



Lung & Bronchus Cancer In Ohio, 1999-2003

This Report on Lung & Bronchus Cancer Contains

- Incidence and Mortality Rates in Ohio and the United States
- Incidence Rates by Gender and Race
- Incidence Rates by County of Residence
- Age-specific Incidence Rates by Gender
- Incidence Rates by Histology
- Survival Probability and Stage at Diagnosis by Gender
- Trends in Stage at Diagnosis, Incidence and Mortality
- Risk Factors
- Clinical Trials Information
- Sources of Data and Additional Information

Lung & Bronchus Cancer Incidence and Mortality

Cancers of the lung and bronchus make up the greatest percentage of incident (newly diagnosed) cancers reported to the Ohio Cancer Incidence Surveillance System (OCISS), comprising 16.2 percent of incident cancers in Ohio in 1999-2003 (Table 1). From 1999 to 2003, the average annual age-adjusted lung and bronchus cancer incidence rate in Ohio was 75.3 cases per 100,000 residents, which is 16.2 percent higher than the average annual age-adjusted U.S. (SEER¹) incidence rate of 64.8 cases per 100,000 residents for 2000-2003. Reporting of invasive lung and bronchus cancer in Ohio is estimated to be 100 percent complete in 1999-2003, allowing for valid comparisons to U.S. data. Similar to incidence, the 1999-2003 Ohio age-adjusted mortality rate for lung and bronchus cancer of 61.2 deaths per 100,000 residents is higher (11.1 percent) than the 2000-2003 U.S. (NCHS²) mortality rate of 55.1 per 100,000 residents.

Table 1: Leading Cancer Sites/Types: Average Annual Number (N), Percent and Age-adjusted Rates of Invasive Cancer Cases and Cancer Deaths in Ohio, 1999-2003, with Comparison to the US (SEER and NCHS), 2000-2003

Incidence	N	%	Ohio Rate	U.S. Rate	Mortality	N	%	Ohio Rate	U.S. Rate
All Sites/Types	55,813		471.3	471.0	All Sites/Types	24,989		208.4	194.5
Lung and Bronchus	9,014	16.2%	75.3	64.8	Lung and Bronchus	7,339	29.4%	61.2	55.1
Breast (Female)	8,235	14.8%	126.4	129.1	Colon and Rectum	2,652	10.6%	22.1	19.8
Prostate	7,887	14.1%	153.8	170.3	Breast (Female)	1,941	7.8%	28.5	25.8
Colon and Rectum	6,625	11.9%	55.3	52.4	Prostate	1,290	5.2%	29.5	28.5
Urinary Bladder	2,657	4.8%	22.1	20.9	Pancreas	1,236	4.9%	10.3	10.5
Non-Hodgkin's Lymphoma	2,265	4.1%	19.0	19.1	Non-Hodgkin's Lymphoma	1,038	4.2%	8.7	7.7

Source: Ohio Cancer Incidence Surveillance System, Chronic Disease and Behavioral Epidemiology Section and the Vital Statistics Program, Ohio Department of Health, 2006.

[1] SEER: Surveillance, Epidemiology and End Results Program, National Cancer Institute, 2006.

[2] NCHS: National Center for Health Statistics, 2005.

Technical Notes:

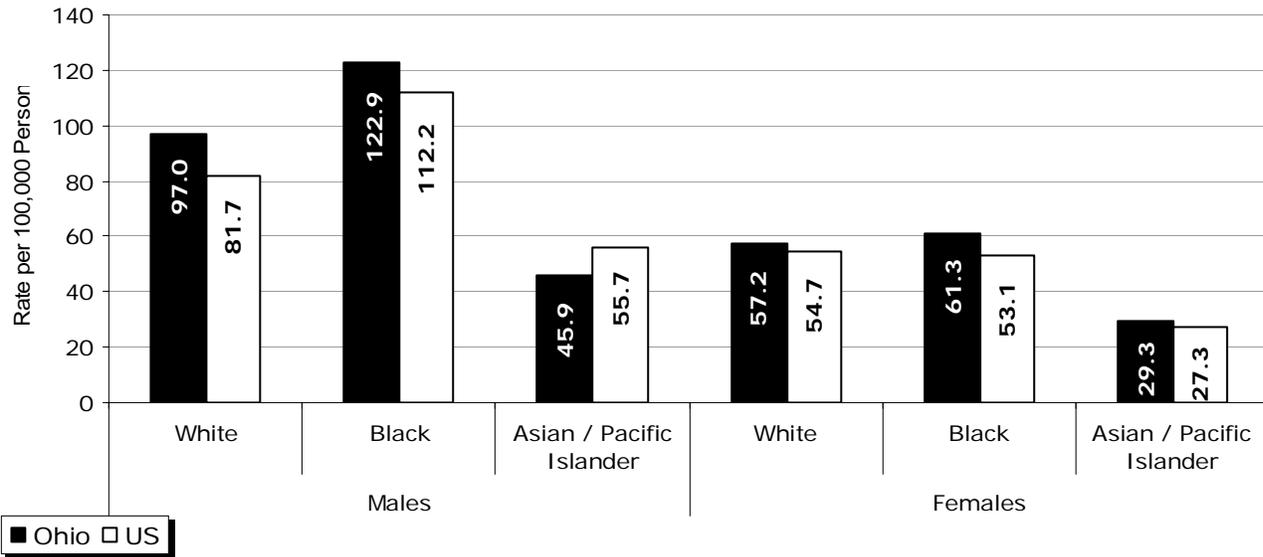
[1] Lung and bronchus cancer cases were defined as follows: International Classification of Diseases for Oncology, Third Edition (ICD-O-3), codes C340-C349, excluding histology types 9590-9989. Lung and bronchus cancer deaths were defined as follows: for 1999, International Classification of Diseases, Ninth Edition (ICD-9), codes 1622-1629; and for 2000-2003, International Classification of Diseases and Related Health Problems, Tenth Edition (ICD-10), codes C340-349.

[2] The 1999-2003 Ohio rates were calculated using the following populations: bridged-race intercensal estimates for July 1, 1999 (U.S. Census Bureau, 2004) and vintage 2004 postcensal estimates for July 1, 2000-2003 (U.S. Census Bureau, 2005). Rates were direct age-adjusted to the U.S. 2000 standard population.

[3] N = Average number of cases per year rounded to the nearest integer.

Lung & Bronchus Cancer Incidence in Ohio Compared to the United States

Figure 1: Cancer of the Lung & Bronchus: Average Annual Age-adjusted Incidence Rates per 100,000 Persons, by Gender and Race in Ohio, 1999-2003, with Comparison to the US (SEER), 2000-2003



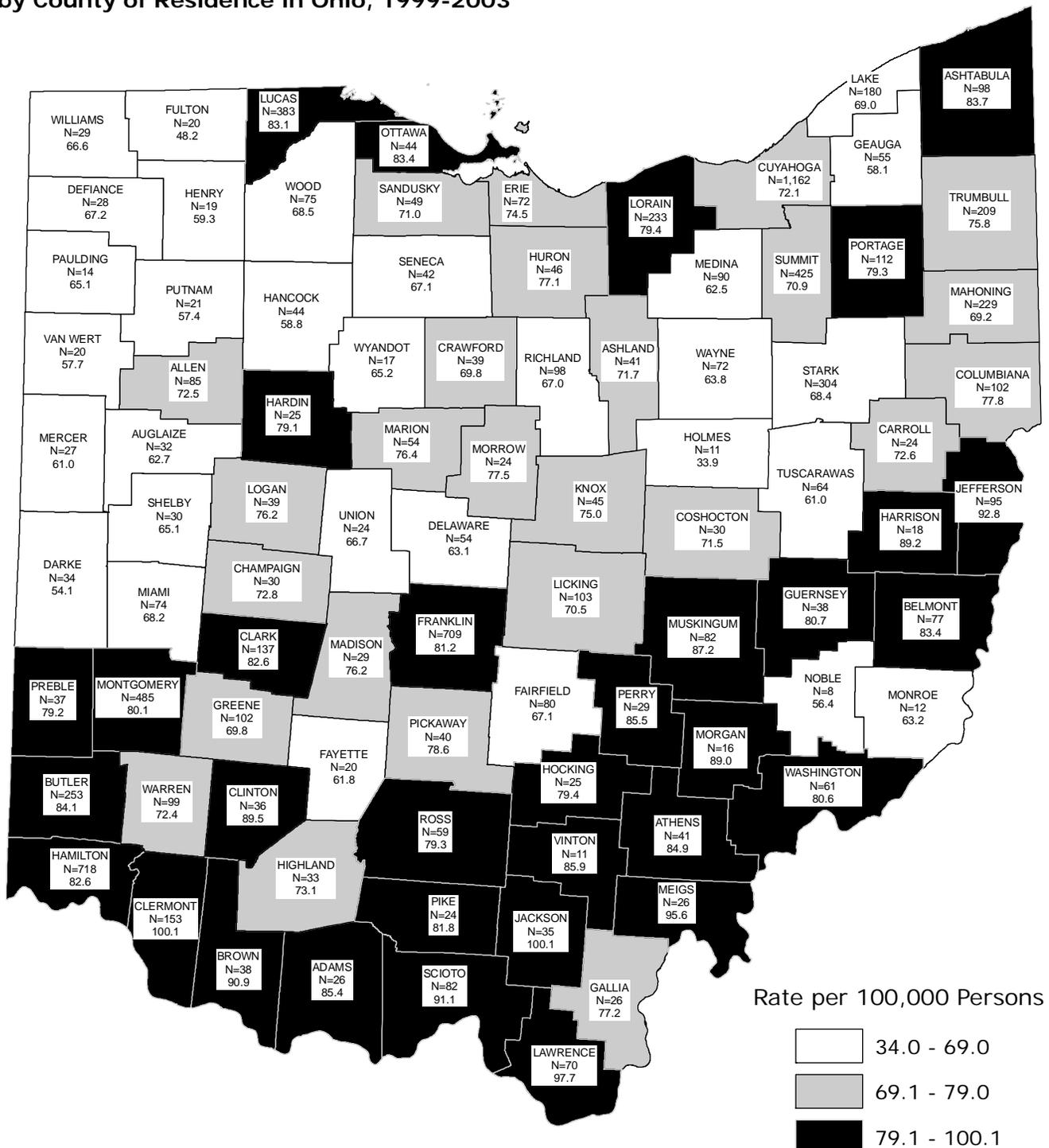
Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2006, and the Surveillance, Epidemiology and End Results Program, National Cancer Institute, 2006.

Figure 1 shows that the lung and bronchus cancer age-adjusted incidence rates among males are approximately double that of females for whites, blacks and Asian/Pacific Islanders. The gender difference in lung and bronchus cancer incidence rates may be due to a greater prevalence of certain risk factors, such as smoking, among males. In both Ohio and the United States, a comparison of the data by race reveals Asian/Pacific Islanders had much lower gender-specific lung and bronchus cancer incidence rates compared to both blacks and whites, with blacks having the highest incidence rates for both males and females. The Ohio lung and bronchus cancer incidence rates were higher than the rates for the United States for each gender/race category except for Asian/Pacific Islander males. The greatest percent difference (18.7 percent) between Ohio and the United States was observed for white males.

Lung & Bronchus Cancer Cases and Rates by County of Residence

Figure 2 presents 1999-2003 average annual age-adjusted lung and bronchus cancer incidence rates by county of residence. Most counties with the highest incidence rates were located in the southern and southeastern portions of the state. This is likely due to the high prevalence of cigarette smoking in the region; according to the 2004 Ohio Behavioral Risk Factor Surveillance System, southeastern Ohio had a smoking prevalence of 32.0 percent compared to a statewide prevalence of 25.9 percent. The following counties had the highest incidence rates for this time period (91.1 or more cases per 100,000 residents): Clermont (N = 153), Jackson (N = 35), Jefferson, (N = 95), Lawrence (N = 70), Meigs (N = 26) and Scioto (N = 82).

Figure 2: Cancer of the Lung & Bronchus: Average Annual Number of Cases (N) and Age-adjusted Incidence Rates per 100,000 Persons, by County of Residence in Ohio, 1999-2003



- Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2006.
- N = Average number of cases per year rounded to the nearest integer.
N = $\frac{\text{Total cases in 1999-2003}}{5 \text{ years}}$
- Each category represents approximately 33%, or 29, of the 88 Ohio counties.

Lung & Bronchus Cancer Cases and Rates by Age at Diagnosis

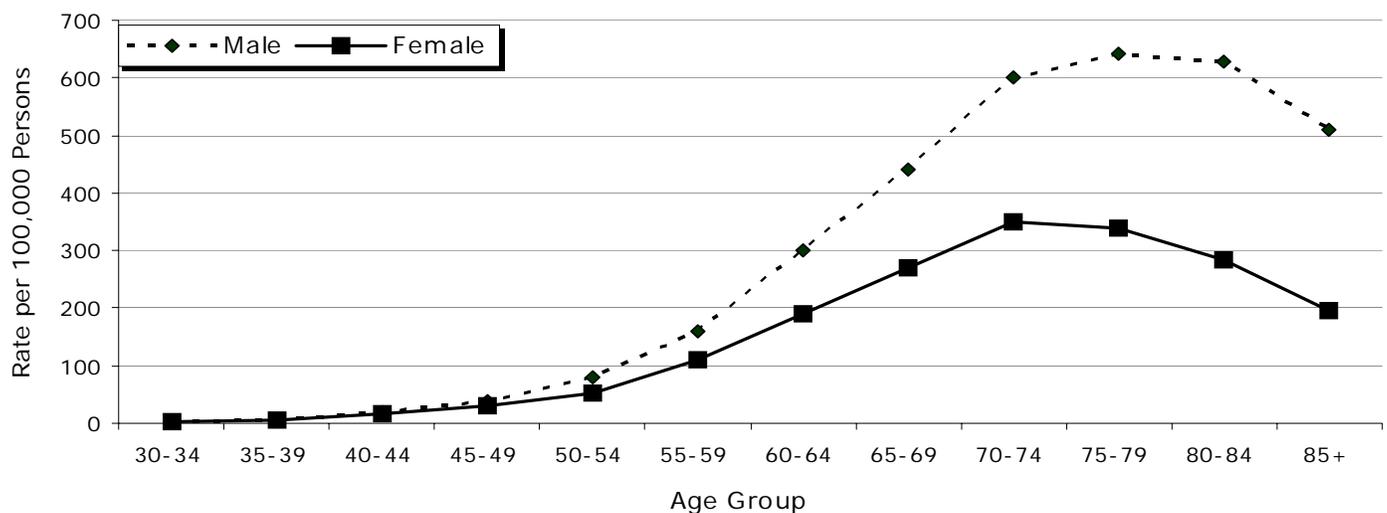
Table 2: Cancer of the Lung & Bronchus: Average Annual Number of Cases (N), Incidence Rates per 100,000 Persons and Cumulative Percentages (Cum%), by Age Group and Gender in Ohio, 1999-2003

Age Group	Males			Females			Total		
	N	Rate	Cum%	N	Rate	Cum%	N	Rate	Cum%
<19	<1	*	0.0%	1	0.1	0.0%	2	0.1	0.0%
20-24	1	0.3	0.0%	2	0.5	0.1%	3	0.4	0.1%
25-29	2	0.6	0.1%	<1	*	0.1%	3	0.4	0.1%
30-34	5	1.4	0.2%	6	1.4	0.2%	11	1.4	0.2%
35-39	24	5.6	0.6%	27	6.3	0.9%	51	6.0	0.8%
40-44	82	18.1	2.3%	74	15.9	2.8%	156	17.0	2.5%
45-49	164	38.8	5.5%	136	31.2	6.3%	300	34.9	5.8%
50-54	291	78.7	11.2%	208	53.7	11.6%	499	65.9	11.4%
55-59	449	160.0	20.0%	328	108.9	20.0%	777	133.5	20.0%
60-64	669	301.5	33.1%	474	190.5	32.1%	1,143	242.9	32.7%
65-69	807	441.8	48.9%	589	271.0	47.2%	1,397	349.0	48.2%
70-74	977	600.8	68.0%	735	349.3	66.0%	1,712	458.9	67.2%
75-79	851	642.8	84.7%	658	338.8	82.9%	1,509	462.0	83.9%
80-84	515	629.3	94.8%	408	284.9	93.3%	923	410.1	94.1%
85+	266	509.0	100.0%	262	195.6	100.0%	528	283.6	100.0%

Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2006.

* Not Applicable. Rates may be unstable and are not presented when the case count for 1999-2003 is less than five (i.e., N<1).

Figure 3: Cancer of the Lung & Bronchus: Age-specific Incidence Rates (Ages 30+) per 100,000 Persons, by Gender in Ohio, 1999-2003

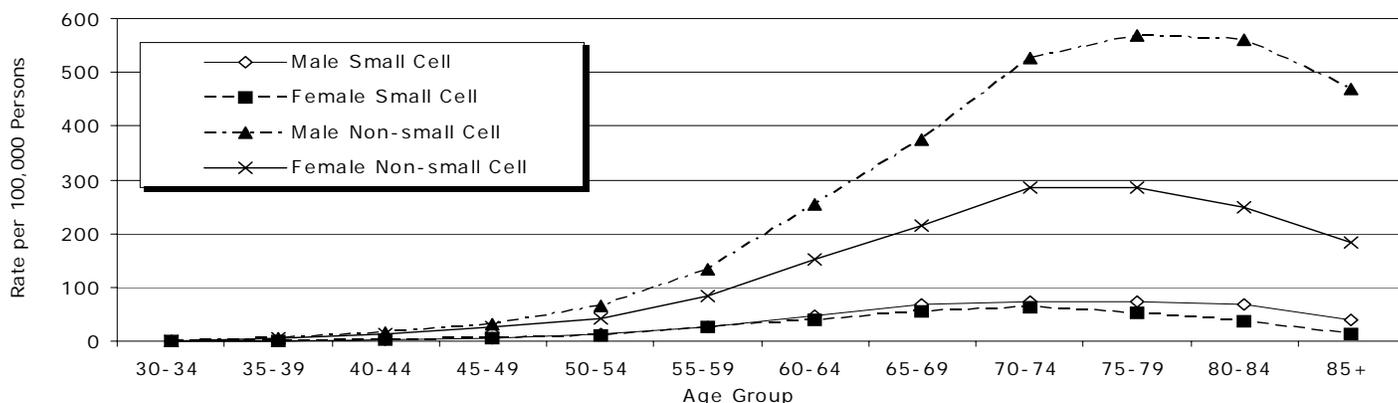


Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2006.

Table 2 and Figure 3 show age-specific incidence rates for lung and bronchus cancer by gender. The median age at diagnosis of lung and bronchus cancer occurred in the 70- to 74-years age group for both males and females. Among males, lung and bronchus cancer incidence rates increased with advancing age group to ages 75-79 years and declined slightly among males 80 years and older. Similarly, among females, lung and bronchus cancer incidence rates increased until ages 70-74 years, followed by a slight decline among females 75 years and older. The cumulative percentages in Table 2 indicate 80 percent of lung and bronchus cancers are diagnosed among persons ages 60 and older.

Lung & Bronchus Cancer By Histology

Figure 4: Cancer of the Lung & Bronchus: Age-specific Incidence Rates (Ages 30+) per 100,000 Persons, by Histological Subgroup (Small Cell, Non-small Cell) and Gender in Ohio, 1999-2003



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2006.

Histology refers to the cancer tissue or cell type. For lung and bronchus cancer, there are two primary histological subgroups: small cell and non-small cell. Small cell lung and bronchus cancer (also called oat cell cancer) is an aggressive (fast-growing) cancer in which the cells are small or oval-shaped. Non-small cell lung and bronchus cancer is slightly less aggressive, especially if detected at the localized stage. Figure 4 shows age-specific incidence rates for lung and bronchus cancer by histology and gender. Among males and females, incidence rates of non-small cell lung and bronchus cancer are greater than those of small cell lung and bronchus cancer. For non-small cell lung and bronchus cancer, males have slightly to moderately greater incidence rates; while for small cell lung and bronchus cancer, the rates are similar between males and females, with slightly higher rates among males in older age groups.

Figure 5: Cancer of the Lung & Bronchus: Age-adjusted Incidence Rates per 100,000 Persons, by Histological Subgroup of Cancer (Small Cell and Non-small Cell) and Gender in Ohio, 1999-2003, with Comparison to the US (SEER), 2000-2003

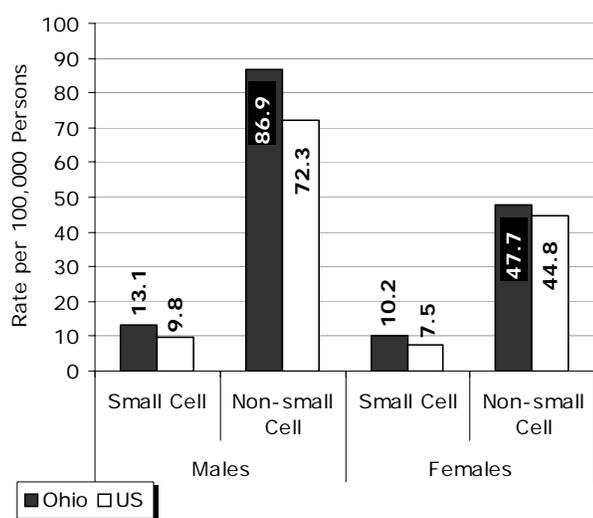


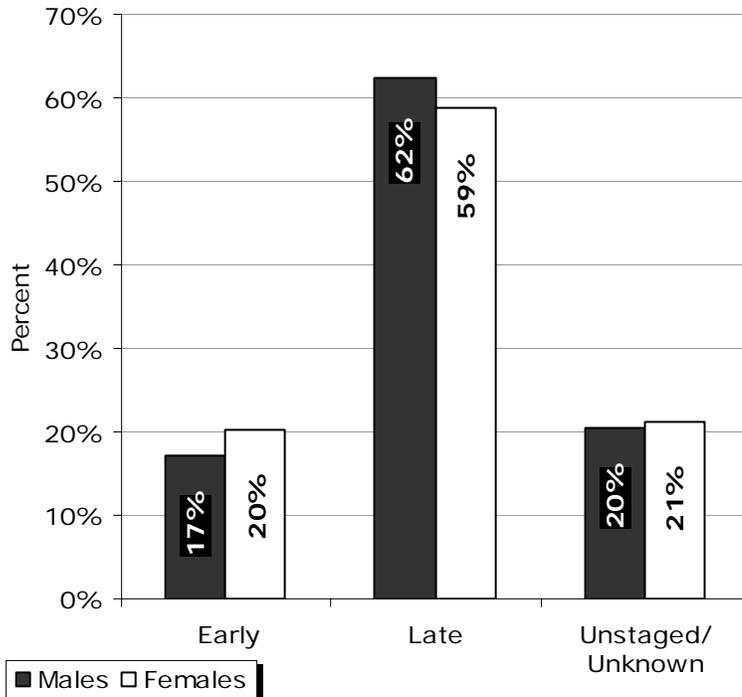
Figure 5 shows the lung and bronchus cancer incidence rates according to histology and gender for Ohio and the United States. The incidence of non-small cell lung and bronchus cancer is greater than that of small cell in Ohio and the United States. For both histological subgroups, incidence rates among males are greater than those of females for both Ohio and the United States. The Ohio lung and bronchus cancer incidence rates are higher than the rates for the United States for each histology/gender category. For non-small cell lung and bronchus cancer, the Ohio incidence rate compared to the U.S. rate is 20.2 percent greater among males and 6.5 percent greater among females, while for small cell lung and bronchus cancer, the Ohio incidence rate is 33.7 percent greater among males and 36.0 percent greater among females.

Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2006.

Technical Note: Small cell lung and bronchus cancer cases were defined as ICD-O-3 histology codes 8041-8045 and non-small cell lung and bronchus cancer cases were defined as ICD-O-3 histology codes 8000-8040 and 8046-9989.

Lung & Bronchus Cancer Cases and Survival by Stage at Diagnosis

Figure 6: Cancer of the Lung & Bronchus: Proportion of Cases (%) by Stage at Diagnosis and Gender in Ohio, 1999-2003



N = 9,026 cases per year

- Note: <1% of cases were diagnosed *in situ* (N = 12).
- Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2006.

The stage at diagnosis of lung and bronchus cancer is an important determinant of survival. For *in situ* cancers, the tumor has not invaded or penetrated surrounding tissue. In the localized stage, the tumor is confined to the organ in which it originated. In the regional stage, the tumor has spread to surrounding tissues. In the distant stage, the malignancy has spread, or metastasized, to other organs. The 1999-2003 Ohio data presented in Figure 6 reveal 17 percent of lung and bronchus cancers among males were diagnosed at the localized (early) stage, while 20 percent of females were diagnosed at this earlier stage. Sixty-two percent of males and 59 percent of females were diagnosed at later (regional and distant) stages. Approximately one in five lung and bronchus cancers were reported with an unstaged/unknown stage at diagnosis and there was little gender difference in the percentage of cases reported unstaged/unknown stage.

Table 3 shows the U.S. (SEER) five-year survival probability for lung and bronchus cancer in 1996-2002 was 15.0 percent for all stages combined. Five-year survival probabilities were 49.3 percent at the localized stage, 15.5 percent at the regional stage and only 2.1 percent for distant-stage tumors. Five-year survival probability for all stages combined was higher for: females (17.2 percent) compared to males (13.1 percent); whites (15.3) compared to blacks (12.2 percent); and those diagnosed with non-small cell (16.6 percent) compared to small cell (5.7 percent) lung and bronchus cancer.

At present, lung and bronchus cancer early detection methods have not been shown to decrease mortality. Results from the Prostate, Lung, Colorectal and Ovarian (PLCO) Cancer Screening Trial will determine whether spiral computed tomography scans reduce mortality among current and former tobacco smokers.

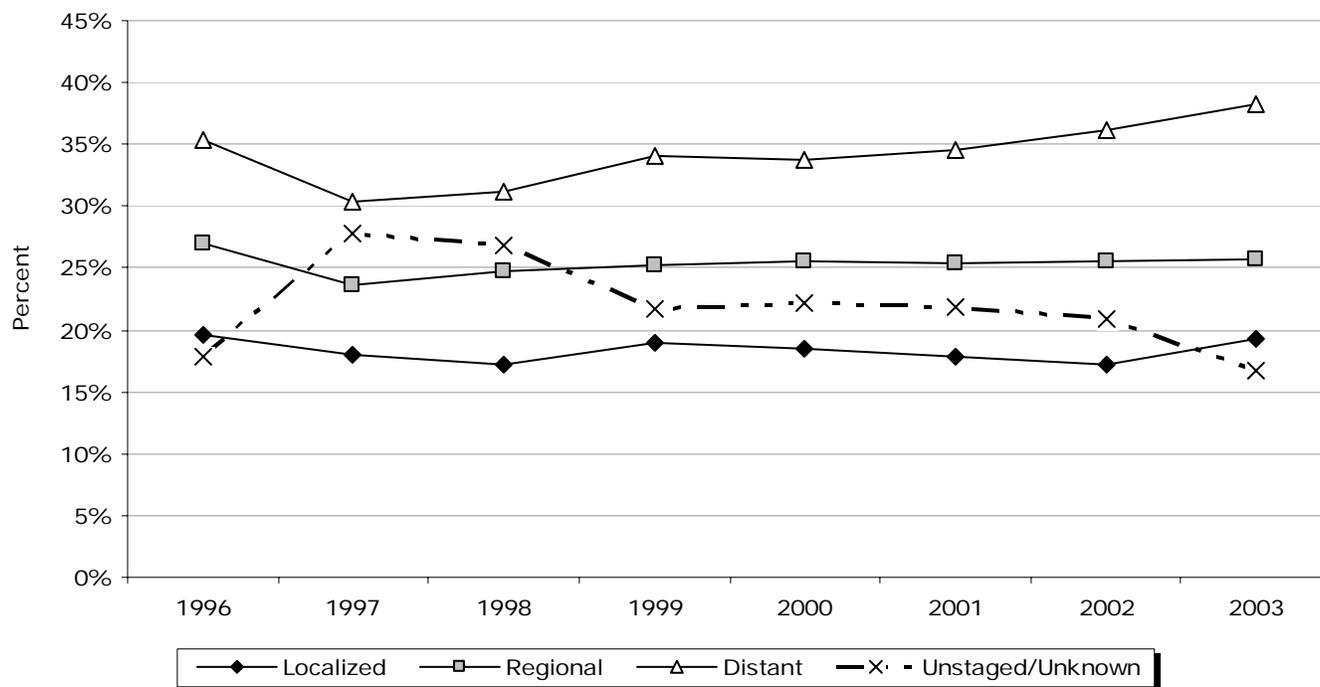
Table 3: Cancer of the Lung & Bronchus: Five-year Survival Probability (%) by Stage at Diagnosis in the US (SEER), 1996-2002

Stage	Overall Five-year Survival Probability (%)
All Stages	15.0%
Localized	49.3%
Regional	15.5%
Distant	2.1%

Source: SEER Cancer Statistics Review 1975-2003, National Cancer Institute, 2006.

Lung & Bronchus Cancer Stage at Diagnosis Trends

Figure 7: Cancer of the Lung & Bronchus:
Trend in the Proportion of Cases (%) by Stage at Diagnosis in Ohio, 1996-2003



Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2006.

Figure 7 shows the distribution of stage at diagnosis of lung and bronchus cancer according to year of diagnosis from 1996 to 2003. There does not appear to be a consistent trend in the proportions of lung and bronchus cancers diagnosed at both the localized and regional stages; however, there has been an increase in the proportion diagnosed at the distant stage between 1997 and 2003. The proportion of lung and bronchus cancers reported with an unstaged/unknown stage at diagnosis increased from 1996 to 1997, followed by a decrease between 1997 and 2003, although the proportion in 1996 (17.8 percent) is similar to that reported for 2003 (16.7 percent).

Did You Know?

According to the Surgeon General, involuntary exposure to tobacco smoke (also known as environmental tobacco or secondhand smoke) is a cause of lung cancer among healthy nonsmokers.

Living with a smoker increases lung cancer risk in nonsmokers by 20 to 30 percent.

Lung & Bronchus Cancer Incidence and Mortality Trends

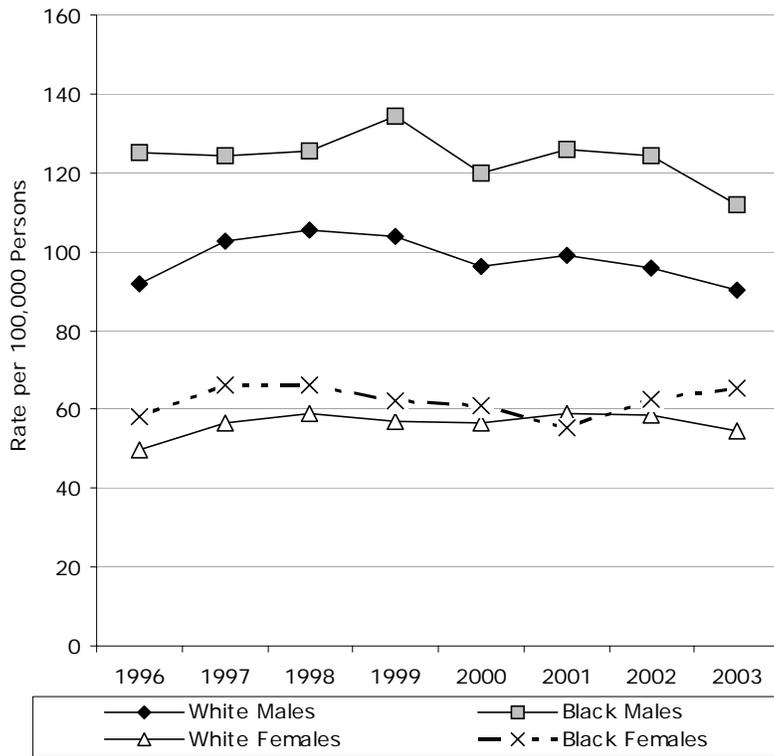


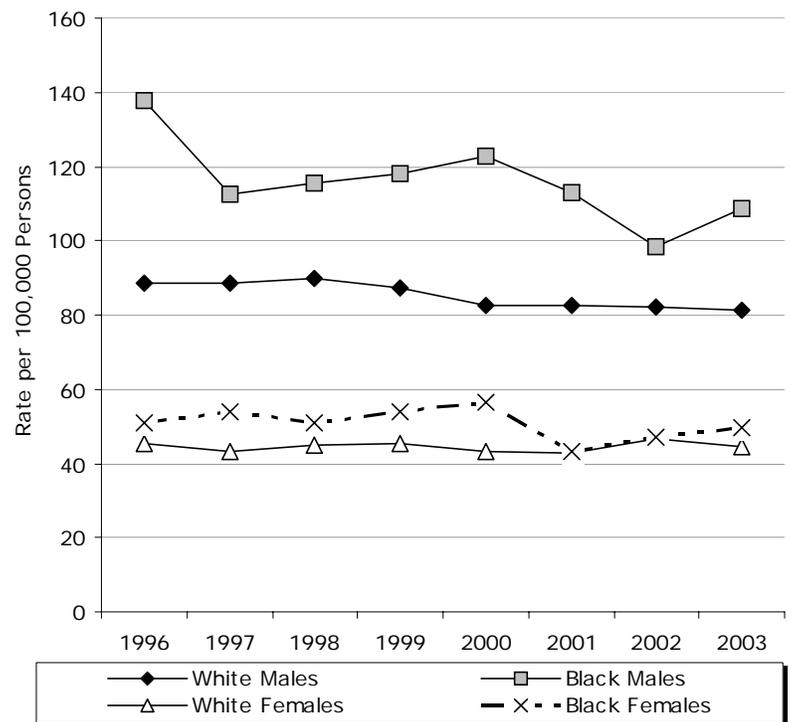
Figure 8: Cancer of the Lung & Bronchus: Trends in Average Annual Age-adjusted Incidence Rates per 100,000 Persons, by Gender and Race in Ohio, 1996-2003

Figure 8 shows incidence rates of lung and bronchus cancer according to year of diagnosis by race/gender group. There does not appear to be a consistent trend in lung and bronchus cancer incidence rates among white males from 1996 to 2003, as the incidence rate in 1996 (92.0 percent) is similar to the rate in 2003 (90.4 percent). There has been a slight increase in lung and bronchus cancer incidence rates among both white and black females over the time period; whereas, for black males, the incidence rate of lung and bronchus cancer decreased from 1996 to 2003.

Source: Ohio Cancer Incidence Surveillance System, Ohio Department of Health, 2006.

Figure 9: Cancer of the Lung & Bronchus: Trends in Average Annual Age-adjusted Mortality Rates per 100,000 Persons, by Gender and Race in Ohio, 1996-2003

Figure 9 shows trends in mortality rates of lung and bronchus cancer according to year of death (1996-2003) by race/gender group. There does not appear to be a consistent trend in lung and bronchus cancer mortality rates for both white and black females, as the mortality rates 1996 are nearly identical to those in 2003. However, there has been a decrease in lung and bronchus cancer mortality rates among both white and black males, with the rate among black males decreasing 26.7 percent during the time period.



Source: Chronic Disease and Behavioral Epidemiology Section and the Vital Statistics Program, Ohio Department of Health, 2006.

Risk Factors for Lung & Bronchus Cancer

- **Tobacco smoking** — Dramatically increases lung and bronchus cancer risk, causing between 80 and 85 percent of lung and bronchus cancers
- **Exposure to environmental (or “secondhand”) tobacco smoke**
- **Exposure to radon** — A gas produced during the naturally occurring breakdown of uranium
- **Exposure to asbestos**
- **Medical history** — History of tuberculosis (TB) and some types of pneumonia
- **Family history** — Having a first-degree relative who has had lung cancer
- **Occupational exposure** — Mining or working with talc may increase risk

Clinical Trials Information

Clinical trials test many types of treatments including new drugs, surgical procedures, radiation therapy and combinations of these. The goal of conducting clinical trials is to find better ways to treat cancer. To obtain information concerning clinical trials for lung and bronchus cancer, please talk with your doctor or visit one of the following Web sites:

- **National Cancer Institute:**
<http://www.cancer.gov/clinicaltrials>
- **American Cancer Society:**
http://www.cancer.org/docroot/ETO/ETO_6.asp?sitearea=ETO
- **Comprehensive Cancer Center at The Ohio State University/The Arthur G. James Cancer Hospital and Richard J. Solove Research Institute:**
<http://www.jamesline.com/trials>
- **The Cleveland Clinic:**
<http://cms.clevelandclinic.org/cancer/body.cfm?id=68&oTopID=68>
- **Case Western Reserve University Comprehensive Cancer Center:**
<http://henge.case.edu/sip/SIPControlServlet>
- **University of Cincinnati:**
<http://uccancercenter.uc.edu/research/clinicaltrials>

Sources of Data and Additional Information

- **Ohio Cancer Incidence Surveillance System:**
http://www.odh.ohio.gov/ODHPrograms/svio/ci_surv/ci_surv1.aspx
 - **National Cancer Institute:**
<http://www.cancer.gov/cancertopics/types/lung>
 - **American Cancer Society:**
http://www.cancer.org/docroot/lrn/lrn_0.asp
 - **U.S. Surgeon General:**
<http://www.surgeongeneral.gov/library/secondhandsmoke>
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