

TENNESSEE DEPARTMENT OF HEALTH

**LUNG CANCER FACTS & FIGURES,
TENNESSEE, 2001-2005**

OFFICE OF POLICY PLANNING & ASSESSMENT

Office of Cancer Surveillance

Tennessee Cancer Registry

This publication was prepared by:

Qiong Li, Ph.D., Epidemiologist, Office of Cancer Surveillance

Office of Cancer Surveillance
Office of Policy, Planning, and Assessment
Tennessee Department of Health
Cordell Hull Building 6th Floor
425 5th Avenue North
Nashville, Tennessee 37243

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LUNG CANCER FACTS & FIGURES, TENNESSEE, 2001-2005

What Is Lung Cancer?

Lung cancer results from an abnormality in the body's basic unit of life, the cell. Lung cancers can arise in any part of the lung, and 90%-95% of lung cancers are thought to arise from the epithelial, or lining cells of the larger and smaller airways (bronchi and bronchioles); for this reason, lung cancers are sometimes called bronchogenic carcinomas or bronchogenic cancers. Lung cancers can also arise from the pleura (the thin layer of tissue that surrounds the lungs), called mesotheliomas, or rarely from supporting tissues within the lungs, for example, blood vessels.

Since lung cancer tends to spread, or metastasize, very early in its course, it is a very life-threatening cancer and one of the most difficult cancers to treat. While lung cancer can spread to any organ in the body, certain organs—particularly the adrenal glands, liver, brain, and bone—are the most common sites for lung cancer metastasis.

The two main types are small cell lung cancer and non-small cell lung cancer. These types are diagnosed based on how the cells look under a microscope, and they are treated differently.

- small cell lung cancer (SCLC)
- non-small cell lung cancer (NSCLC)

About 85% to 90% of all lung cancers are of the non-small cell type, and about 10% to 15% of all lung cancers are the small cell type. If the cancer has features of both types, it is called *mixed small cell/large cell cancer*.

Lung cancer is the second common types of cancer and responsible for the most cancer deaths in both men and women throughout the world. The American Cancer Society estimates that 5,070 new cases of lung cancer in Tennessee will be diagnosed and 4,490 deaths due to lung cancer will occur in 2008. Lung cancer is predominantly a disease of the elderly; almost 60% of people diagnosed with the condition are over 65 years of age. However, still about 8% of cases occur in people under age 45.

How Is Lung Cancer Detected?

Since most people with early lung cancer do not have any symptoms, only a small number of lung cancers are found at an early stage. When lung cancer is found early, it is often because of tests that were being done for something else.

Because lung cancer often spreads beyond the lungs before it causes symptoms, a good screening test to find lung cancer early could save many lives. Scientists are studying ways to detect lung cancer before symptoms develop. They are exploring the chest x-rays and spiral CT scanning etc. and try to find out how useful these tests might be. Unfortunately so far we don't have better ways to detect lung cancer yet. People who smoke should keep in mind that the best way to avoid dying from lung cancer is to stop smoking.

Who Develops Lung Cancer?

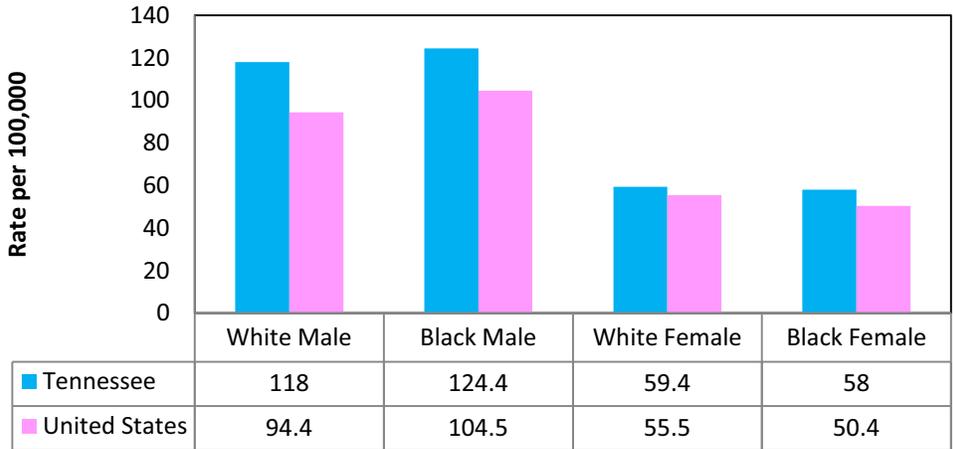
Each year from 2001 to 2005, nearly 5000 cases of lung cancer were reported to the Tennessee Cancer Registry. Males were more likely to be diagnosed with the lung cancer than females.

Each year from 2001 to 2005, over 4000 Tennessean died from lung cancer. The mortality rate for males was much higher than that for females, almost double its rate.

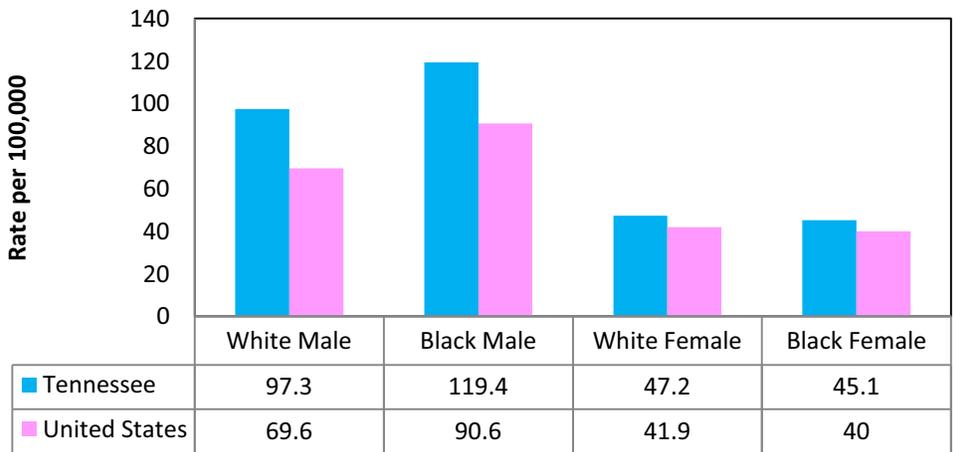
Overall, Tennessee's lung cancer incidence rate was about 24% higher than the U.S. rate (67.4 per 100,000 in 2004), and Tennessee's lung cancer mortality rate was about 29% higher than the U.S. rate (53.3 per 100,000 in 2004).

Lung cancer is the leading cause of cancer death in Tennessee.

**Lung Cancer Incidence Rates
Tennessee and United States (2004), by Sex and Race**



**Lung Cancer Mortality Rates
Tennessee and United States (2004), by Sex and Race**



What Are The Causes And Risk Factors For Lung Cancer?

A risk factor is anything that affects a person's chance of getting a disease such as cancer. Different cancers have different risk factors. But risk factors don't tell us everything. Having a risk factor, or even many risk factors, does not mean that you will get the disease. And many people who get the disease may not have had any known risk factors. Even if a person with lung cancer has a risk factor, it is often very hard to know how much that risk factor may have contributed to the cancer.

Still, having many risk factors can make you more likely to develop lung cancer. Some risk factors, such as smoking, can be controlled. Others, like a person's age or family history, can't be changed.

Tobacco Smoke

Smoking is by far the leading risk factor for lung cancer. Tobacco smoke causes more than nearly 9 out of 10 cases of lung cancer. The longer a person has been smoking and the more packs per day smoked, the greater the risk

Cigar and pipe smoking are almost as likely to cause lung cancer as is cigarette smoking.

People who don't smoke but who breathe the smoke of others may also be at a higher risk for lung cancer. Non-smoking spouses who live with a smoker, for example, have about a 20% to 30% greater risk of developing lung cancer than do spouses of non-smokers. Non-smokers exposed to tobacco smoke in the workplace are also more likely to get lung cancer.

Hookah smoking has become popular among young people in recent years. It is often marketed as being safer than cigarettes. Although there is less tobacco in the product used for hookahs, it is still dangerous and addictive. And hookah smoking may lead to cigarette smoking in the future.

Radon

Radon is a radioactive gas made by the natural breakdown of uranium, which is found at higher than normal levels in the soil in some parts of the United States. Radon can't be seen, tasted, or smelled. It can become concentrated indoors and create a possible risk for cancer. Smokers are especially sensitive to the effects of radon.

Asbestos

Asbestos exposure is another risk factor for lung cancer. People who work with asbestos have a higher risk of getting lung cancer. If they smoke too, the risk is greatly increased.

Other Cancer-causing Agents in the Workplace

Other things that cause cancer (cancer-causing agents) found in the workplace that can increase lung cancer risk include:

- radioactive ores such as uranium
- inhaled chemicals or minerals such as arsenic, beryllium, cadmium, vinyl chloride, nickel compounds, chromium compounds, coal products, mustard gas, and chloromethyl ethers
- diesel exhaust

Radiation Treatment to the Lungs

People who have had radiation to the chest to treat another cancer are at higher risk for lung cancer, especially if they smoke.

Arsenic

High levels of arsenic in drinking water may increase the risk of lung cancer. The effect is even greater for smokers.

Certain Diseases

Diseases such as silicosis and berylliosis (caused by breathing in certain minerals) also increase the risk of lung cancer.

Personal and Family History

If you have had lung cancer, you have a higher risk of getting another lung cancer. Brothers, sisters, and children of people who have had lung cancer may have a slightly higher risk themselves.

Diet and Vitamins

Some reports suggest that a diet low in fruits and vegetables might increase the risk of lung cancer in people who are exposed to tobacco smoke

Air Pollution

In cities, air pollution may slightly increase the risk of lung cancer. But the risk is still far less than that caused by smoking.

Marijuana

Medical reports suggest that marijuana could cause cancers of the mouth and throat. But because marijuana is an illegal substance it is not easy to gather information about its effects on the body.

DNA and Gene Changes

During the past few years, scientists have made great progress in understanding how risk factors produce certain changes in the DNA of lung cells, causing the cells to become cancerous.

What Are The Symptoms Of Lung Cancer?

Most lung cancers do not cause symptoms until they have spread. The most common symptoms are:

- a cough that does not go away
- chest pain, often made worse by deep breathing, coughing, or laughing
- hoarseness
- weight loss and loss of appetite
- bloody or rust-colored sputum (spit or phlegm)
- shortness of breath
- infections such as bronchitis and pneumonia that keep coming back
- new onset of wheezing

When lung cancer spreads to distant organs, it may cause:

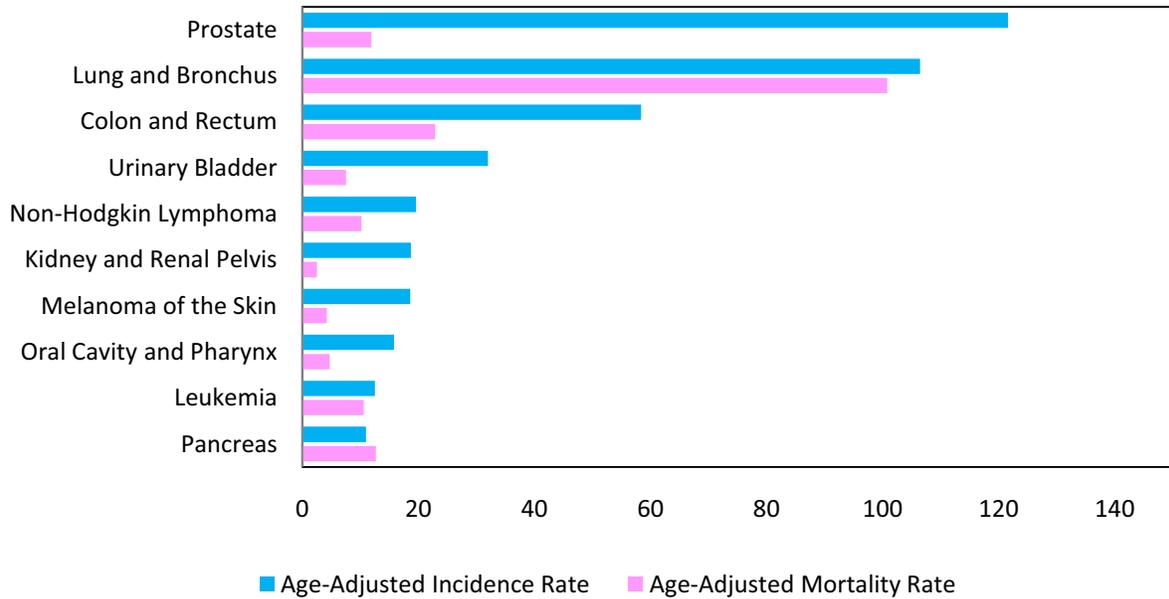
- bone pain
- weakness or numbness of the arms or legs
- headache, dizziness, or seizure
- yellow coloring of the skin and eyes (jaundice)
- lumps near the surface of the body, caused by cancer spreading to the skin or to lymph nodes in the neck or above the collarbone

If you have any of these problems, you should see a doctor right away.

Less often, there are some other clusters of symptoms (called syndromes) that can point to a possible lung cancer.

What Are The Leading Causes Of Cancer Incidence And Mortality In Men And Women?

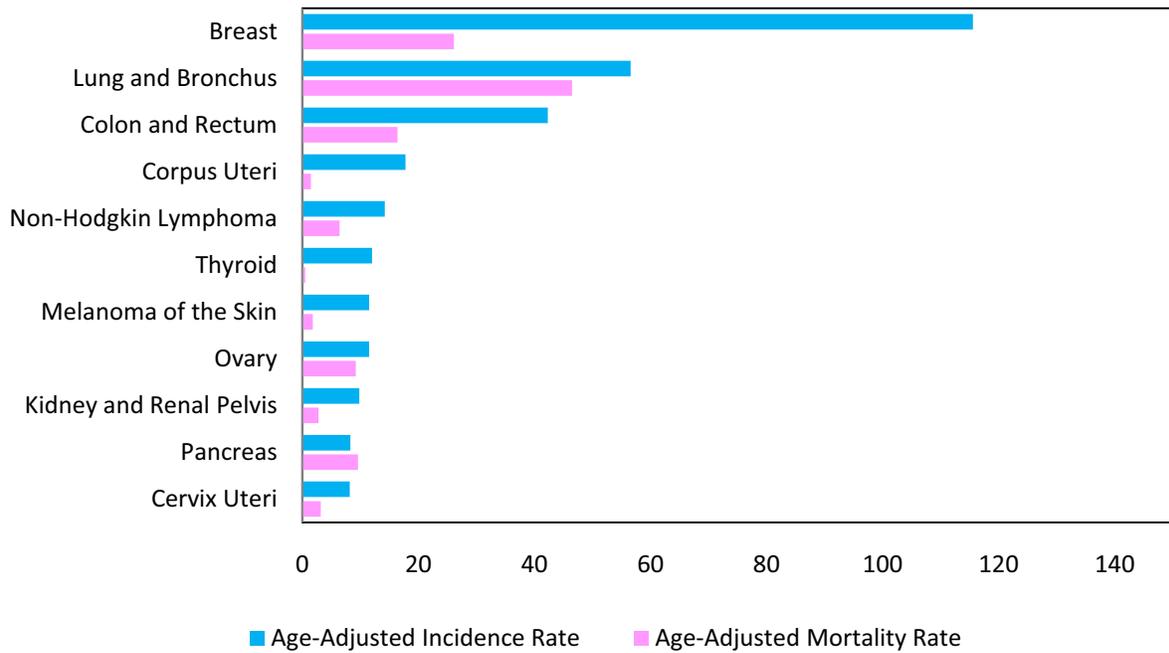
Top 10 Cancer Sites: 2001-2005, Male, Tennessee-All Races



For Tennessee males during 2001-2005, prostate cancer was the most commonly diagnosed cancer. The second commonly diagnosed cancer was lung and bronchus cancer. The third was colon and rectum cancer.

Among males in Tennessee during 2001-2005, the leading cause of cancer-related death was lung and bronchus cancer. The second cancer-related cause of death was colon and rectum cancer and the third was pancreas.

Top 10 Cancer Sites: 2001-2005, Female, Tennessee-All Races

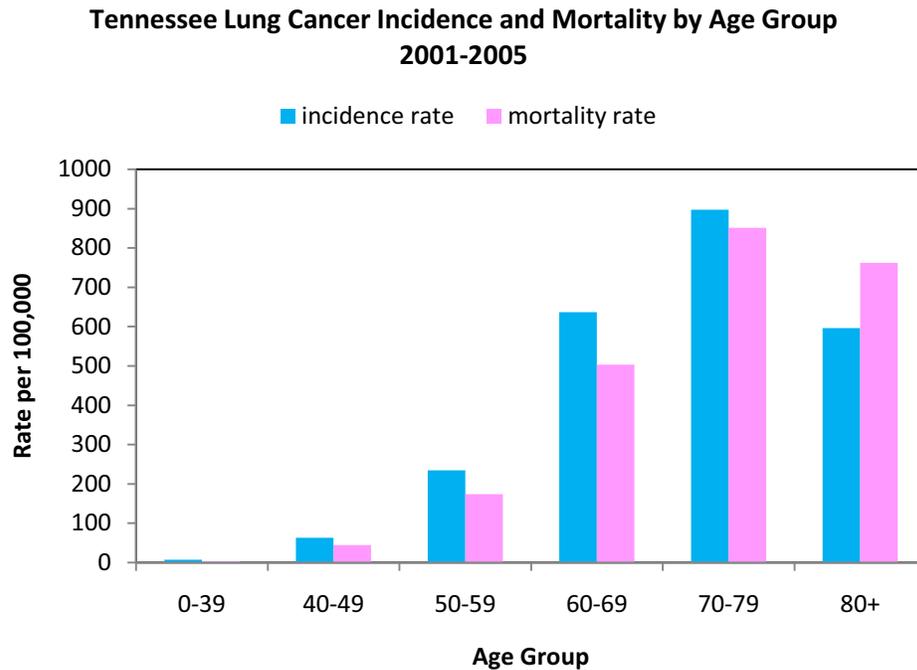


For Tennessee females during 2001-2005, breast cancer was the most commonly diagnosed cancer. The second commonly diagnosed cancer was lung and bronchus cancer. The third was colon and rectum cancer.

Among females in Tennessee during 2001-2005, the leading cause of cancer-related death was lung and bronchus cancer. The second cancer-related cause of death was breast cancer and the third was colon and rectum cancer.

At What Age Is Lung Cancer Most Often Diagnosed?

Lung cancer incidence and mortality rates increase with age, and are highest in people with age 70-79.



What Is The Treatment For Lung Cancer?

Types of Treatment for Non-Small Cell Lung Cancer

Surgery: Surgery is usually recommended (often along with other treatments) for early stage lung cancers. If surgery can be done, it gives the best chance of curing NSCLC.

Radiation Therapy: Radiation therapy is treatment with high-energy rays (such as x-rays) to kill or shrink cancer cells. The radiation may come from outside the body (external radiation) or from radioactive materials placed into or next to the tumor (brachytherapy). External radiation is the type most often used to treat lung cancer.

Other Local Treatments: At times, treatments other than surgery or radiation therapy may be used to destroy lung cancer cells in certain places.

Chemotherapy: Chemotherapy (often called simply "chemo") is treatment with anti-cancer drugs injected into a vein or taken by mouth. These drugs enter the bloodstream

and go throughout the body, making this treatment useful for cancer that has spread (metastasized) to organs beyond the lung. Doctors give chemo in cycles, with each period of treatment followed by a rest period to allow the body time to recover. Chemo cycles generally last about 3 to 4 weeks, and the first round of treatments typically involves 4 to 6 cycles.

Targeted Therapies: Drugs That Target Tumor Blood Vessel Growth (Angiogenesis) and Drugs That Target EGFR.

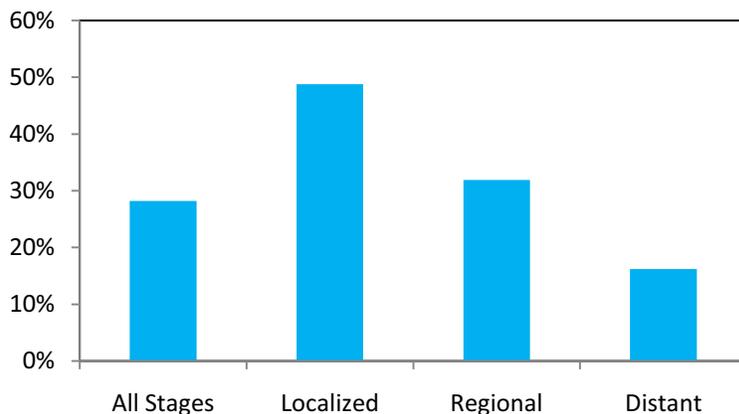
Types of Treatment for Small Cell Lung Cancer

If you have small cell lung cancer, the main treatment will most likely be chemotherapy, either alone or combined with radiation. Very rarely, surgery might be done, depending on the stage of the cancer.

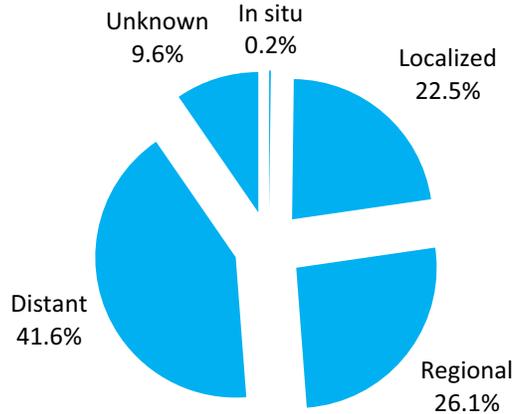
Who Survives Lung Cancer?

Finding the cancer early improves the chances that it can be treated successfully. Five-year relative survival rate for lung cancer found in the localized stage is almost triple the chance of survival than found in the distant stage. In Tennessee, more than 65% lung cancer was diagnosed at advanced stages (regional and distant stages). Only 22.5% lung cancer was diagnosed at localized stage.

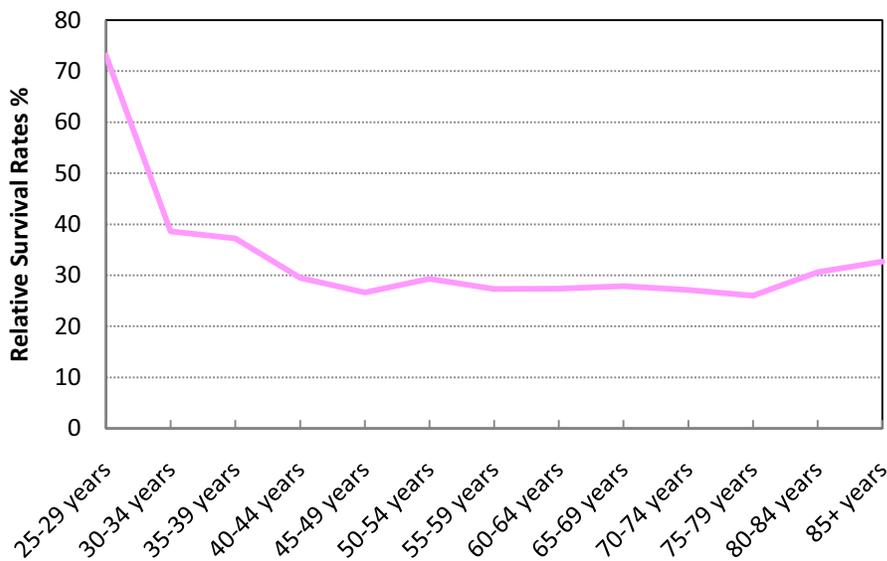
**5-year Relative Survival Rate by Stage of Disease
Tennessee 2001-2005**



Lung Cancer by Stage, Tennessee. 2001-2005



Lung Cancer 5-year Relative Survival Rate by Age at Diagnosis, Tennessee 2001-2005



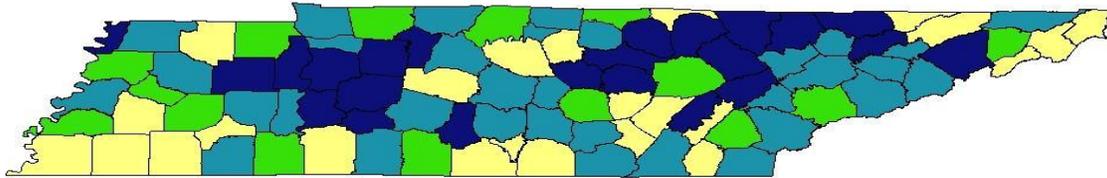
Age-specific relative survival patterns support the concept that lung cancer may be more severe or advanced in younger people. People 55-59 years of age at diagnosis had the lowest relative survival rate of all age groups.

These survival data suggest that almost only one of every five persons diagnosed with lung cancer today may be expected to survive for at least five years. Given the lower survival rate and higher incidence and mortality rates of lung cancer, lung cancer control and prevention are in high priority of public health.

How Does Lung Cancer Vary By Region?



**Lung Cancer Incidence Rates
by County, Tennessee, All Races, Both Sex, 2001-2005**



Lung Cancer Age-adjusted Incidence Rate

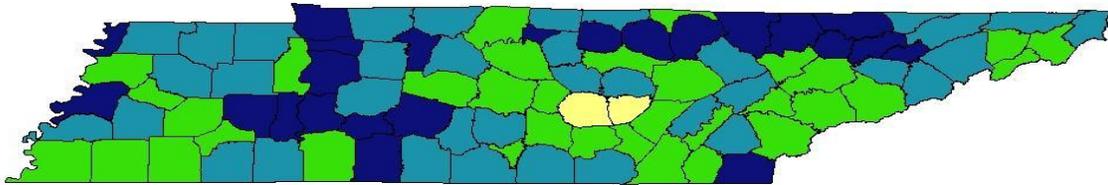
- 31.3 - 67.4
- 67.5 - 77.4
- 77.5 - 89.5
- 89.6 - 115.5 (bottom quartile)

Tennessee Lung Cancer Incidence Rate (2001-2005): 77.4 per 100,000
 U.S. Lung Cancer Incidence Rate (2004): 67.4 per 100,000

* Five-year average annual rate per 100,000 Tennessee males and females, age-adjusted to the 2000 U.S. standard population
 * U.S. rate is from U.S. Cancer Statistics: 2004 Incidence and Mortality



**Lung Cancer Mortality Rates
by County, Tennessee, All Races, Both Sex, 2001-2005**



Lung Cancer Age-adjusted Mortality Rate

- 42.4 - 53.3
- 53.4 - 68.8
- 68.9 - 81.4
- 81.5 - 123.7 (bottom quartile)

Tennessee Lung Cancer Mortality Rate (2001-2005): 68.8 per 100,000
 U.S. Lung Cancer Mortality Rate (2004): 53.3 per 100,000

* Five-year average annual rate per 100,000 Tennessee males and females, age-adjusted to the 2000 U.S. standard population
 * U.S. rate is from U.S. Cancer Statistics: 2004 Incidence and Mortality

Where Can I Find Out More About Lung Cancer?

You can learn more about lung cancer from the following organizations:

American Cancer Society

Telephone: 1-800-ACS-2345

Internet Address: <http://www.cancer.org>

National Cancer Institute, Cancer Information Service

Telephone: 1-800-4-CANCER

Internet Address: <http://www.cancer.gov>

Technical Notes

Data sources:

The primary source of data on cancer incidence is medical records. Staff at health care facilities abstract data from patients' medical records, enter it into the facility's own cancer registry if it has one, and then send the data to the state registry. The Tennessee Cancer Registry (TCR) collects data using uniform data items and codes as documented by North American Association of Central Cancer Registries (NAACCR). Information on primary site and histology was coded according to the *International Classification of Diseases for Oncology, Third Edition (ICD-O-3)*, and categorized according to the revised SEER (stands for the Surveillance, Epidemiology and End Results program of the National Cancer Institute (NCI)) recodes dated January 27, 2003, which define standard groupings of primary cancer sites.

Cancer mortality statistics in this report are based on information from all death certificates filed in the state's vital records processed by Tennessee Division of Health Statistics for deaths that occurred in 2001-2006 and were received as of December, 2007.

The cancer mortality data were compiled in accordance with World Health Organization (WHO) regulations, which specify that member nations classify and code causes of death in accordance with the current revision of the *International Classification of Diseases (ICD)*. Effective with deaths that occurred in 1999, the United States began using the Tenth Revision of this classification (ICD-10).

The Tennessee population estimates for the denominators of incidence and death rates presented in this report are race-specific (all races, whites, blacks) and sex-specific (both sex, males, females) population estimates aggregated to the county level. They are based on single years of age and are summed to form the 5-year age groups. The estimates used in this report are based on the revised Tennessee population estimates effective on February 1, 2008 made by Tennessee Department of Health's Division of Health Statistics.

The 2000 US standard population were obtained from the U.S. Bureau of the Census.

Methods:

SEER*Stat software was used to calculate all rates, and SAS software was used to generate all results. ArcGIS software was used to draw the maps with rate distribution by county.

Definitions:

Incidence rate: The cancer incidence rate is the number of new cancers of a specific site/type occurring in a specified population during a year, usually expressed as the number of cancers per 100,000 persons at risk. That is,

$$\text{Incidence rate} = (\text{New Cancer Counts} / \text{Population}) * 100,000.$$

The *numerator* of the incidence rate is the number of new cancers; the *denominator* of the incidence rate is the size of the population.

Mortality rate: The cancer mortality (or death) rate is the number of deaths with cancer given as the underlying cause of death occurring in a specified population during a year, usually expressed as the number of deaths due to cancer per 100,000 persons. That is,

$$\text{Death Rate} = (\text{Cancer Death Counts} / \text{Population}) * 100,000.$$

The *numerator* of the death rate is the number of deaths; the *denominator* of the death rate is the size of the population.

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 population. The potential confounding effect of age is reduced when comparing age-adjusted rates based on the same standard population.

Relative survival rate: Relative survival is defined as the ratio expressed as a percent, of the proportion of *observed* survivors in a cohort of cancer patients to the proportion of expected survivors.

Stage of cancer: Stage provides a measure of disease progression, detailing the degree to which the cancer has advanced. SEER historic describes cancers in five stages:

- **In situ cancer** is early cancer that is present only in the layer of cells in which it began. For most cancer sites mentioned in this report, in situ tumors are excluded from the analysis because of non-uniform classification; the urinary bladder is exception.
- **Localized cancer** is cancer that is limited to the organ in which it began, without evidence of spread.
- **Regional cancer** is cancer that has spread beyond the original (primary) site to nearby lymph nodes or organs and tissues.
- **Distant cancer** is cancer that has spread from the primary site to distant organs or distant lymph nodes.
- **Unstaged cancer** is cancer for which there is not enough information to indicate a stage.

References

American Cancer Society, *Learn About Lung Cancer*. Available at <http://www.cancer.org>. Accessed July 2008.

Li Q., Whiteside MA. *Cancer in Tennessee 2001-2005*, Tennessee Department of Health, Office of Cancer Surveillance. Nashville, Tennessee, June 2008.