Chapter 9
Cancer of the Lung

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INTRODUCTION

This study provides survival analyses for 201,067 histologically confirmed adult cases of lung cancer diagnosed from 1988 through 2001. Cases were obtained from the Surveillance, Epidemiology, and End Results (SEER) Program of the National Cancer Institute (NCI). The SEER Program -- a sequel to two earlier NCI initiatives, the End Results Program and the Third National Cancer Survey -- has evolved in response to the National Cancer Act of 1971, which requires the collection, analysis, and dissemination of data relevant to the prevention, diagnosis, and treatment of cancer. This chapter focuses on the influence of extent of disease, histologic grade, and demographic factors on lung cancer survival.

MATERIALS AND METHODS

The NCI contracts with medically oriented nonprofit institutions -- such as universities and state health departments -- to obtain data on all cancers diagnosed in residents of the SEER geographic areas. SEER collects data on all invasive and in situ cancers except basal cell and squamous cell carcinomas of the skin and in situ carcinoma of the uterine cervix.

SEER selects participating institutions on the basis of two criteria: their ability to operate and maintain a population-based cancer reporting system and the epidemiologic significance of their population subgroups. At times, registries will withdraw; at times, registries will be added. This analysis is based on data from 12 geographic areas, which collectively contain about 14% of the total US population. The areas are the States of Connecticut, Iowa, New Mexico, Utah, and Hawaii; the metropolitan areas of Detroit, Atlanta, San Francisco, Seattle, San Jose, and Los Angeles; and 10 counties in rural Georgia. Los Angeles contributed data for diagnosis years 1992 to 2001, the others for 1988 to 2001.

To ensure maximal ascertainment of cancer cases, each registry abstracts the records of all cancer patients in hospitals, laboratories, and all other health service units that provide diagnostic services. Data collected by SEER registries on each patient include patient demographics, primary tumor site, tumor morphology, diagnostic methods, extent of disease, and first course of cancer-directed therapy. A separate record is coded for each primary cancer. All patients are followed from diagnosis to death, allowing detailed survival analysis.

SEER has collected extent of disease (EOD) information on all cancers since the inception of the program. The detail and amount of information collected, however, have varied over time. In 1988, there were revisions to the lung cancer EOD scheme allowing the SEER EOD information to be collapsed into the TNM classification described in the third edition of the American Joint Committee on Cancer (AJCC) Manual for Staging of Cancer (1). The AJCC TNM classification for lung cancer is the same as that of the International Union Against Cancer.

Relative Survival

The survival analysis is based on relative survival rates calculated by the life-table method. The relative rate is used to estimate the effect of cancer on the survival of the cohort. Relative survival, defined as observed survival divided by expected survival, adjusts for the expected mortality that the cohort would experience from other causes of death. When relative survival is 100%, a patient has the same chance to live 5 more years as a cancer-free person of the same age and sex. For lung cancer, the relative rate may underestimate survival slightly, since the expected mortality tables are based on the entire US population, whose expected survival is greater than the smoking population's expected survival.

Exclusions

The following were excluded from the analysis: patients for whom lung cancer was not the first primary; cases identified through autopsy or death certificate only; persons of unknown race; cases without active follow-up; patients

Table 9.1: Cancer of the Lung: Number of Cases and Exclusions by Reason, 12 SEER Areas, 1988-2001

Number Selected/Remaining	Number Excluded	Reason for Exclusion/Selection
273,521	0	Select 1988-2001 diagnosis (Los Angeles for 1992-2001 only)
225,617	47,904	Select first primary only
220,264	5,353	Exclude death certificate only or at autopsy
219,919	345	Exclude unknown race
219,768	151	Active follow-up and exclude alive with no survival time
219,713	55	Exclude children (Ages 0-19)
219,577	136	Exclude in situ cancers for all except breast & bladder cancer
201,502	18,075	Exclude no or unknown microscopic confirmation
201,067	435	Exclude sarcomas

less than 20 years old; in situ cases; cases without microscopic confirmation; and sarcomas. Table 9.1 details the exclusions. There were 201,067 cases for analysis.

RESULTS

Overall, the relative survival rate was poor; only 15% survived 5 years. In most of the following tables, each prognostic factor is presented both individually and in relation to a second factor.

Race and Sex

Overall, the 5-year relative survival rate for whites was 16% and for blacks was 12%. The overall 5-year relative survival rates were 14% for males and 18% for females (Table 9.2).

Geographic Location

Five-year relative survival rates in the 12 SEER areas represented in this study ranged from 13% in New Mexico and Rural Georgia to 17% in Connecticut (Table 9.3).

Stage of Disease

Lung cancer was seldom found (only 13.4%) when it was still confined to the lung. Rather, over 60% of the patients had stage III or IV disease at diagnosis. Twenty-one percent of the cases did not have enough diagnostic information to be staged. The stage distributions for males and females were similar (Table 9.4).

Stage of disease was a strong predictor of survival, as was expected. The 5-year relative survival rates ranged from a high of 57% for stage I to a low of 2% for stage IV (Table 9.4). Table 9.4 shows the survival rates for males and females by stage. Females had higher survival rates at all stages.

Sex, Stage, and Histology

Table 9.5 shows that the histologic type distributions of lung cancers in males and females are somewhat different. Adenocarcinomas comprise 41% of female cases but only 33% of male cases, while squamous cell carcinomas comprise 15% of female cases but 24% of male cases. The other types are roughly equal in males and in females.

Based on 5-year relative survival rates for both sexes combined, patients with adenocarcinoma survived longer than those with squamous cell, large cell, or small cell carcinoma for all stages combined and for stage I (Table 9.5). For stage II, however, patients with squamous cell carcinoma had a slightly better survival rate than those with adenocarcinoma.

For males, relative survival rates were similar for adenocarcinoma and squamous cell carcinoma for all stages, but for stage I adenocarcinoma had higher survival and for stage II squamous cell carcinoma had higher survival (Figure 9.1). For females, relative survival rates were higher for adenocarcinomas for stage I and II (Figure 9.2). Survival rates were more influenced by stage than by histology. For non-small cell carcinoma and small cell carcinoma, survival curves by stage are shown in figure 9.3 and 9.4, respectively. Survival rates are lower for

Table 9.2: Cancer of the Lung: Number of Cases and 5-Year Relative Survival Rates (RSR) (%) by Race and Sex, Ages 20+, 12 SEER Areas,1988-2001

	Male and Female		Male		Female	
Race	Cases	5-Year RSR %	Cases	5-Year RSR %	Cases	5-Year RSR %
All Races	201,067	15.5	117,472	13.6	83,595	18.0
White	165,487	15.9	94,728	13.9	70,759	18.4
Black	22,219	12.5	14,120	10.9	8,099	15.0
Other	13,361	~	8,624	~	4,737	~

~ Rate not shown.

Table 9.3: Cancer of the Lung: Number and Distribution of Cases and 1-, 2-, 3-, 5-, 8-, & 10-Year Relative Survival Rates (%) by SEER Area, Ages 20+, 12 SEER Areas, 1988-2001

SEER Geographic Area	Cases	Percent	Relative Survival Rate (%)					
			1-Year	2-Year	3-Year	5-Year	8-Year	10-Year
Total	201,067	100.0	42.6	25.9	20.0	15.5	12.4	11.0
Atlanta and Rural Georgia	13,754	6.8	42.6	26.4	20.5	15.9	13.1	11.4
Atlanta (Metropolitan) - 1988+	12,956	6.4	42.9	26.7	20.8	16.1	13.3	11.6
Rural Georgia - 1988+	798	0.4	38.0	21.5	16.2	13.0	10.2	8.8
California								
Los Angeles - 1992+	30,677	15.3	41.3	25.1	19.4	14.8	11.8	10.1
Greater Bay Area	33,987	16.9	42.1	25.6	19.5	15.2	12.2	10.8
San Francisco-Oakland SMSA - 1988+	23,746	11.8	41.8	25.0	19.0	14.7	11.6	10.3
San Jose-Monterey - 1988+	10,241	5.1	42.7	26.9	20.8	16.5	13.7	11.9
Connecticut - 1988+	26,207	13.0	45.0	28.1	21.9	17.2	14.0	12.3
Detroit (Metropolitan) - 1988+	33,074	16.4	43.1	26.3	20.6	15.8	12.7	11.3
Hawaii - 1988+	6,480	3.2	44.3	26.8	20.6	16.1	13.1	12.3
Iowa - 1988+	21,548	10.7	41.9	24.5	18.6	14.0	10.7	9.3
New Mexico - 1988+	7,159	3.6	38.4	22.3	17.3	13.0	10.4	9.3
Seattle (Puget Sound) - 1988+	23,799	11.8	43.7	26.6	20.9	16.3	12.6	11.6
Utah - 1988+	4,382	2.2	38.4	22.6	17.7	13.9	11.9	11.1

small cell carcinoma, but even within small cell carcinoma, survival rates vary by stage (Figure 9.4).

Sex, Stage, and Age

Table 9.6 presents the survival statistics by sex, stage, and age at diagnosis. Females had better relative survival rates than males. The largest differences were for stage I cancers and very young or older patients. Females under 45 with stage I disease had a 72% 5-year relative survival rate; in contrast, the rate was 41% for females 85 and over. In general, younger patients survived better than older patients for stage I and II disease. Survival rates were poor for stage IV at all ages.

Laterality

Tumors were more frequently diagnosed in the right lung than the left lung. But, survival rates were nearly identical for patients whose tumors arose in the right lung as compared to the left lung (Table 9.7). 'Other' category includes not a paired site, only one side - side unspecified, bilateral - single primary, and paired site (but no information concerning laterality).

Subsite

Over 40% of the lung cancers originated in the upper lobe no matter at which stage they were diagnosed. For stage I, 61.6% of the cancers originated in the upper lobe and 28.9% in the lower lobe. For stage II, 53.9% of the cancers originated in the upper lobe and 34.1% in the lower lobe. For stages III, IV, and unknown, the origin

Table 9.4: Cancer of the Lung: Number of Cases, Stage Distribution, and 5-Year Relative Survival Rates (%) by AJCC Stage (3rd edition) and Sex, Ages 20+, 12 SEER Areas, 1988-2001

AJCC Stage (3rd edition)	Male and Female			Male			Female		
	Cases	Percent	5-Year Relative Survival Percent	Cases	Percent	5-Year Relative Survival Percent	Cases	Percent	5-Year Relative Survival Percent
All Stages	201,067	100.0	15.5	117,472	100.0	13.6	83,595	100.0	18.0
I	26,879	13.4	56.9	14,598	12.4	53.5	12,281	14.7	60.8
II	5,635	2.8	33.7	3,402	2.9	32.4	2,233	2.7	35.7
III	50,254	25.0	9.4	29,863	25.4	9.0	20,391	24.4	10.1
IV	75,057	37.3	1.8	44,783	38.1	1.6	30,274	36.2	2.2
Unknown	43,242	21.5	18.0	24,826	21.1	15.0	18,416	22.0	21.9

of the cancer was not specified 16.8%, 24.7%, and 17.9%, respectively. Overall, the 5-year relative survival rates were lower for patients whose tumor originated in the main stem bronchus (a category that includes the carina and hilum) than for those whose tumor originated in the upper, middle, or lower lobe (Table 9.8). If the lobe was not specified, the 5-year relative survival rate was 5%. For tumors that crossed lobe boundaries, survival rates were intermediate. For patients diagnosed at stage I, those whose tumor had originated in the upper lobe had a survival rate (60%) more than double that of those whose tumors originated in the main bronchus, carina, or hilum (23%) (Table 9.9).

Extent of Disease

Only cases with no lymph nodes involved (approximately one-fourth of the cases) were used to investigate the influence of extent of disease on survival (Table 9.10). Five-year

Figure 9.1: Male Lung Cancer: 5-Year Relative Survival Rates (%) by Histology and AJCC Stage, Ages 20+, 12 SEER Areas, 1988-2001

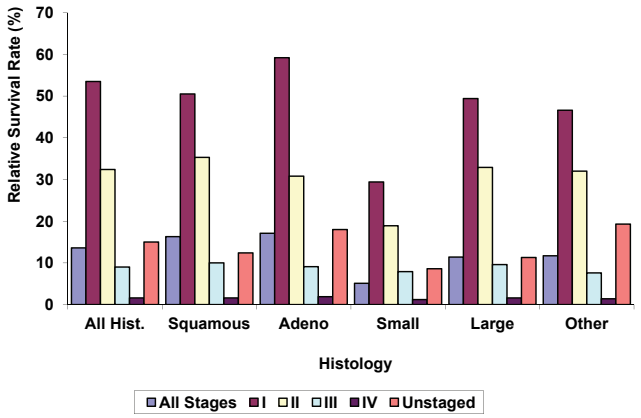

Figure 9.2: Female Lung Cancer: 5-Year Relative Survival Rates (%) by Histology and AJCC Stage, Ages 20+, 12 SEER Areas, 1988-2001

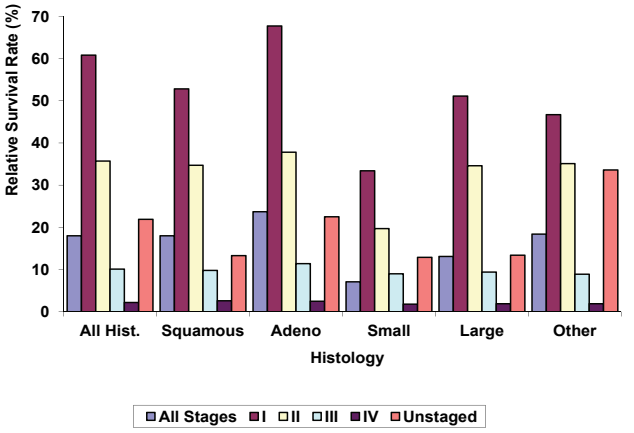

Table 9.5: Cancer of the Lung: Number of Cases and 5-Year Relative Survival Rates (RSR) (%) by Sex, Histology and AJCC Stage (3rd edition), Ages 20+, 12 SEER Areas, 1988-2001

	AJCC Stage (3rd edition)											
	Total		I		II		III		IV		Unknown	
Sex/Histology	Cases	5-Year RSR %	Cases	5-Year RSR %	Cases	5-Year RSR %	Cases	5-Year RSR %	Cases	5-Year RSR %	Cases	5-Year RSR %
Male and Female	201,067	15.5	26,879	56.9	5,635	33.7	50,254	9.4	75,057	1.8	43,242	18.0
Squamous cell	41,212	16.8	7,196	51.3	1,698	35.1	12,061	9.9	10,263	1.9	9,994	12.7
Adenocarcinoma	73,535	20.3	14,432	63.8	2,802	34.4	17,587	10.2	27,593	2.2	11,121	20.2
Small Cell	33,008	6.0	953	31.4	270	19.3	8,213	8.4	16,962	1.5	6,610	10.7
Large Cell	14,945	12.1	1,705	50.2	365	33.7	3,931	9.5	6,014	1.7	2,930	12.2
Others	38,367	14.5	2,593	46.6	500	33.1	8,462	8.1	14,225	1.6	12,587	26.0
Male	117,472	13.6	14,598	53.5	3,402	32.4	29,863	9.0	44,783	1.6	24,826	15.0
Squamous cell	28,463	16.3	4,734	50.5	1,281	35.3	8,516	10.0	7,116	1.6	6,816	12.4
Adenocarcinoma	39,303	17.1	6,865	59.2	1,406	30.8	9,562	9.1	15,584	1.9	5,886	18.0
Small Cell	17,827	5.1	488	29.4	134	18.9	4,166	7.9	9,579	1.2	3,460	8.6
Large Cell	9,033	11.4	965	49.4	239	32.9	2,361	9.6	3,753	1.6	1,715	11.3
Others	22,846	11.7	1,546	46.6	342	32.0	5,258	7.6	8,751	1.4	6,949	19.3
Female	83,595	18.0	12,281	60.8	2,233	35.7	20,391	10.1	30,274	2.2	18,416	21.9
Squamous cell	12,749	18.0	2,462	52.8	417	34.7	3,545	9.8	3,147	2.6	3,178	13.3
Adenocarcinoma	34,232	23.7	7,567	67.7	1,396	37.8	8,025	11.4	12,009	2.5	5,235	22.5
Small Cell	15,181	7.1	465	33.4	136	19.7	4,047	9.0	7,383	1.8	3,150	12.9
Large Cell	5,912	13.1	740	51.1	126	34.6	1,570	9.4	2,261	1.9	1,215	13.4
Others	15,521	18.4	1,047	46.7	158	35.1	3,204	8.9	5,474	1.9	5,638	33.6

relative survival ranged from a high of 60% for cases in which the cancer was confined to one lung down to 4% for those with metastases. For nearly every category, women fared better than men. For those patients whose tumor was confined to one lung, women had a 64% 5-year relative survival rate compared to 56% for men.

Grade

Nearly 40% of the cases did not have histologic grade. But for stage I, only 18% were not graded. For all stages combined, survival was four times higher for grade 1 compared to grade 4. Within stages, the survival differences by grade were not as pronounced (Table 9.11). For stage I, grade 1 cases had better survival (73%) than grade 4 cases (48%). Stage I adenocarcinomas had a similar range (Table 9.12). For adenocarcinomas, grade III and IV had similar survival and for stage IV, the survival was less than 4% no matter which grade (Table 9.12).

DISCUSSION

While lung cancer survival rates overall are generally poor, lung cancer survival rates vary by patient and tumor charac-

Table 9.6: Cancer of the Lung: Number of Cases and 5-Year Relative Survival Rates (%) by Sex, Age (20+), and AJCC Stage (3rd edition) at Diagnosis, 12 SEER Areas, 1988-2001

Sex/Age (Years)	AJCC Stage (3rd edition)											
	Total		I		II		III		IV		Unknown	
	Cases	5-Year Relative Survival Percent	Cases	5-Year Relative Survival Percent	Cases	5-Year Relative Survival Percent	Cases	5-Year Relative Survival Percent	Cases	5-Year Relative Survival Percent	Cases	5-Year Relative Survival Percent
Male and Female	201,067	15.5	26,879	56.9	5,635	33.7	50,254	9.4	75,057	1.8	43,242	18.0
20-44	6,148	21.6	497	69.7	132	52.5	1,450	14.8	2,734	2.4	1,335	46.7
45-49	7,995	17.5	759	64.9	234	42.5	1,934	13.6	3,681	2.3	1,387	32.4
50-54	13,789	17.6	1,549	66.5	470	42.3	3,361	13.2	6,029	2.5	2,380	24.9
55-59	20,684	17.0	2,620	62.1	626	36.8	5,048	12.2	8,733	2.2	3,657	22.4
60-64	29,038	16.4	3,829	61.2	910	36.8	7,090	11.2	11,677	1.7	5,532	19.1
65-69	36,469	16.2	5,443	57.6	1,102	32.3	8,872	9.7	13,518	1.8	7,534	16.9
70-74	36,666	14.8	5,512	53.9	1,130	27.2	9,166	7.6	12,745	1.7	8,113	14.7
75-79	28,228	12.3	4,074	48.9	713	26.0	7,101	5.6	9,391	1.0	6,949	11.5
80-84	15,235	10.2	1,963	42.6	251	24.6	4,114	3.7	4,637	1.5	4,270	10.2
85+	6,815	6.6	633	33.9	67	16.9	2,118	2.1	1,912	0.7	2,085	7.6
Male	117,472	13.6	14,598	53.5	3,402	32.4	29,863	9.0	44,783	1.6	24,826	15.0
20-44	3,378	18.4	240	67.1	73	47.6	836	14.7	1,565	2.4	664	39.5
45-49	4,603	14.8	359	66.1	133	41.1	1,167	11.8	2,185	1.5	759	27.8
50-54	8,124	14.9	787	61.0	284	43.9	2,053	12.7	3,648	1.9	1,352	19.2
55-59	12,245	14.7	1,397	58.5	373	36.3	3,137	11.5	5,250	2.1	2,088	17.3
60-64	17,738	14.6	2,169	58.1	545	34.4	4,405	10.2	7,275	1.3	3,344	16.8
65-69	21,847	14.4	3,061	54.3	699	32.0	5,336	9.1	8,260	1.5	4,491	14.3
70-74	21,536	13.0	3,028	50.5	679	25.1	5,467	7.2	7,670	1.6	4,692	12.2
75-79	16,043	10.9	2,209	45.4	441	21.2	4,130	5.2	5,343	0.8	3,920	10.1
80-84	8,384	8.1	1,007	35.4	138	25.3	2,243	3.4	2,594	1.4	2,402	7.5
85+	3,574	4.9	341	26.4	37	14.4	1,089	1.0	993	0.4	1,114	5.4
Female	83,595	18.0	12,281	60.8	2,233	35.7	20,391	10.1	30,274	2.2	18,416	21.9
20-44	2,770	25.5	257	71.9	59	58.5	614	14.9	1,169	2.5	671	53.6
45-49	3,392	21.1	400	63.8	101	44.5	767	16.3	1,496	3.4	628	37.8
50-54	5,665	21.4	762	72.2	186	39.5	1,308	13.9	2,381	3.2	1,028	32.1
55-59	8,439	20.3	1,223	66.1	253	37.7	1,911	13.4	3,483	2.4	1,569	29.1
60-64	11,300	19.3	1,660	65.2	365	40.1	2,685	12.6	4,402	2.3	2,188	22.3
65-69	14,622	18.6	2,382	61.7	403	32.6	3,536	10.6	5,258	2.1	3,043	20.6
70-74	15,130	17.1	2,484	57.9	451	30.0	3,699	8.1	5,075	1.8	3,421	17.8
75-79	12,185	13.9	1,865	52.5	272	32.7	2,971	5.9	4,048	1.3	3,029	13.1
80-84	6,851	12.4	956	48.9	113	23.5	1,871	4.1	2,043	1.3	1,868	13.1
85+	3,241	8.1	292	40.6	30	17.2	1,029	2.8	919	1.1	971	9.6

Table 9.7: Cancer of the Lung: Number of Cases and 5-Year Relative Survival Rates (%) by AJCC Stage (3rd edition) and Laterality, Ages 20+, 12 SEER Areas, 1988-2001

	Laterality							
	Total		Right		Left		Other	
AJCC Stage	Cases	5-Year Relative Survival Percent	Cases	5-Year Relative Survival Percent	Cases	5-Year Relative Survival Percent	Cases	5-Year Relative Survival Percent
All Stages	201,067	15.5	109,776	16.2	79,276	16.2	12,015	4.0
I	26,879	56.9	15,554	57.5	11,311	56.1	14	~
II	5,635	33.7	2,994	32.2	2,637	35.5	<5	~
III	50,254	9.4	28,596	9.5	20,287	9.6	1,371	5.2
IV	75,057	1.8	38,949	1.7	28,041	1.9	8,067	2.0
Unstaged/Unknown	43,242	18.0	23,683	18.9	17,000	18.1	2,559	9.4

~ Statistic not displayed due to less than 25 cases.

Table 9.8: Cancer of the Lung: Number of Cases and 5-Year Relative Survival Rates (%) by Subsite and Sex, Ages 20+, 12 SEER Areas, 1988-2001

	Male and Female		Male		Female	
Subsite	Cases	5-Year Relative Survival Percent	Cases	5-Year Relative Survival Percent	Cases	5-Year Relative Survival Percent
All Subsites	201,067	15.5	117,472	13.6	83,595	18.0
Main bronchus	11,384	7.0	6,620	6.4	4,764	7.8
Upper lobe	97,916	19.0	57,830	16.9	40,086	21.8
Middle lobe	8,496	19.7	4,632	16.5	3,864	23.2
Lower lobe	44,106	17.8	25,390	15.2	18,716	21.0
Overlapping	3,940	14.7	2,346	14.2	1,594	15.3
NOS	35,225	4.7	20,654	3.7	14,571	5.9

Table 9.9: Cancer of the Lung: Number of Cases and 5-Year Relative Survival Rates (%) by Subsite and AJCC Stage (3rd edition), Ages 20+, 12 SEER Areas, 1988-2001

	AJCC Stage (3rd edition)											
	Total		I		II		III		IV		Unknown	
Subsite	Cases	5-Year Relative Survival Percent	Cases	5-Year Relative Survival Percent	Cases	5-Year Relative Survival Percent	Cases	5-Year Relative Survival Percent	Cases	5-Year Relative Survival Percent	Cases	5-Year Relative Survival Percent
All Subsites	201,067	15.5	26,879	56.9	5,635	33.7	50,254	9.4	75,057	1.8	43,242	18.0
Main bronchus	11,384	7.0	303	23.1	149	27.4	4,130	8.0	4,597	1.1	2,205	13.9
Upper lobe	97,916	19.0	16,567	59.9	3,036	38.3	24,834	11.6	32,845	2.2	20,634	18.7
Middle lobe	8,496	19.7	1,351	55.4	248	30.1	1,877	8.7	2,898	1.5	2,122	29.7
Lower lobe	44,106	17.8	7,763	53.5	1,921	28.1	9,756	8.5	14,813	1.7	9,853	20.9
Overlapping	3,940	14.7	478	50.0	183	33.5	1,219	9.8	1,353	1.3	707	19.9
NOS	35,225	4.7	417	34.9	98	20.7	8,438	4.7	18,551	1.5	7,721	10.4

Figure 9.3: Non-small-cell Lung Cancer: Relative Survival Rates (%) by AJCC Stage, Ages 20+, 12 SEER Areas, 1988-2001

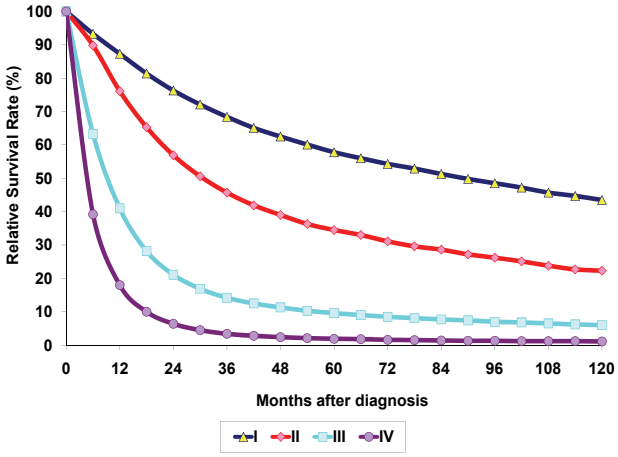

Figure 9.4: Small-cell Lung Cancer: Relative Survival Rates (%) by AJCC Stage, Ages 20+, 12 SEER Areas, 1988-2001

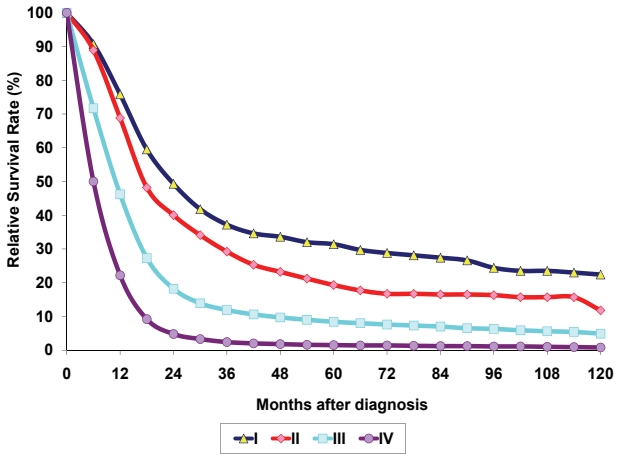

Table 9.10: Cancer of the Lung without lymph node involvement: Number and Distribution of Cases and 5-Year Relative Survival Rates (%) by Extension and Sex, Ages 20+, 12 SEER Areas, 1988-2001

Extension	Male and Female			Male			Female		
	Cases	Percent	5-Year RSR	Cases	Percent	5-Year RSR	Cases	Percent	5-Year RSR
All Cases without Lymph Node Involvement	49,758	100.0	41.5	27,861	100.0	37.3	21,897	100.0	46.5
10-One lung	22,200	44.6	59.7	11,683	41.9	55.7	10,517	48.0	64.0
20-Involving MSB, away from carina	1,206	2.4	56.0	715	2.6	49.1	491	2.2	65.3
30-Localized, NOS	3,261	6.6	38.7	1,860	6.7	36.0	1,401	6.4	42.1
40-Atelectasis/obs. pneumonitis < entire lung, w/o pleural effusion	6,459	13.0	51.6	3,629	13.0	47.3	2,830	12.9	56.7
50-Involving MSB, close to carina	344	0.7	24.8	223	0.8	25.2	121	0.6	23.8
60-Atelectasis/obstructive pneumonitis of entire lung	1,765	3.5	27.1	1,143	4.1	25.2	622	2.8	30.4
65-Multiple masses - same lobe	293	0.6	+	137	0.5	+	156	0.7	+
70-Carina/trachea	1,837	3.7	17.5	1,207	4.3	17.2	630	2.9	17.9
71-Heart	135	0.3	13.6	94	0.3	11.9	41	0.2	16.8
72-Malignant pleural effusion	2,569	5.2	9.4	1,500	5.4	8.4	1,069	4.9	10.7
73-Adjacent rib	632	1.3	16.2	405	1.5	16.1	227	1.0	16.3
75-Sternum/vertebrae	304	0.6	14.7	193	0.7	14.3	111	0.5	15.2
77-Separate lobes (same lung)	255	0.5	!	120	0.4	!	135	0.6	!
78-Contralateral	494	1.0	11.2	258	0.9	7.8	236	1.1	14.4
80-Further extension	68	0.1	10.9	43	0.2	3.0	25	0.1	23.9
85-Metastasis	6,994	14.1	4.3	4,097	14.7	3.7	2,897	13.2	4.9
99-Unknown	885	1.8	16.2	519	1.9	14.7	366	1.7	18.1

Bases on 49,758 cases with no lymph node involvement. Extensions with fewer than 50 cases excluded.

\+ The statistic could not be calculated.

! Not enough intervals to produce rate.

Table 9.11: Cancer of the Lung: Number of Cases and 5-Year Relative Survival Rates (%) by Grade and AJCC Stage (3rd edition), Ages 20+, 12 SEER Areas, 1988-2001

	AJCC Stage (3rd edition)											
	Total		I		II		III		IV		Unknown	
Grade	Cases	5-Year RSR Percent	Cases	5-Year RSR Percent	Cases	5-Year RSR Percent	Cases	5-Year RSR Percent	Cases	5-Year RSR Percent	Cases	5-Year RSR Percent
All Grades	201,067	15.5	26,879	56.9	5,635	33.7	50,254	9.4	75,057	1.8	43,242	18.0
1	6,831	41.4	2,645	73.3	237	39.3	1,143	15.9	1,187	3.6	1,619	33.9
2	25,993	29.8	8,000	63.0	1,685	37.7	6,086	12.8	5,319	2.8	4,903	22.2
3	61,072	15.8	9,364	54.3	2,467	33.7	16,349	11.4	22,116	1.9	10,776	14.1
4	27,991	9.4	1,940	47.8	533	30.6	7,270	9.5	12,632	1.6	5,616	11.9
Unknown	79,180	10.4	4,930	46.4	713	24.7	19,406	6.1	33,803	1.6	20,328	19.7

Table 9.12: Adenocarcinoma of the Lung: Number of Cases and 5-Year Relative Survival Rates (%) by Grade and AJCC Stage (3rd edition), Ages 20+, 12 SEER Areas, 1988-2001

	AJCC Stage (3rd edition)											
	Total		I		II		III		IV		Unknown	
Grade	Cases	5-Year RSR Percent	Cases	5-Year RSR Percent	Cases	5-Year RSR Percent	Cases	5-Year RSR Percent	Cases	5-Year RSR Percent	Cases	5-Year RSR Percent
Total	73,535	20.3	14,432	63.8	2,802	34.4	17,587	10.2	27,593	2.2	11,121	20.2
1	4,915	46.5	2,248	76.2	174	36.8	625	19.9	906	3.9	962	34.7
2	13,284	35.7	4,915	67.5	992	37.0	2,446	15.9	3,080	3.1	1,851	29.1
3	26,197	17.6	4,567	56.3	1,226	33.4	6,762	12.3	10,053	2.0	3,589	16.9
4	1,470	16.2	218	50.5	84	35.8	413	11.1	545	3.4	210	16.0
Unknown	27,669	10.8	2,484	60.3	326	28.4	7,341	5.1	13,009	1.8	4,509	16.3

teristics. For lung cancer, stage had the most prognosis, but other factors such as grade, age, sex, and histologic type also played a role. Many of these results expand on similar analyses performed on earlier SEER data (2).

While females have somewhat better survival than males, it does not appear to be due to more cases with a favorable extent of disease; the differential also exists within most of the detailed EOD categories.

Lung cancer is a major disease in the US for both males and females; survival of lung cancer is worse than survival of most other types of cancer. While overall survival was poor, the 5-year relative survival rate for stage I patients was 57%.

Females had better survival than males for most lung cancer histologic types, even though females had a higher proportion of small cell carcinoma (18% in women and 15% in men in our data set), which has a much worse prognosis than the other tumor types (Table 9.5).

Although the prognosis for lung cancer is dismal for most patients, there are some groups that are exceptional. For instance, females under age 45 with stage I lung cancer had a 5-year relative survival rate of 72%.

Since relative survival rates are higher for younger persons than for older, some of the female-male survival differential may be due to a greater proportion of younger patients in the female group. However, even within age groups, females tended to survive better than males.

TNM stage was a good predictor of survival even when analyzed by various demographic and tumor factors. There were, however, wide ranges of survival possible within a particular stage, especially for stage I. For instance, as mentioned above, young females with stage I lung cancer had a 5-year relative survival rate of 72%; for females aged 85 and over, the corresponding rate was only 41%.

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