundation.org/
International Agency for Research on Cancer	http://www.iarc.fr/
Journal of Clinical Oncology	http://jco.ascopubs.org/
National Cancer Informatics Program (NCIP)	http://cbiit.nci.nih.gov/ncip
National Cancer Institute (NCI)	http://www.cancer.gov/
National Comprehensive Cancer Network (NCCN)	http://www.nccn.org/
National Program of Cancer Registries (NPCR)	http://www.cdc.gov/cancer/npcr/
North American Association of Central Cancer Registries (NAACCR)	http://www.naaccr.org/

REFERENCES

American Cancer Society. (2015). Health Risks of Smoking Tobacco. Retrieved from https://www.cancer.org/cancer/cancer-causes/tobacco-and-cancer

American Cancer Society. (2017). Lifetime Risk of Developing or Dying From Cancer. Retrieved from http://www.cancer.org/cancer/cancerbasics/lifetime-probability-of-developing-or-dying-from-cancer

American Cancer Society. (2017). What are the Differences Between Cancers in Adults and Children? Retrieved from http://www.cancer.org/cancer/cancerinchildren/detailedguide/cancer-in-children-differences-adults-children

Centers for Disease Control (CDC). (2019). Behavioral Risk Factor Surveillance System (BRFSS): Prevalence and Trends Data. Retrieved from https://www.cdc.gov/brfss/brfssprevalence/

Centers for Disease Control and Prevention (CDC). (2019). US Diabetes Surveillance System. Retrieved from https://www.cdc.gov/diabetes/data

Everhart J, Wright D. (1995). Diabetes mellitus as a risk factor for pancreatic cancer. A meta-analysis. JAMA.273:1605–1609.

Fay M.P. (2004). "Estimating age conditional probability of developing disease from surveillance data". Population Health Metrics 2:6. Retrieved from http://www.pophealthmetrics.com/content/2/1/6

Howlader N, Noone AM, Krapcho M, Miller D, Brest A, Yu M, Ruhl J, Tatalovich Z, Mariotto A, Lewis DR, Chen HS, Feuer EJ, Cronin KA (eds) (2019). SEER Cancer Statistics Review, 1975-2016, National Cancer Institute. Bethesda, MD, https://seer.cancer.gov/csr/1975_2016/, based on November 2018 SEER data submission, posted to the SEER web site, April 2019.

Islami F, Goding Sauer A, Miller KD, Siegel RL, Fedewa SA, Jacobs EJ, et al. (2018). Proportion and number of cancer cases and deaths attributable to potentially modifiable risk factors in the United States. CA: A Cancer Journal for Clinicians. 68:31–54.

Lifetime Risk (Percent) of Being Diagnosed with Cancer by Site and Race/Ethnicity: Males, 18 SEER Areas, 2014-2016 (Table 1.15) and Females, 18 SEER Areas, 2014-2016 (Table 1.15). (2019). Retrieved from https://seer.cancer.gov/csr/1975_2016/results_merged/topic_lifetime_risk.pdf

Lifetime Risk (Percent) of Dying from Cancer by Site and Race/Ethnicity: Males, Total US, 2014-2016 (Table 1.18) and Females, Total US, 2014-2016 (Table 1.19). (2019). Retrieved from https://seer.cancer.gov/csr/1975_2016/results_merged/topic_lifetime_risk.pdf

Lortet-Tieulent, J., Goding Sauer, A., Siegel R. L., Miller, K. D., Islami, F., Fedewa, S., Jacobs, E. J., Jemal, A. (2016). State-Level Cancer Mortality Attributable to Cigarette Smoking in the United States. Journal of American Medical Association (JAMA).

Mariotto, A. B., Yabroff, K. R., Shao, Y., Feuer, E. J., & Brown, M. L. (2011). Projections of the Cost of Cancer Care in the United States 2010-2020. Journal of the National Cancer Institute, 103(2), 117-128.

National Cancer Institute (NCI) (2019). State Cancer Profiles. Retrieved from https://statecancerprofiles.cancer.gov/index.html

National Cancer Institute (NCI). (2013). Cancer Prevalence and Cost of Care Projections. Retrieved from http://costprojections.cancer.gov

National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP). (2017). Quitting Smoking. Retrieved from Smoking & Tobacco Use website: https://www.cdc.gov/tobacco/data_statistics/fact_sheets/cessation/quitting/index.htm

National Lung Screening Trial Research Team (NLSTRT). (2011). The National Lung Screening Trial: overview and study design. Radiology, 258(1), 243-253.

Tiwari, R. C., Clegg, L. X., & Zou, Z. (2006). Efficient interval estimation for age-adjusted cancer rates. *Statistical Methods in Medical Research*, 15, 547-569

U.S. Department of Health and Human Services. (2010). *A Report of the Surgeon General: How Tobacco Smoke Causes Disease: What It Means to You.* U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office of Smoking and Health.

U.S. Federal Trade Commission. (2019). Estimated Annual Tobacco Industry Marketing Expenditures in Each State (in millions of dollars) [Table]. Retrieved from https://www.ftc.gov/system/files/documents/reports/federal-trade-commission-cigarette-report-2017-federal-trade-commission-smokeless-tobacco-report/ftc_cigarette_report_2017.pdf

U.S. Federal Trade Commission (FTC). (2017). *Cigarette Report for 2017.* Washington, D.C.: Federal Trade Commission.

U.S. Preventive Services Task Force (USPSTF). (2019). Published Recommendations. Rockville, MD: U.S. Preventive Services Task Force. Retrieved from https://www.uspreventiveservicestaskforce.org/BrowseRec/Index/browse-recommendations