Cancer Statistics, 2002

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ABSTRACT Every year the American Cancer Society estimates the number of new cancer cases and deaths expected in the United States in the current year and compiles the most recent data on cancer incidence, mortality, and survival, using National Cancer Institute (NCI) incidence and National Center for Health Statistics (NCHS) mortality data. Incidence and death rates are age adjusted to the 1970 US standard population. It is estimated that 1,284,900 new cases of cancer will be diagnosed and 555,500 people will die from cancer in the United States in the year 2002. From 1992 to 1998, cancer death rates declined in males and females, while cancer incidence rates decreased among males and increased slightly among females. Most notably, African-American men showed the largest decline for both incidence and mortality. Nevertheless, African Americans still carry the highest burden of cancer with later-stage cancer diagnosis and poorer survival compared with whites. Despite the continued decline in cancer death rates, the total number of recorded cancer deaths in the United States continues to increase slightly due to the aging and expanding population. *(CA Cancer J Clin 2002;52:23-47.)*

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This article is also available at www.cancer.org.

INTRODUCTION

At present, cancer remains a major public health problem in the United States and in other developed countries as well. One in four deaths in the United States is caused by cancer. In order to provide an up-to-date perspective on the occurrence of cancer, the American Cancer Society presents this overview of cancer frequency, incidence, mortality, and survival statistics for the year 2002.

MATERIALS AND METHODS

Data Sources

Mortality data were obtained from the National Center for Health Statistics (NCHS).[1] Incidence data, including five-year relative survival rate data and data on lifetime probability of developing cancer, were obtained from the Surveillance, Epidemiology, and End Results (SEER) program of the National Cancer Institute (NCI) covering about 10 percent of the US population.[2] Population data were obtained from the US Census Bureau.[3] For 1999 mortality data, causes of death were coded and classified according to the *Tenth Revision of the International Classification of Diseases* (ICD-10),[4] replacing ICD-9[5] used in the United States for deaths occurring during 1979 through 1998. Cancer cases were classified according to the International Classification of Diseases for Oncology.[6]

Estimated New Cancer Cases

Because the United States has no nationwide cancer registry, precisely how many new cases of cancer are diagnosed each year in the United States and in all individual states is unknown. Consequently, we first estimated the number of new cancer cases occurring annually in the United States from 1979 through 1998 by using age-specific cancer incidence rates collected by NCI's SEER program[2] coupled with population data reported by the US Census Bureau.[3] We then forecasted the number of cancer cases expected to be diagnosed in the United States in the year 2002 using an autoregressive quadratic model fitted to the annual cancer case estimates.[7]

The observed trend in prostate cancer incidence was not compatible with the selected forecasting model, as rates increased greatly between 1988 and 1992, declined sharply between 1992 and 1995, and leveled off from 1995 to 1998.[8,9] This trend likely reflects extensive use of prostate-specific antigen (PSA) screening in a previously unscreened population and the subsequent increase in cancer diagnoses at an early stage.[10,11] We therefore assumed that the number of prostate cancer cases is approaching the pattern in effect prior to widespread use of PSA screening; and then estimated the number of new cases of prostate cancer for 2002 using a linear projection based on data from 1979 to 1989 and 1995 to 1998 only.

We could not use the methods mentioned above to estimate new cancer cases for individual states because complete cancer incidence and case counts are not available for many states. To derive these estimates, we relied on state cancer death statistical data and assumed that the ratio of cancer deaths to cancer cases was the same in each state as in the United States on the whole.

Estimated Cancer Deaths

We estimated the number of cancer deaths expected to occur in the United States and in each state in the year 2002 using underlying cause-of-death data from death certificates as reported to the National Center for Health Statistics.[1] The recorded numbers of cancer deaths occurring annually from 1979 to 1999 in the United States and in each state were fitted with autoregressive quadratic models[7] in order to forecast the number of cancer deaths expected to occur in 2002.

Other Statistics

We provide mortality statistics for the leading causes of deaths and deaths from cancer for 1999. Causes of death for 1999 mortality data were coded and classified according to ICD-10 rulings, replacing ICD-9 coding used for deaths that occurred from 1979 through 1998. Comparisons between the recorded number of deaths between 1998 and 1999 were adjusted for the change in ICD coding rules using a comparability ratio.[12]

This report also provides updated statistics on the probability of developing cancer,[13] trends in cancer mortality and incidence, and five-year relative survival rates for selected cancer sites based on data from 1973 through 1998.[2] Cancer incidence and death rates are standardized to the 1970 US standard population and expressed per 100,000 person-years. Death rates for 1999 are presented using both 1970 and 2000 US standard population for age standardization to illustrate the impact of the 2000 standard population on death rates.

SELECTED FINDINGS

Expected Numbers of New Cancer Cases

The estimated number of new cancer cases expected in 2002 is indicated for men, women, and for both sexes combined in Table 1. The estimate of about 1,284,900 new cases of invasive cancer does not include carcinoma in situ of any site except urinary bladder, nor does it include basal and squamous cell cancers of the skin. More than one million cases of basal

TABLE **1**

Estimated New Cancer Cases and Deaths by Gender, US, 2002*

	Estimated New Cases			Estimated Deaths		
	Both Sexes	Male	Female	Both Sexes	Male	Female
All Sites	1,284,900	637,500	647,400	555,500	288,200	267,300
Oral cavity and pharynx	**28,900**	**18,900**	**10,000**	**7,400**	**4,900**	**2,500**
Tongue	7,100	4,700	2,400	1,700	1,100	600
Mouth	9,800	5,200	4,600	2,000	1,100	900
Pharynx	8,600	6,500	2,100	2,100	1,500	600
Other oral cavity	3,400	2,500	900	1,600	1,200	400
Digestive system	**250,600**	**130,300**	**120,300**	**132,300**	**70,800**	**61,500**
Esophagus	13,100	9,800	3,300	12,600	9,600	3,000
Stomach	21,600	13,300	8,300	12,400	7,200	5,200
Small intestine	5,300	2,500	2,800	1,100	600	500
Colon	107,300	50,000	57,300	48,100	23,100	25,000
Rectum	41,000	22,600	18,400	8,500	4,700	3,800
Anus, anal canal, and anorectum	3,900	1,700	2,200	500	200	300
Liver and intrahepatic bile duct	16,600	11,000	5,600	14,100	8,900	5,200
Gallbladder and other biliary	7,100	3,400	3,700	3,500	1,300	2,200
Pancreas	30,300	14,700	15,600	29,700	14,500	15,200
Other digestive organs	4,400	1,300	3,100	1,800	700	1,100
Respiratory system	**183,200**	**100,700**	**82,500**	**161,400**	**94,100**	**67,300**
Larynx	8,900	6,900	2,000	3,700	2,900	800
Lung and bronchus	169,400	90,200	79,200	154,900	89,200	65,700
Other respiratory organs	4,900	3,600	1,300	2,800	2,000	800
Bones and joints	**2,400**	**1,300**	**1,100**	**1,300**	**700**	**600**
Soft tissue (including heart)	**8,300**	**4,400**	**3,900**	**3,900**	**2,000**	**1,900**
Skin (excluding basal and squamous)	**58,300**	**32,500**	**25,800**	**9,600**	**6,200**	**3,400**
Melanoma-skin	53,600	30,100	23,500	7,400	4,700	2,700
Other non-epithelial skin	4,700	2,400	2,300	2,200	1,500	700
Breast	**205,000**	**1,500**	**203,500**	**40,000**	**400**	**39,600**
Genital system	**279,100**	**197,700**	**81,400**	**57,100**	**30,900**	**26,200**
Uterine cervix	13,000		13,000	4,100		4,100
Uterine corpus	39,300		39,300	6,600		6,600
Ovary	23,300		23,300	13,900		13,900
Vulva	3,800		3,800	800		800
Vagina and other genital, female	2,000		2,000	800		800
Prostate	189,000	189,000		30,200	30,200	
Testis	7,500	7,500		400	400	
Penis and other genital, male	1,200	1,200		200	200	
Urinary system	**90,700**	**62,200**	**28,500**	**24,900**	**16,200**	**8,700**
Urinary bladder	56,500	41,500	15,000	12,600	8,600	4,000
Kidney and renal pelvis	31,800	19,100	12,700	11,600	7,200	4,400
Ureter and other urinary organs	2,400	1,600	800	700	400	300
Eye and orbit	**2,200**	**1,100**	**1,100**	**200**	**100**	**100**
Brain and other nervous system	**17,000**	**9,600**	**7,400**	**13,100**	**7,200**	**5,900**
Endocrine system	**22,700**	**6,000**	**16,700**	**2,300**	**1,000**	**1,300**
Thyroid	20,700	4,900	15,800	1,300	500	800
Other endocrine	2,000	1,100	900	1,000	500	500
Lymphoma	**60,900**	**31,900**	**29,000**	**25,800**	**13,500**	**12,300**
Hodgkin's disease	7,000	3,700	3,300	1,400	800	600
Non-Hodgkin's lymphoma	53,900	28,200	25,700	24,400	12,700	11,700
Multiple myeloma	**14,600**	**7,800**	**6,800**	**10,800**	**5,500**	**5,300**
Leukemia	**30,800**	**17,600**	**13,200**	**21,700**	**12,100**	**9,600**
Acute lymphocytic leukemia	3,800	2,200	1,600	1,400	800	600
Chronic lymphocytic leukemia	7,000	4,100	2,900	4,500	2,600	1,900
Acute myeloid leukemia	10,600	5,900	4,700	7,400	4,000	3,400
Chronic myeloid leukemia	4,400	2,500	1,900	2,000	1,100	900
Other leukemia	5,000	2,900	2,100	6,400	3,600	2,800
Other and unspecified primary sites	**30,200**	**14,000**	**16,200**	**43,700**	**22,600**	**21,100**

*Excludes basal and squamous cell skin cancers and in situ carcinomas except urinary bladder. Carcinoma in situ of the breast accounts for about 54,300 new cases annually and melanoma in situ accounts for about 34,300 new cases annually.
Estimates of new cases are based on incidence rates from the NCI Surveillance, Epidemiology, and End Results program, 1979 to 1998.

TABLE **2** Estimated New Cancer Cases for Selected Cancer Sites by State, US, 2002*

STATE	All Sites	Female Breast	Uterine Cervix	Colon and Rectum	Uterine Corpus	Leukemia	Lung and Bronchus	Melanoma of the Skin	Non-Hodgkin's Lymphoma	Prostate	Urinary Bladder
AL	22,600	3,100	200	2,200	600	500	3,200	900	800	3,900	800
AK	1,600	300	10	200	†	†	200	100	100	100	100
AZ	22,100	3,500	200	2,400	600	500	2,900	1,200	1,000	3,300	1,000
AR	14,200	2,000	200	1,500	400	300	2,200	500	600	2,300	500
CA	119,900	19,900	1,400	12,900	3,700	3,000	14,300	5,300	5,100	17,300	5,600
CO	14,500	2,400	100	1,600	400	400	1,600	800	700	2,200	600
CT	16,100	2,600	100	1,800	500	400	2,000	600	700	2,400	800
DE	4,100	600	100	400	100	100	600	200	100	600	300
DC	2,700	600	40	300	100	†	300	†	†	500	100
FL	92,200	13,100	900	10,400	2,600	2,200	13,000	4,100	3,900	13,600	4,300
GA	31,600	5,200	400	3,200	1,000	700	4,400	1,300	1,100	4,800	1,100
HI	4,700	700	30	500	100	100	600	100	200	700	100
ID	5,200	900	40	600	100	100	600	300	200	900	300
IL	57,400	9,700	700	6,800	1,800	1,400	7,400	2,200	2,400	8,500	2,500
IN	30,000	4,600	300	3,600	900	700	4,300	1,300	1,200	4,400	1,300
IA	14,800	2,400	100	2,000	500	400	1,900	600	600	2,400	600
KS	12,300	1,800	100	1,400	300	300	1,700	600	500	1,900	500
KY	21,100	3,100	300	2,300	500	400	3,400	900	800	2,700	800
LA	21,900	3,500	200	2,600	600	500	2,900	700	800	3,400	700
ME	7,000	1,000	100	800	200	100	1,000	300	300	800	400
MD	23,500	4,100	300	2,900	700	500	3,200	800	900	3,400	1,100
MA	31,700	4,700	200	3,800	900	700	4,000	1,400	1,400	4,600	1,700
MI	45,800	7,300	400	5,300	1,500	1,000	6,100	1,700	2,100	6,700	2,100
MN	20,800	3,200	200	2,300	700	600	2,500	900	1,100	3,400	1,000
MS	14,400	2,200	200	1,500	300	300	2,100	500	500	2,500	500
MO	28,600	4,000	300	3,300	900	700	4,200	1,300	1,100	3,900	1,100
MT	4,400	600	40	500	100	100	600	200	200	800	200
NE	7,700	1,200	100	1,100	200	200	1,000	300	300	1,000	300
NV	9,500	1,300	100	1,200	200	200	1,400	500	300	1,400	400
NH	5,800	800	40	700	200	100	800	300	200	700	300
NJ	41,100	6,900	400	4,900	1,600	1,100	4,900	1,800	1,900	5,700	2,100
NM	7,100	1,200	100	800	200	200	800	400	200	1,200	300
NY	83,700	14,700	1,000	10,400	3,400	2,000	10,000	2,800	3,400	11,800	4,300
NC	38,200	5,900	400	4,200	1,200	900	5,500	1,500	1,400	5,600	1,500
ND	3,100	500	30	400	100	100	300	100	100	400	200
OH	58,700	9,500	600	7,200	1,900	1,400	7,900	2,300	2,600	8,100	2,700
OK	16,900	2,700	200	2,000	400	400	2,500	900	700	2,100	700
OR	16,800	2,600	100	1,800	500	400	2,200	800	700	2,800	800
PA	68,900	11,000	600	8,700	2,300	1,600	8,700	2,700	3,000	10,300	3,300
RI	5,600	800	100	700	200	100	800	200	200	800	300
SC	19,500	3,100	200	2,200	600	400	2,600	700	700	3,100	800
SD	3,700	500	20	500	100	100	400	200	200	600	100
TN	29,100	4,400	400	3,100	700	700	4,400	1,400	1,200	3,900	1,000
TX	79,700	13,100	1,000	9,500	2,500	1,900	10,800	3,600	3,400	11,700	3,000
UT	5,900	1,100	40	700	200	200	500	400	300	1,300	300
VT	2,900	400	40	400	100	100	400	200	100	400	100
VA	31,300	5,000	300	3,500	1,000	700	4,200	1,300	1,200	4,700	1,200
WA	25,600	3,700	200	2,700	700	700	3,400	1,300	1,100	3,300	1,100
WV	11,000	1,500	100	1,300	400	300	1,700	400	400	1,400	500
WI	25,300	3,900	200	2,900	800	700	3,000	1,100	1,300	4,000	1,200
WY	2,300	300	20	300	100	100	300	100	100	400	100
US	1,284,900	203,500	13,000	148,300	39,300	30,800	169,400	53,600	53,900	189,000	56,500

*Rounded to nearest 100. Excludes basal and squamous cell skin cancers and in situ carcinomas except urinary bladder.
†Estimate is 50 or fewer cases.
Note: These estimates are offered as a rough guide and should be interpreted with caution. They are calculated according to the distribution of estimated cancer deaths in 2002 by state. State estimates may not add to US total due to rounding.

and squamous cell skin cancers, 54,300 cases of breast carcinoma in situ, and 34,300 cases of in situ melanoma are expected to be newly diagnosed in 2002. The estimated number of new cancer cases by state and cancer site are shown in Table 2.

Figure 1 lists the most common cancers expected to occur in men and women in 2002. Among men, cancers of the prostate, lung and bronchus, and colon and rectum comprise 55 percent of all new cancer cases. Prostate cancer accounts for 30 percent (189,000) of new cancer cases in men. Based on the most current data on stage distributions of prostate cancer cases, however, over 80 percent of these estimated new cases are expected to be diagnosed at local and regional stages with nearly 100 percent five-year relative survival rates.

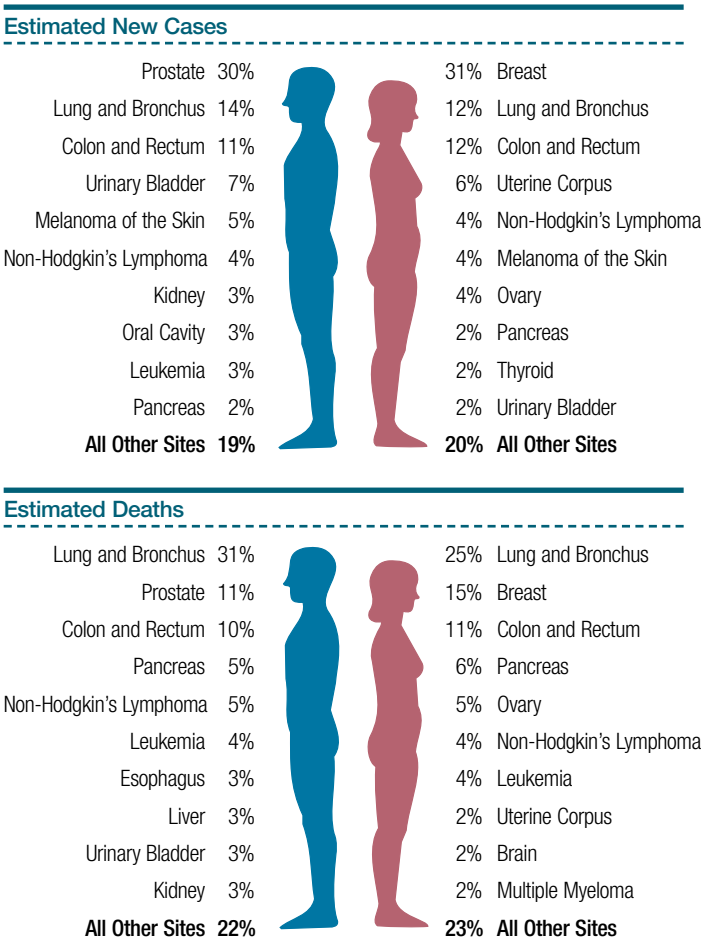
Among women, the three most commonly diagnosed cancers are expected to be cancers of the breast, lung and bronchus, and colon and rectum. Cancers occurring at these sites are expected to account for about 55 percent of new cancer cases in women. Breast cancer alone is expected to account for 31 percent (203,500) of all new cancer cases among women in 2002.

Expected Number of Cancer Deaths

Table 1 also shows the expected number of cancer deaths in 2002 for men, women, and both sexes combined. It is estimated that about 555,500 Americans will die from cancer, corresponding to 1,500 deaths per day. Cancers of the lung and bronchus, prostate, and colon and rectum in men, and cancers of the lung and bronchus, breast, and colon and rectum in women continue to be the most common causes of cancer deaths. These four cancers account for more than half of the total cancer deaths among men and women (Figure 1).

FIGURE **1**

Ten Leading Cancer Sites for the Estimated New Cancer Cases and Deaths by Gender, US, 2002*

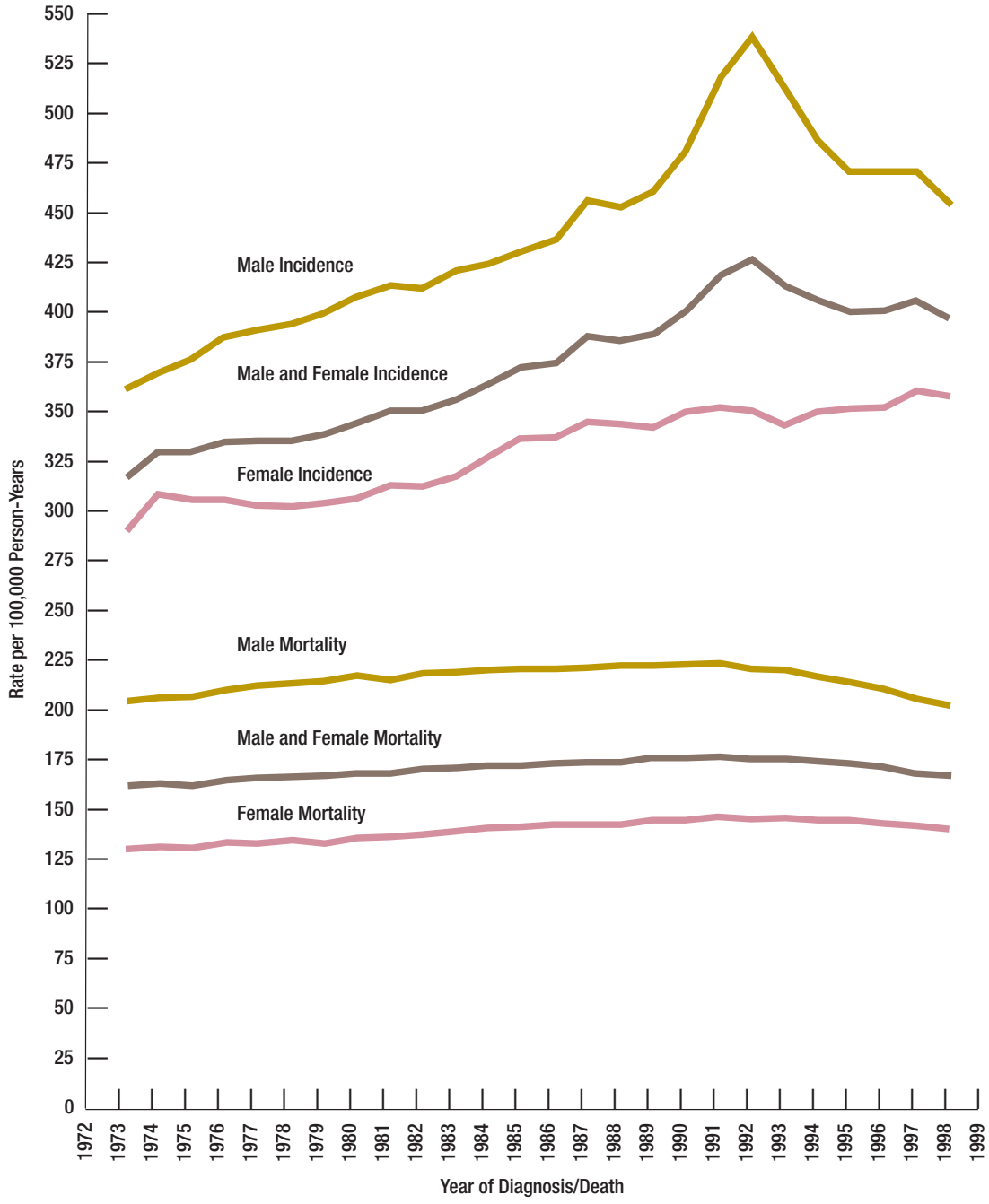


*Excludes basal and squamous cell skin cancers and in situ carcinomas except urinary bladder.
Percentages may not total 100% due to rounding.

Lung cancer has surpassed breast cancer as the leading cause of cancer death in women since 1987 and is expected to account for about 25 percent of all female cancer deaths in 2002. The estimated number of cancer deaths in 2002 by state appears in Table 3.

FIGURE **2**

Annual Age-adjusted Cancer Incidence and Death Rates* by Gender, US, 1973 to 1998



*Rates are age adjusted to the 1970 US standard population.
Source: Incidence data from Surveillance, Epidemiology, and End Results program, 1973 to 1998, Division of Cancer Control and Population Sciences, National Cancer Institute, 2001. Mortality data from US Mortality Public Use Data Tapes, 1960 to 1999, National Center for Health Statistics.

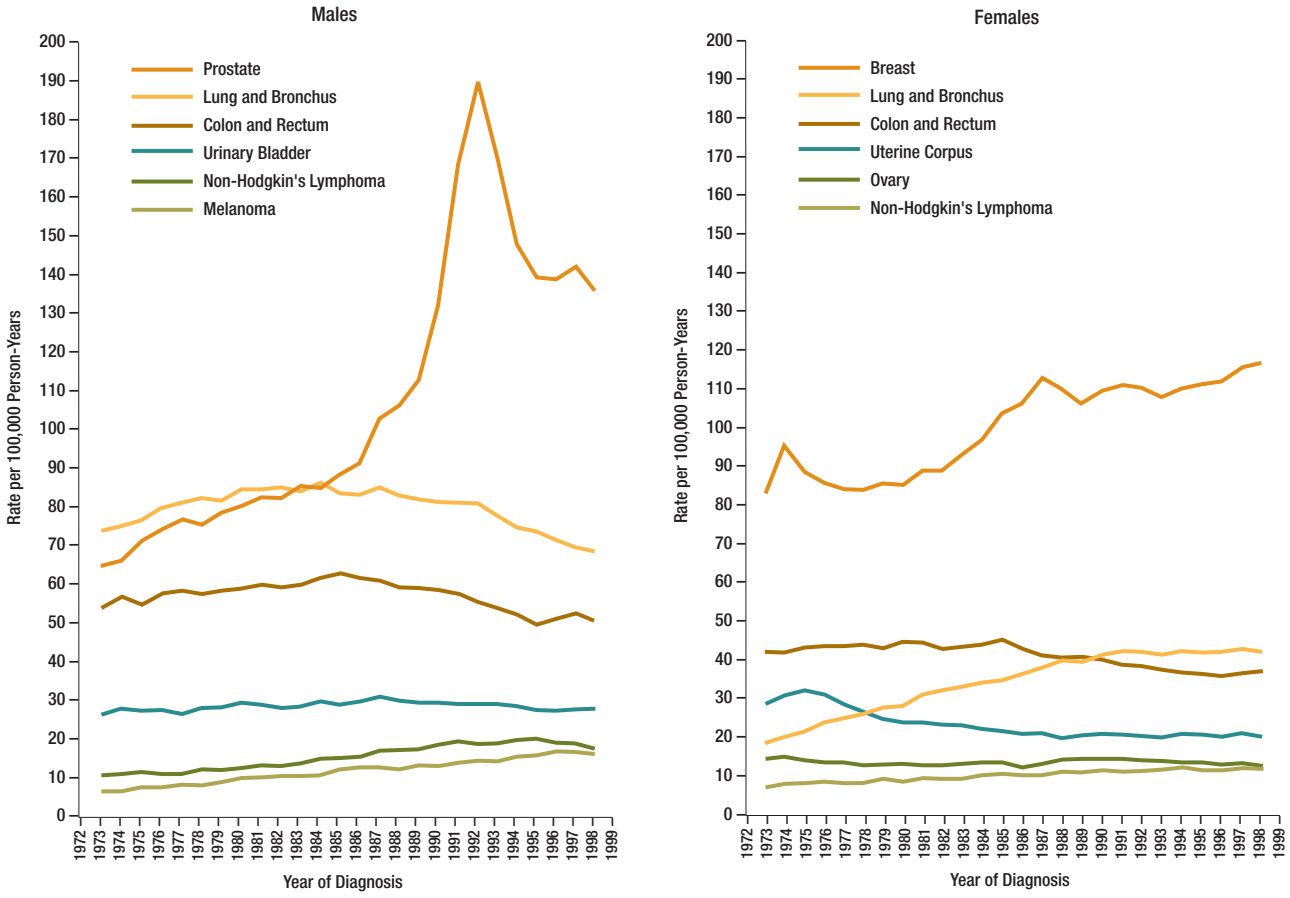
TABLE **3** Estimated Cancer Deaths for Selected Cancer Sites by State, US, 2002*

State	Recorded‡ Death Rate Per 100,000	All Sites	Brain/ Nervous System	Female Breast	Colon and Rectum	Leukemia	Liver	Lung and Bronchus	Non-Hodgkin's Lymphoma	Ovary	Pancreas	Prostate
AL	177.7	9,800	200	600	800	400	300	2,900	400	200	500	600
AK	160.1	700	†	100	100	†	†	200	†	†	†	†
AZ	150.1	9,600	200	700	900	400	200	2,700	500	200	500	500
AR	177.8	6,200	200	400	600	200	200	2,000	300	100	300	400
CA	151.7	51,800	1,500	3,900	4,900	2,100	1,800	13,100	2,300	1,400	2,800	2,800
CO	139.3	6,300	200	500	600	300	100	1,500	300	200	400	400
CT	160.1	7,000	100	500	700	300	200	1,800	300	200	400	400
DE	188.5	1,800	†	100	200	100	†	500	100	†	100	100
DC	205.5	1,200	†	100	100	†	†	300	†	†	100	100
FL	162.7	39,900	900	2,600	4,000	1,600	1,000	11,900	1,800	1,000	2,100	2,200
GA	172.2	13,700	300	1,000	1,200	500	300	4,000	500	400	700	800
HI	129.2	2,000	†	100	200	100	100	500	100	†	100	100
ID	145.4	2,300	100	200	200	100	†	600	100	100	100	100
IL	172.1	24,800	500	1,900	2,600	1,000	600	6,700	1,100	600	1,300	1,400
IN	174.8	13,000	300	900	1,400	500	300	4,000	600	300	600	700
IA	155.8	6,400	200	500	800	300	100	1,700	300	200	300	400
KS	155.4	5,300	100	400	500	200	100	1,500	200	100	300	300
KY	189.1	9,100	200	600	900	300	200	3,100	400	200	400	400
LA	190.3	9,500	200	700	1,000	300	300	2,700	400	200	500	500
ME	180.0	3,000	100	200	300	100	100	900	100	100	200	100
MD	179.2	10,200	200	800	1,100	400	200	2,900	400	200	600	500
MA	171.4	13,700	300	900	1,500	500	300	3,600	600	300	800	700
MI	168.0	19,800	400	1,400	2,000	700	500	5,500	900	500	1,100	1,100
MN	153.1	9,000	200	600	900	400	200	2,300	500	200	500	500
MS	181.8	6,200	200	400	600	200	200	1,900	200	100	300	400
MO	172.7	12,300	300	800	1,300	500	300	3,800	500	300	600	600
MT	154.8	1,900	†	100	200	100	†	500	100	100	100	100
NE	151.3	3,300	100	200	400	200	100	900	200	100	200	200
NV	178.1	4,100	100	300	500	100	100	1,300	100	100	200	200
NH	177.2	2,500	100	200	300	100	100	700	100	100	100	100
NJ	174.3	17,800	400	1,400	1,900	800	500	4,500	800	500	1,000	900
NM	143.5	3,000	100	200	300	100	100	700	100	100	200	200
NY	164.2	36,200	800	2,900	4,000	1,400	1,000	9,100	1,500	900	2,200	1,900
NC	171.4	16,500	400	1,200	1,600	600	300	5,000	600	400	800	900
ND	150.9	1,300	†	100	100	100	†	300	100	†	100	100
OH	175.9	25,400	600	1,900	2,700	1,000	500	7,300	1,200	600	1,300	1,300
OK	168.0	7,300	100	500	700	300	200	2,300	300	100	300	300
OR	162.7	7,300	200	500	700	300	100	2,000	300	200	400	500
PA	172.5	29,800	600	2,200	3,300	1,100	700	8,000	1,400	700	1,600	1,600
RI	176.4	2,400	100	200	300	100	100	700	100	100	100	100
SC	174.1	8,400	200	600	800	300	200	2,400	300	200	500	500
SD	152.7	1,600	100	100	200	100	†	400	100	100	100	100
TN	181.0	12,600	300	900	1,200	500	300	4,000	500	300	600	600
TX	163.8	34,500	900	2,600	3,600	1,300	1,200	9,900	1,500	800	1,800	1,900
UT	119.8	2,500	100	200	300	100	100	400	100	100	100	200
VT	169.4	1,300	†	100	200	†	†	400	100	†	100	100
VA	172.8	13,500	300	1,000	1,400	500	300	3,800	600	300	700	800
WA	158.2	11,100	300	700	1,000	500	300	3,100	500	300	600	500
WV	182.1	4,700	100	300	500	200	100	1,500	200	100	200	200
WI	159.3	11,000	300	800	1,100	500	200	2,800	600	300	600	600
WY	155.3	1,000	†	100	100	†	†	200	†	†	†	100
US est.	**166.2**	**555,500**	**13,100**	**40,000**	**56,600**	**21,700**	**14,100**	**154,900**	**24,400**	**13,900**	**29,700**	**30,200**

*Rounded to nearest 100. Excludes in situ carcinomas except urinary bladder.
†Estimate is 50 or fewer deaths.
‡Average annual rates for 1994 to 1998 and age adjusted to 1970 US standard population.
Note: State estimates may not add to US total due to rounding.
Source: US Mortality Public Use Data Tapes, 1960 to 1999, National Center for Health Statistics.

FIGURE **3**

Annual Age-adjusted Cancer Incidence Rates* Among Males and Females for Selected Cancer Sites, US, 1973 to 1998



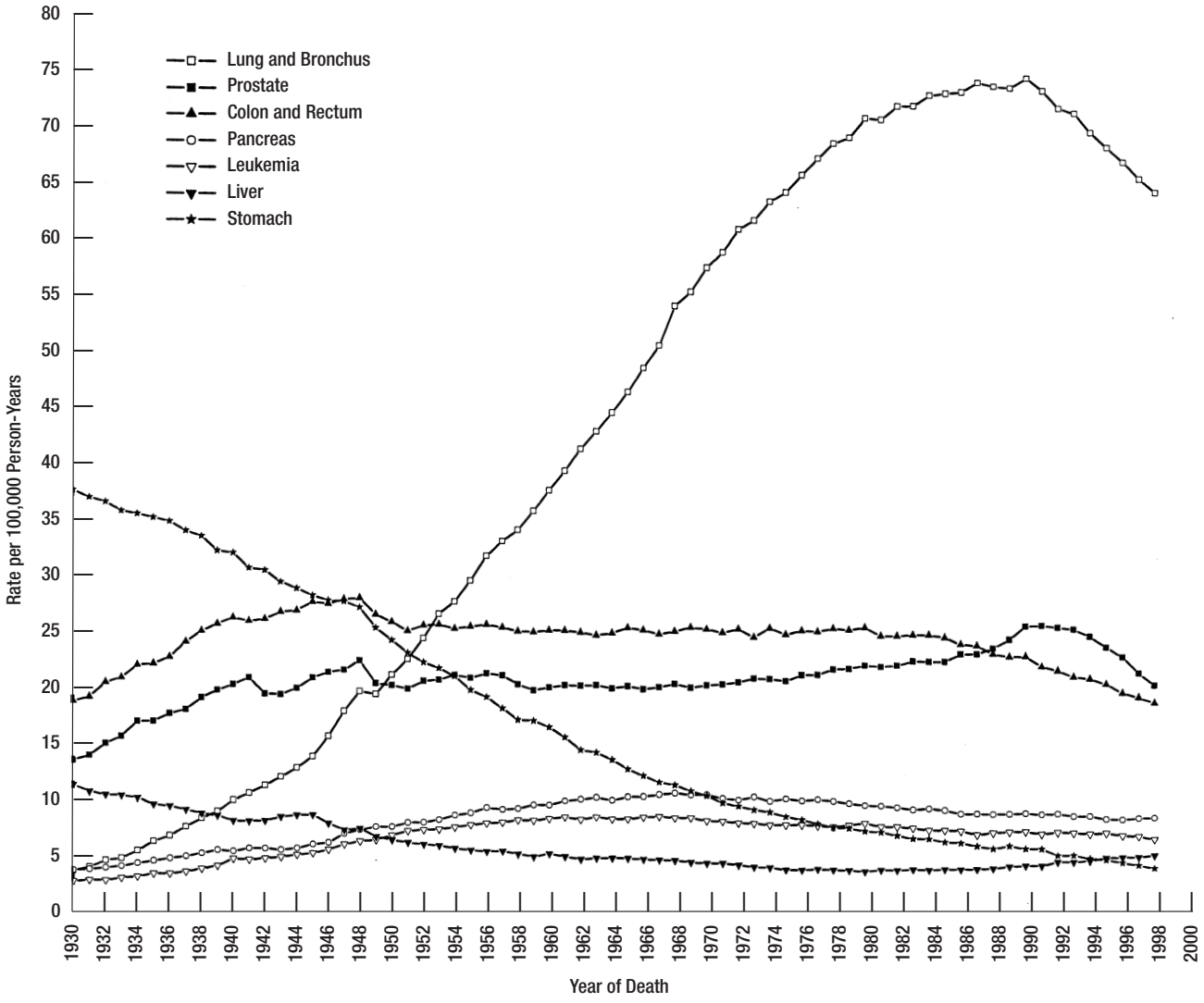
*Rates are age adjusted to the 1970 US standard population.
Source: Surveillance, Epidemiology, and End Results program, Division of Cancer Control and Population Sciences, National Cancer Institute, 2001.

Trends in Cancer Incidence and Mortality

From 1992 through 1998, overall cancer incidence and mortality rates declined by 1.1 percent each year on average (Figure 2). Mortality declined among both males and females, while incidence declined only in males and increased slightly in females. Most notably, African-American men showed the largest decline for both incidence and mortality (data not shown). Recent declines or stabilizations in incidence (Figure 3) and mortality (Figures 4 and 5) have occurred for several leading cancer sites.

FIGURE **4**

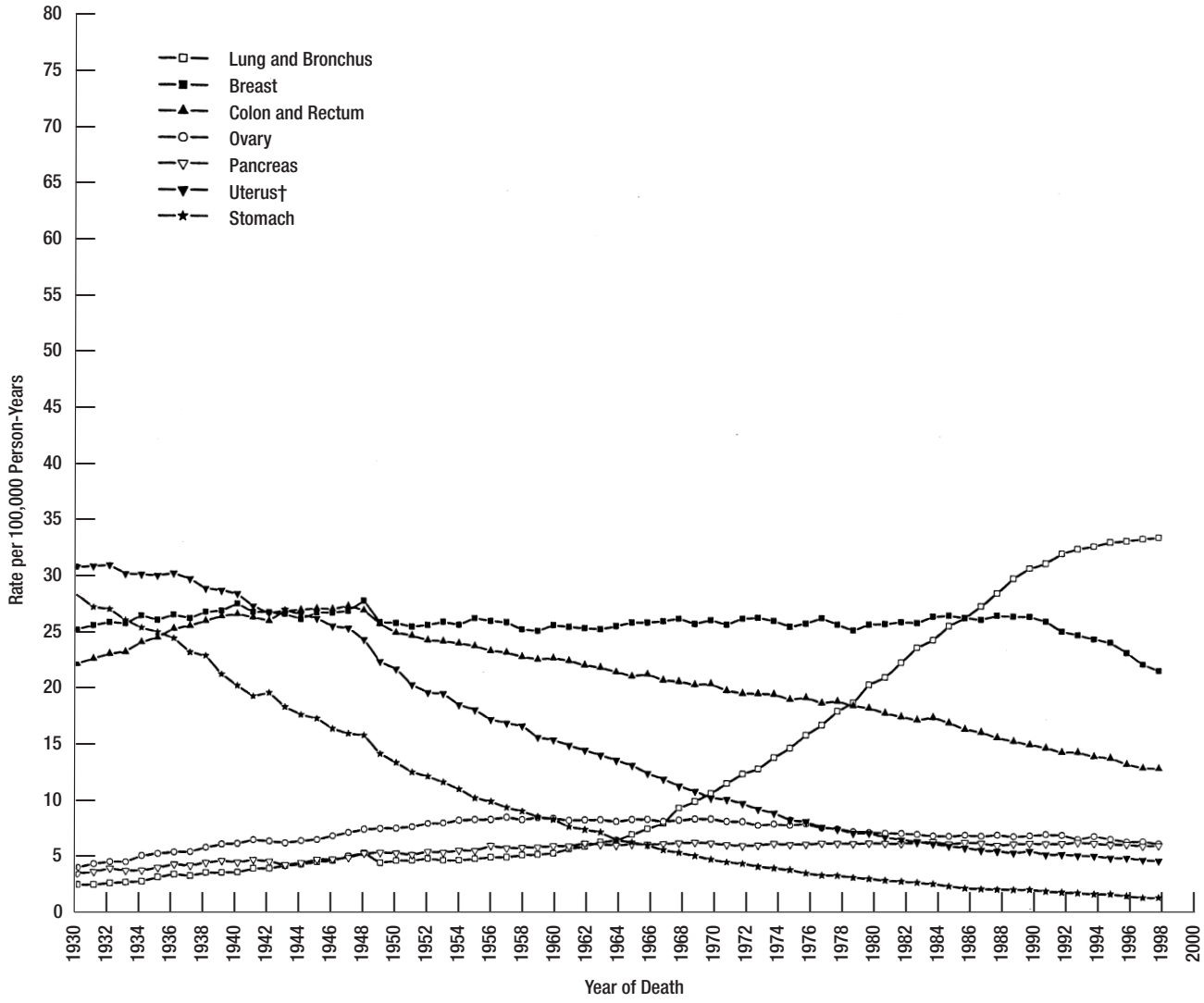
Annual Age-adjusted Cancer Death Rates* Among Males for Selected Cancer Sites, US, 1930 to 1998



*Rates are per 100,000 and are age adjusted to the 1970 US standard population.
Note: Due to changes in ICD coding, numerator information has changed over time. Rates for cancer of the lung and bronchus, and colon and rectum are affected by these coding changes.
Source: US Mortality Public Use Data Tapes, 1960 to 1998, US Mortality Volumes, 1930 to 1959, National Center for Health Statistics.

FIGURE **5**

Annual Age-adjusted Cancer Death Rates* Among Females for Selected Cancer Sites, US, 1930 to 1998



*Rates are per 100,000 and are age adjusted to the 1970 US standard population.
†Uterus cancer death rates are for uterine cervix and uterine corpus combined.
Note: Due to changes in ICD coding, numerator information has changed over time. Rates for cancer of the uterus, ovary, lung and bronchus, and colon and rectum are affected by these coding changes.
Source: US Mortality Public Use Data Tapes, 1960 to 1998, US Mortality Volumes, 1930 to 1959, National Center for Health Statistics.

TABLE **4**

Fifteen Leading Causes of Death, US, 1999

Rank	Cause of Death	Number of Deaths	Percent Total Deaths	Age-adjusted Rate (1970 US Standard Population)	Age-adjusted Rate (2000 US Standard Population)
	All Causes	**2,391,399**		**647.4**	**882.1**
1	Heart Diseases	725,192	30.3	184.7	267.9
2	Cancer	549,838	23.0	161.2	202.7
3	Cerebrovascular Diseases	167,366	7.0	40.4	61.9
4	Chronic Lower Respiratory Diseases	124,181	5.2	33.5	45.7
5	Accidents (Unintentional Injuries)	97,860	4.1	31.2	35.9
6	Diabetes Mellitus	68,399	2.9	19.2	25.2
7	Influenza and Pneumonia	63,730	2.7	14.8	23.6
8	Alzheimer's Disease	44,536	1.9	9.5	16.5
9	Nephritis, Nephrotic Syndrome, and Nephrosis	35,525	1.5	9.2	13.1
10	Septicemia	30,680	1.3	8.1	11.3
11	Intentional Self-harm (Suicide)	29,199	1.2	9.5	10.7
12	Chronic Liver Disease and Cirrhosis	26,259	1.1	8.3	9.7
13	Hypertension and Hypertensive Renal Disease	16,968	0.7	4.2	6.3
14	Assault (Homicide)	16,889	0.7	6.1	6.1
15	Atherosclerosis	14,979	0.6	3.3	5.5
	All Other and Ill-defined Causes	379,798			

Note: Percentages may not total 100% due to rounding.
Source: US Mortality Public Use Data Tape, 1999, National Center for Health Statistics, Centers for Disease Control and Prevention, 2001.

Female breast cancer incidence for all races combined increased by 3.8 percent per year between 1980 and 1987, and stabilized through 1998 (Figure 3). A significant downturn in the incidence of lung and bronchus cancer in males began in the early 1980s; between 1992 and 1998, incidence rates decreased 2.4 percent per year. Overall incidence rates of female lung and bronchus cancer have been stable since 1991, but rates have begun to decline in women under 65 years of age from 28.3 percent per 100,000 women in 1991 to 22.7 percent per 100,000 women in 1998. In both men and women, colon and rectum cancer incidence declined between the mid-1980s and the mid-1990s and stabilized thereafter. Prostate cancer incidence rates have generally leveled off during the years 1995 to 1998, following large annual increases of 17.5 percent from 1988 to 1992 and a sharp decline of 10.0 percent per year from 1992 to 1995.[8,9]

Similar to trends in incidence, significant

TABLE **5**

Reported Deaths for the Ten Leading Causes of Death by Age and Gender, US, 1999

	All Ages		Ages 1 to 19		Ages 20 to 39		Ages 40 to 59		Ages 60 to 79		Ages 80+	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
	All Causes 1,175,460	**All Causes 1,215,939**	**All Causes 17,247**	**All Causes 9,375**	**All Causes 64,591**	**All Causes 30,157**	**All Causes 192,537**	**All Causes 117,773**	**All Causes 509,056**	**All Causes 415,988**	**All Causes 376,106**	**All Causes 630,276**
1	Heart Diseases 351,617	Heart Diseases 373,575	Accidents (Unintentional Injuries) 7,725	Accidents (Unintentional Injuries) 3,952	Accidents (Unintentional Injuries) 19,924	Accidents (Unintentional Injuries) 6,300	Heart Diseases 51,247	Cancer 46,757	Cancer 160,670	Cancer 131,972	Heart Diseases 134,592	Heart Diseases 238,579
2	Cancer 285,832	Cancer 264,006	Assault (Homicide) 2,192	Cancer 945	Intentional Self-harm (Suicide) 8,763	Cancer 5,747	Cancer 49,529	Heart Diseases 20,249	Heart Diseases 159,306	Heart Diseases 111,350	Cancer 69,360	Cancer 78,550
3	Cerebro-vascular Diseases 64,485	Cerebro-vascular Diseases 102,881	Intentional Self-harm (Suicide) 1,541	Assault (Homicide) 709	Assault (Homicide) 7,046	Heart Diseases 2,768	Accidents (Unintentional Injuries) 17,192	Accidents (Unintentional Injuries) 6,256	Chronic Lower Respiratory Diseases 34,287	Chronic Lower Respiratory Diseases 30,453	Cerebro-vascular Diseases 30,791	Cerebro-vascular Diseases 68,709
4	Accidents (Unintentional Injuries) 63,535	Chronic Lower Respiratory Diseases 61,766	Cancer 1,230	Congenital Anomalies 535	Heart Diseases 5,607	Intentional Self-harm (Suicide) 1,915	Chronic Liver Disease & Cirrhosis 8,478	Cerebro-vascular Diseases 5,262	Cerebro-vascular Diseases 26,618	Cerebro-vascular Diseases 27,981	Chronic Lower Respiratory Diseases 23,578	Chronic Lower Respiratory Diseases 26,912
5	Chronic Lower Respiratory Diseases 62,415	Diabetes Mellitus 37,249	Congenital Anomalies 664	Heart Diseases 365	Cancer 5,001	Assault (Homicide) 1,841	Intentional Self-harm (Suicide) 7,567	Diabetes Mellitus 4,199	Diabetes Mellitus 16,205	Diabetes Mellitus 17,204	Pneumonia & Influenza 16,114	Pneumonia & Influenza 26,531
6	Diabetes Mellitus 31,150	Influenza & Pneumonia 36,012	Heart Diseases 558	Intentional Self-harm (Suicide) 318	HIV Disease 4,218	HIV Disease 1,659	HIV Disease 6,262	Chronic Lower Respiratory Diseases 3,889	Accidents (Unintentional Injuries) 10,350	Pneumonia & Influenza 7,400	Alzheimer's Disease 9,368	Alzheimer's Disease 25,679
7	Influenza & Pneumonia 27,718	Accidents (Unintentional Injuries) 34,325	Chronic Lower Respiratory Diseases 183	Pneumonia & Influenza 143	Chronic Liver Disease & Cirrhosis 981	Cerebro-vascular Diseases 804	Cerebro-vascular Diseases 6,111	Chronic Liver Disease & Cirrhosis 2,892	Pneumonia & Influenza 8,764	Accidents (Unintentional Injuries) 6,971	Diabetes Mellitus 8,474	Diabetes Mellitus 15,192
8	Intentional Self-harm (Suicide) 23,458	Alzheimer's Disease 31,145	Influenza & Pneumonia 153	Chronic Lower Respiratory Diseases 117	Diabetes Mellitus 811	Diabetes Mellitus 605	Diabetes Mellitus 5,613	Intentional Self-harm (Suicide) 2,372	Nephritis, Nephrotic Syndrome, & Nephrosis 7,393	Nephritis, Nephrotic Syndrome, & Nephrosis 6,843	Accidents (Unintentional Injuries) 7,756	Accidents (Unintentional Injuries) 10,483
9	Chronic Liver Disease & Cirrhosis 17,115	Nephritis, Nephrotic Syndrome, & Nephrosis 18,509	Septicemia 101	Septicemia 95	Cerebro-vascular Diseases 807	Chronic Liver Disease & Cirrhosis 546	Chronic Lower Respiratory Diseases 3,988	HIV Disease 1,673	Chronic Liver Disease & Cirrhosis 6,554	Septicemia 6,002	Nephritis, Nephrotic Syndrome, & Nephrosis 7,473	Nephritis, Nephrotic Syndrome, & Nephrosis 9,917
10	Nephritis, Nephrotic Syndrome, & Nephrosis 17,016	Septicemia 17,285	Cerebro-vascular Diseases 92	Cerebro-vascular Diseases 86	Congenital Anomalies 517	Congenital Anomalies 439	Assault (Homicide) 2,602	Septicemia 1,539	Septicemia 5,970	Alzheimer's Disease 5,373	Septicemia 4,960	Septicemia 9,230

Source: US Mortality Public Use Data Tape, 1999, National Center for Health Statistics, Centers for Disease Control and Prevention, 2001.

decreases in death rates for lung and bronchus cancer have occurred only among males (on average 1.8 percent per year during 1990 to 1998) (Figure 4); the increase in lung cancer death rates among females has begun to slow recently (Figure 5).

Breast cancer death rates among females declined annually by 1.6 percent from 1989 to 1995, and by 3.4 percent since then. Age-specific analysis revealed that breast cancer mortality declined in every age group except in African-American women, age 75 and older; the decline was more pronounced in females younger than 50 years old in both whites and African Americans.[9] Colon and rectum cancer death rates have been decreasing by about 2 percent per year since 1984 in females and 1987 in males.[8,9] Prostate cancer deaths peaked in 1991, and have decreased an average of 4.5 percent per year from 1994 through 1998.[8,9]

The Recorded Number of Deaths from Cancer and Other Causes in 1999

A total of 549,838 cancer deaths were recorded in 1999 in the United States, up by 8,306 deaths compared with 1998. Adjusting for changes in rules for selecting underlying cause of death reduced the increase in the number of cancer deaths to 4,624. Cancer deaths accounted for 23 percent of all deaths, ranking second only to death from heart disease (Table 4). When deaths are categorized by age and sex, cancer is by far the leading cause of death among women aged 40 to 79 and among men aged 60 to 79 (Table 5). In contrast, cancer ranks fifth as a cause of death among men aged 20 to 39.

Table 6 describes the leading site-specific causes of cancer death by age for males and females. Among men under age 40, leukemia is the most common fatal cancer, while lung and bronchus cancer ranks first for men aged 40 years and older. Colorectal cancer is the second most common site causing death among men 40 to 79 years old. Among women under age 20, leukemia is the leading cause of cancer death; breast cancer ranks first as the cause of cancer death for women between age 20 to 59 years, and lung cancer is the leading cause of cancer death for women aged 60 years and above.

The number of recorded cancer deaths among men increased by 3,767 from 1998 to 1999 (Table 7). Accounting for the change in ICD coding rules diminished the increase to 1,849. The recorded number of deaths from lung cancer continued to decrease among men. The decrease in lung cancer death was accentuated by the change in ICD code from ICD-9 to ICD-10. The new ICD code more rigorously excluded cancers metastatic to the lung, causing a decline of 1.6 percent of total lung cancer deaths.[12] Accounting for this change substantially reduced the decline in the number of lung cancer deaths (from 1,998 deaths to 508 deaths). The number of prostate cancer deaths has continued to decline since 1995. From 1998 to 1999, the recorded number of prostate cancer deaths decreased by 474 and 906 with and without adjustment for the change in ICD codes and coding rules, respectively. Colon and rectum cancer deaths among men increased by about 300 from 1998 to 1999, and were affected very little by the new ICD version.

Among women, the total number of cancer deaths recorded increased from 259,467 in 1998 to 264,006 in 1999 (Table 7). Adjusting for changes in ICD coding rules reduced the increase from 4,539 to 2,775 cancer deaths. There were 413 fewer female lung cancer deaths in 1999, compared with the year before, due to a decrease of 1.6 percent of lung cancer deaths resulting from the implementation of ICD-10. Accounting for this change resulted in 615 more lung cancer deaths in 1999 compared with 1998, consistent with the long-term increasing trend. Female breast cancer deaths decreased by 593, and decreased even more (827 deaths) when accounting for changes in

TABLE **6**

Reported Deaths for the Five Leading Cancer Sites by Gender and Age, US, 1999

All Ages	< 20	20 to 39	40 to 59	60 to 79	≥ 80
Males					
All Sites 285,832	**All Sites 1,266**	**All Sites 5,001**	**All Sites 49,529**	**All Sites 160,670**	**All Sites 69,360**
Lung and Bronchus 89,401	Leukemia 379	Leukemia 641	Lung and Bronchus 15,457	Lung and Bronchus 57,263	Lung and Bronchus 16,242
Prostate 31,729	Brain and ONS* 287	Brain and ONS* 606	Colon and Rectum 4,615	Colon and Rectum 15,470	Prostate 15,523
Colon and Rectum 28,313	Bones and Joints 117	Non-Hodgkin's Lymphoma 443	Pancreas 2,948	Prostate 15,158	Colon and Rectum 7,823
Pancreas 14,176	Endocrine System 109	Lung and Bronchus 428	Non-Hodgkin's Lymphoma 2,268	Pancreas 8,145	Urinary Bladder 3,041
Non-Hodgkin's Lymphoma 11,794	Soft Tissue 92	Colon and Rectum 398	Esophagus 2,253	Non-Hodgkin's Lymphoma 6,224	Leukemia 3,005
Females					
All Sites 264,006	**All Sites 977**	**All Sites 5,747**	**All Sites 46,757**	**All Sites 131,972**	**All Sites 78,550**
Lung and Bronchus 62,662	Leukemia 293	Breast 1,426	Breast 11,525	Lung and Bronchus 38,260	Lung and Bronchus 13,786
Breast 41,144	Brain and ONS* 259	Uterine Cervix 519	Lung and Bronchus 10,182	Breast 17,773	Colon and Rectum 12,044
Colon and Rectum 28,909	Bones and Joints 92	Leukemia 494	Colon and Rectum 3,571	Colon and Rectum 12,940	Breast 10,415
Pancreas 14,906	Endocrine System 84	Lung and Bronchus 432	Ovary 2,964	Pancreas 7,747	Pancreas 5,202
Ovary 13,627	Soft Tissue 60	Brain and ONS* 384	Pancreas 1,860	Ovary 7,100	Non-Hodgkin's Lymphoma 3,983

*ONS = other nervous system.
Note: "All Sites" excludes in situ carcinomas except urinary bladder.
Source: US Mortality Public Use Data Tape, 1999, National Center for Health Statistics, Centers for Disease Control and Prevention, 2001.

TABLE **7**

Trends in the Recorded Number of Cancer Deaths for Selected Cancer Sites by Gender, US, 1989 to 1999

	All Sites		Lung and Bronchus		Colon and Rectum		Prostate	Breast
Year	Male	Female	Male	Female	Male	Female	Male	Female
1989	263,309	232,843	88,975	48,042	28,123	28,903	30,520	42,837
1990	268,283	237,039	91,014	50,136	28,484	28,674	32,378	43,391
1991	272,380	242,277	91,603	52,022	28,026	28,753	33,564	43,583
1992	274,838	245,740	91,322	54,485	28,280	28,714	34,240	43,068
1993	279,375	250,529	92,493	56,234	28,199	29,206	34,865	43,555
1994	280,465	253,845	91,825	57,535	28,471	28,936	34,902	43,644
1995	281,611	256,844	91,800	59,304	28,409	29,237	34,475	43,844
1996	281,898	257,635	91,559	60,351	27,989	28,766	34,123	43,091
1997	281,110	258,467	91,278	61,922	28,075	28,621	32,891	41,943
1998	282,065	259,467	91,399	63,075	28,024	28,950	32,203	41,737
1998*	283,983	261,231	89,909	62,047	28,004	28,930	32,635	41,971
1999	285,832	264,006	89,401	62,662	28,313	28,909	31,729	41,144

*Comparability-modified number of cancer deaths, i.e., the total number of cancer deaths that would have been recorded in 1998 if the underlying causes of death for 1998 mortality data were classified according to the *Tenth Revision International Classification of Diseases* (ICD-10).
Note: Effective with the mortality data for 1999, causes of death are classified by ICD-10, replacing ICD-9 used for 1979 to 1998 data.
Source: US Mortality Public Use Data Tapes, 1989 to 1999, National Center for Health Statistics, Centers for Disease Control and Prevention, 2001.

ICD coding rules. The number of colorectal cancer deaths among females has remained fairly constant in recent years.

Lifetime Probability of Developing Cancer

The lifetime probability of developing cancer is higher for men (43.39 percent) than for women (38.25 percent) (Table 9). However, because of breast cancer, women have a slightly higher probability of developing cancer before the age of 60.

CANCER OCCURRENCE BY RACE/ETHNICITY

Cancer incidence and mortality rates vary considerably among racial and ethnic groups (Table 8). Overall, African Americans have the highest incidence and mortality rates for cancer. Incidence rate is 60 percent higher in African Americans than in Hispanics and Asian/Pacific Islanders and is more than twice as high as the rate for American Indians. Similarly, the mortality rate from cancer is about 33 percent higher in African Americans than among whites, and more than twice as high as cancer death rates in Asian/Pacific Islanders, American Indians, and Hispanics. Except for female breast cancer incidence and female lung cancer death rates, where rates are highest in whites, race- and sex-specific incidence and death rates for the most common cancer sites are higher for African Americans than for any of the other racial and ethnic groups.

From 1992 through 1998, cancer incidence rates decreased by 2 percent per year among Hispanics, by 1.7 percent for African Americans, and by 1.2 percent for whites, while rates remained relatively stable among American Indians/Alaska Natives and Asian/Pacific Islanders (data not shown). Similarly, the annual mortality rate for all cancer sites combined decreased 1.3 percent in African

TABLE **8**

Average Annual Incidence and Mortality Rates* for Selected Cancer Sites by Race and Ethnicity, US, 1992 to 1998

	White	African American	Asian/ Pacific Islander	American Indian/ Alaska Native	Hispanic†
Incidence					
All Sites					
Males	470.4	596.8	327.7	227.7	319.7
Females	354.4	337.6	252.1	186.3	237.7
Total	**401.4**	**445.3**	**283.4**	**202.7**	**270.0**
Breast (female)	115.5	101.5	78.1	50.5	68.5
Colon and rectum					
Males	51.4	57.7	47.3	33.5	35.2
Females	36.3	44.7	31.0	24.6	23.2
Total	**42.9**	**50.1**	**38.2**	**28.6**	**28.4**
Lung and bronchus					
Males	69.6	107.2	51.9	44.3	36.0
Females	43.6	45.7	22.7	20.6	18.7
Total	**54.7**	**71.6**	**35.5**	**31.0**	**26.0**
Prostate	144.6	234.2	82.8	47.8	103.4
Mortality					
All Sites					
Males	203.2	297.7	125.6	125.3	128.8
Females	138.0	166.6	82.4	90.8	84.3
Total	164.5	218.2	101.2	105.4	102.6
Breast (female)	24.3	31.0	11.0	12.4	14.8
Colon and rectum					
Males	20.6	27.3	12.9	11.9	13.0
Females	13.9	19.6	8.9	8.9	8.0
Total	**16.8**	**22.8**	**10.7**	**10.3**	**10.2**
Lung and bronchus					
Males	67.8	96.2	33.8	41.8	30.5
Females	34.6	33.6	15.1	20.9	10.9
Total	**48.8**	**59.1**	**23.3**	**30.1**	**19.3**
Prostate	22.4	53.1	9.8	14.0	15.9

*Rates are per 100,000 and are age adjusted to the 1970 US standard population.
†Hispanic is not mutually exclusive from White, African American, Asian/Pacific Islander, or American Indian/Alaska Native.
Note: Incidence data are from the 11 SEER areas; mortality data are from all states except data for Hispanics; data for Hispanics include deaths that occurred in all states except Connecticut, Louisiana, New Hampshire, and Oklahoma.
Source: Surveillance, Epidemiology, and End Results program, 1973 to 1998, Division of Cancer Control and Population Sciences, National Cancer Institute, 2001. Mortality derived from data originating from the National Center for Health Statistics, Centers for Disease Control and Prevention, 2001.

TABLE **9**

Probability of Developing Invasive Cancers within Selected Age Intervals, by Gender, US, 1996 to 1998*

		Birth to 39 (%)	40 to 59 (%)	60 to 79 (%)	Birth to Death (%)
All Sites †	Male	1.45 (1 in 69)	8.33 (1 in 12)	33.3 (1 in 3)	43.48 (1 in 2)
	Female	1.92 (1 in 52)	9.09 (1 in 11)	20.0 (1 in 5)	33.3 (1 in 3)
Bladder ‡	Male	0.024 (1 in 4,234)	0.42 (1 in 236)	2.38 (1 in 42)	3.45 (1 in 29)
	Female	(Less than 1 in 10,000)	0.13 (1 in 760)	0.64 (1 in 156)	1.12 (1 in 89)
Breast	Female	0.44 (1 in 229)	4.17 (1 in 24)	7.14 (1 in 14)	12.5 (1 in 8)
Colon and Rectum	Male	0.07 (1 in 1,508)	0.87 (1 in 115)	4.00 (1 in 25)	5.88 (1 in 17)
	Female	0.06 (1 in 1,719)	0.69 (1 in 145)	3.03 (1 in 33)	5.55 (1 in 18)
Leukemia	Male	0.16 (1 in 627)	0.21 (1 in 483)	0.81 (1 in 124)	1.43 (1 in 70)
	Female	0.12 (1 in 810)	0.15 (1 in 671)	0.47 (1 in 212)	1.04 (1 in 96)
Lung and Bronchus	Male	0.03 (1 in 3,060)	1.12 (1 in 89)	5.88 (1 in 17)	7.69 (1 in 13)
	Female	0.03 (1 in 3,099)	0.86 (1 in 116)	4.00 (1 in 25)	5.88 (1 in 17)
Melanoma of the Skin	Male	0.13 (1 in 769)	0.50 (1 in 199)	0.97 (1 in 103)	1.72 (1 in 58)
	Female	0.19 (1 in 508)	0.38 (1 in 261)	0.49 (1 in 201)	1.22 (1 in 82)
Non-Hodgkin's Lymphoma	Male	0.17 (1 in 591)	0.48 (1 in 208)	1.23 (1 in 81)	2.08 (1 in 48)
	Female	0.08 (1 in 1,311)	0.32 (1 in 317)	0.98 (1 in 102)	1.75 (1 in 57)
Prostate	Male	(Less than 1 in 10,000)	2.08 (1 in 48)	12.5 (1 in 8)	16.67 (1 in 6)
Uterine Cervix	Female	0.18 (1 in 567)	0.35 (1 in 288)	0.28 (1 in 354)	0.85 (1 in 117)
Uterine Corpus	Female	0.05 (1 in 2,097)	0.72 (1 in 138)	1.64 (1 in 61)	2.70 (1 in 37)

*For those free of cancer at beginning of age interval. Based on cancer cases diagnosed during 1996 to 1998.
The "1 in" statistic and the inverse of the percentage may not be equivalent due to rounding.
†All sites exclude basal and squamous cell skin cancers and in situ cancers except urinary bladder.
‡Includes invasive and in situ cancer cases.
Source: DEVCAN Software, Version 4.1, Surveillance, Epidemiology, and End Results program, 1973 to 1998, Division of Cancer Control and Population Sciences, National Cancer Institute, 2001.

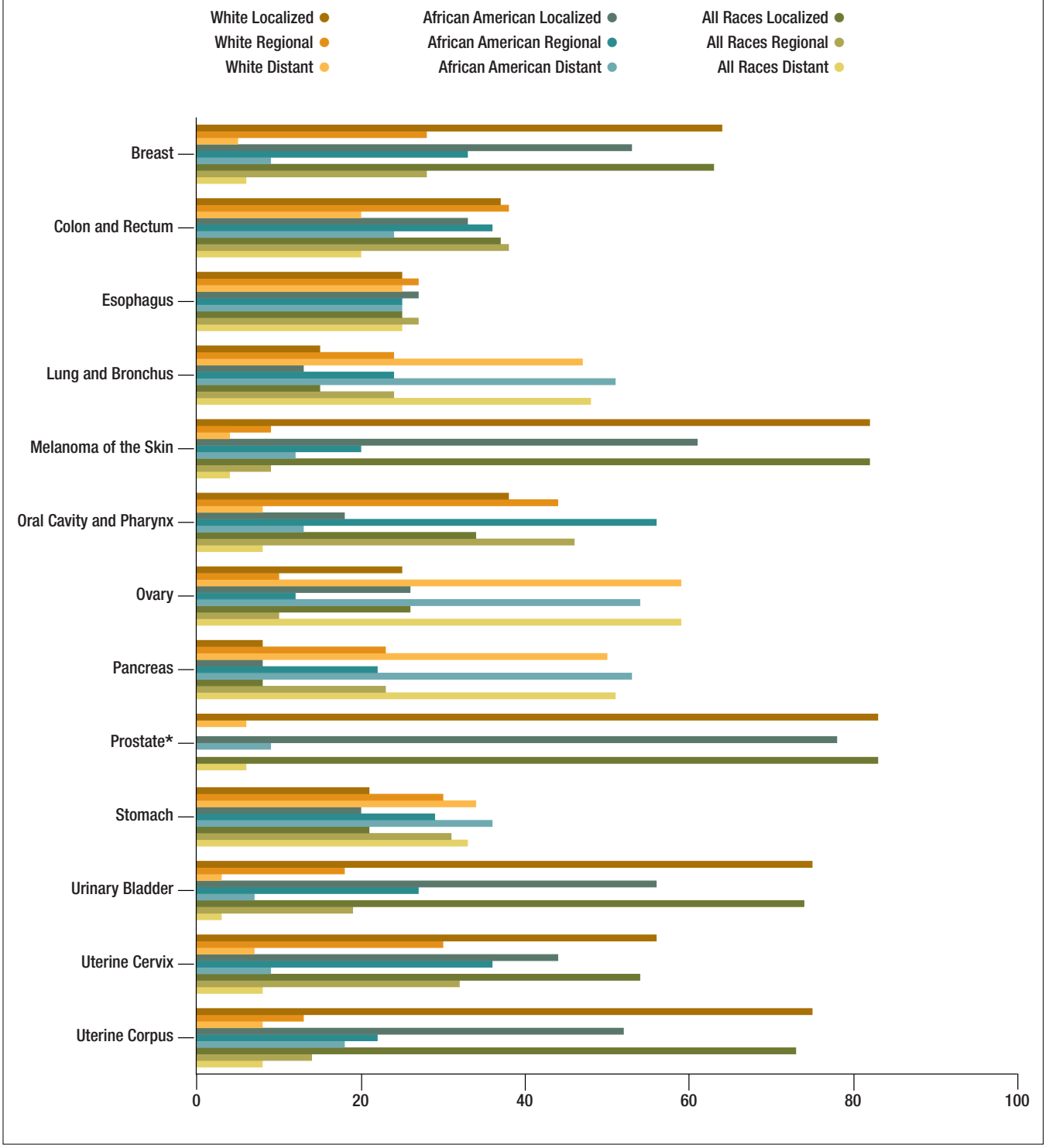
Americans, 1.2 percent in Asian/Pacific Islanders, 1.1 percent among whites, and 0.9 percent among Hispanics; and it leveled off in American Indians/Alaska Natives. For race- and sex-specific trends, African-American men showed the largest decrease in both incidence and mortality during the same calendar years.

Cancer Survival By Race

A poorer probability of survival once a cancer diagnosis is made contributes to the higher death rates among African-American men and women. African Americans are less likely than whites to be diagnosed with cancer

FIGURE **6**

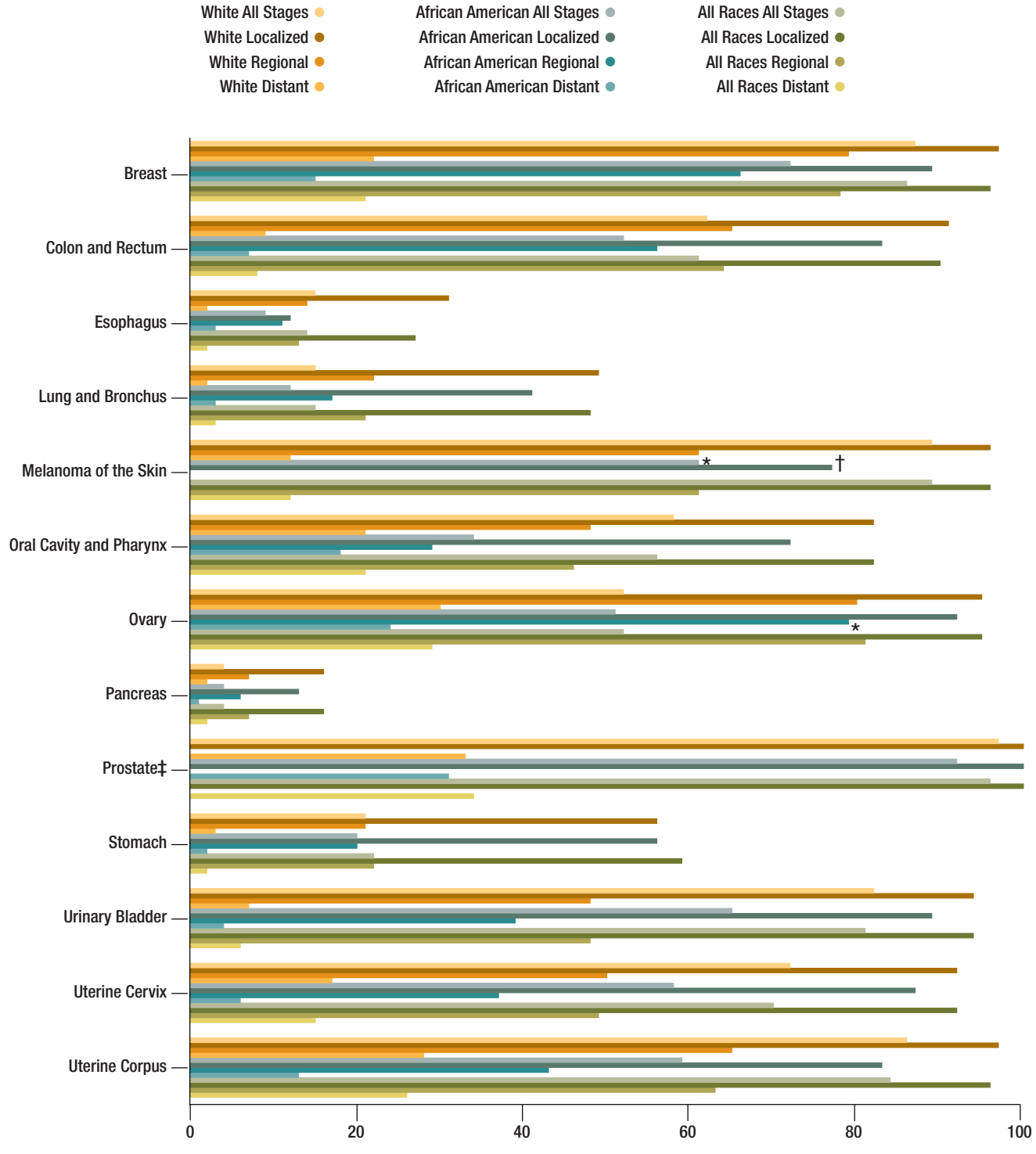
Distribution of Cancer Cases by Race and Stage at Diagnosis, US, 1992 to 1997



*The rate for local stage represents local and regional stages combined.
Note: Staging according to Surveillance, Epidemiology, and End Results (SEER) historic stage categories rather than the American Joint Committee on Cancer (AJCC) staging system.
For each site and race, stage categories do not total 100% because sufficient information is not available to assign a stage to all cancer cases.
Source: Surveillance, Epidemiology, and End Results program, 1973 to 1998, Division of Cancer Control and Population Sciences, National Cancer Institute, 2001.

FIGURE **7**

Five-Year Relative Survival Rates by Race and Stage at Diagnosis, US, 1992 to 1997



*The standard error is between five and 10 percentage points.
†The standard error is greater than 10 percentage points.
‡The rate for local stage represents local and regional stages combined.
Note: Staging according to Surveillance, Epidemiology, and End Results (SEER) historic stage categories rather than the American Joint Committee on Cancer (AJCC) staging system.
Source: Surveillance, Epidemiology, and End Results program, 1973 to 1998, Division of Cancer Control and Population Sciences, National Cancer Institute, 2001.

TABLE **10**

Trends in Five-Year Relative Cancer Survival Rates* (%) by Race and Year of Diagnosis, US, 1974 to 1997

	Relative Five-Year Survival Rate (%)											
	White				African American				All Races			
SITE	1974 to 1976	1983 to 1985	1992 to 1997		1974 to 1976	1983 to 1985	1992 to 1997		1974 to 1976	1983 to 1985	1992 to 1997	
All Sites	**51**	**54**	**63**	**†**	**39**	**40**	**52**	**†**	**50**	**52**	**62**	**†**
Brain	22	26	31	†	27	32	39	†	22	27	32	†
Breast (female)	75	79	87	†	63	63	72	†	75	78	86	†
Uterine cervix	70	71	72	†	64	60	58		69	69	70	
Colon	51	58	62	†	46	49	51	†	50	58	61	†
Uterine corpus	89	85	86	†	61	54	59		88	83	84	†
Esophagus	5	9	15	†	4	6	9	†	5	8	14	†
Hodgkin's disease	72	79	84	†	69	78	78	†	71	79	83	†
Kidney	52	56	62	†	49	55	60	†	52	56	62	†
Larynx	66	69	66		60	55	53		66	67	65	
Leukemia	35	42	46	†	31	33	38		34	41	45	†
Liver	4	6	6	†	1	4	4		4	6	6	†
Lung and bronchus	13	14	15	†	12	11	12		12	14	15	†
Melanoma of the skin	80	85	89	†	67 ‡	74 §	61 ‡		80	85	89	†
Multiple myeloma	24	27	28	†	27	31	31		24	28	29	†
Non-Hodgkin's lymphoma	48	54	54	†	49	45	43	†	47	54	53	†
Oral cavity	55	55	58	†	36	35	34		53	53	56	†
Ovary	37	40	52	†	41	41	51	†	37	41	52	†
Pancreas	3	3	4	†	3	5	4		3	3	4	†
Prostate	68	76	97	†	58	64	92	†	67	75	96	†
Rectum	49	56	62	†	42	44	52	†	49	55	61	†
Stomach	15	16	21	†	17	19	20		15	17	22	†
Testis	79	91	95	†	76 ‡	88 ‡	88		79	91	95	†
Thyroid	92	93	95	†	88	92	94		92	93	95	†
Urinary bladder	74	78	82	†	48	59	65	†	73	78	81	†

*Survival rates are adjusted for normal life expectancy and are based on cases diagnosed from 1992 to 1997, followed through 1997.
†The difference in rates between 1974 to 1976 and 1992 to 1997 is statistically significant ($p < 0.05$).
‡The standard error of the survival rate is between 5 and 10 percentage points.
§The standard error of the survival rate is greater than 10 percentage points.
Source: Surveillance, Epidemiology, and End Results program, 1973 to 1998, Division of Cancer Control and Population Sciences, National Cancer Institute, 2001.

at a localized stage, when the disease may be more easily and successfully treated, and are more likely to be diagnosed with cancer at a regional or distant stage of disease. This is true for most of the common cancer sites (Figure 6). Furthermore, for nearly every cancer site, African Americans have lower five-year relative survival rates than whites at each stage of diagnosis (Figure 7), suggesting the possible influences of differences in treatment, tumor pathology, and comorbid conditions.

Importantly, there have been notable improvements over time in the probability of survival from most of the common cancer sites

TABLE **11**

Fifteen Leading Causes of Death Among Children Ages 1 to 14, US, 1999

Rank	Cause of Death	Number of Deaths	Percent (%) of Total Deaths*	Death Rate (1970 US Standard Population)	Death Rate (2000 US Standard Population)
	All Causes	**12,844**	**100**	**23.2**	**23.5**
1	Accidents (Unintentional Injuries)	4,989	38.8	9.0	9.1
2	Cancer	1,430	11.1	2.6	2.6
3	Congenital Anomalies	977	7.6	1.7	1.8
4	Assault (Homicide)	808	6.3	1.7	1.7
5	Heart Diseases	460	3.6	0.8	0.8
6	Intentional Self-harm (Suicide)	244	1.9	0.5	0.5
7	Pneumonia and Influenza	223	1.7	0.4	0.4
8	Chronic Lower Respiratory Diseases	193	1.5	0.4	0.4
9	Septicemia	164	1.3	0.3	0.3
10	Cerebrovascular Diseases	111	0.9	0.2	0.2
11	HIV Disease	90	0.7	0.2	0.2
12	Anemias	83	0.6	0.2	0.2
13	Meningitis	72	0.6	0.1	0.1
14	Meningococcal Infection	55	0.4	0.1	0.1
15	Complications of Medical and Surgical Care	48	0.4	0.1	0.1
	All Others	2,897	22.6		

*Percentages may not total 100% due to rounding.
Note: Rates are per 100,000 population.
Source: US Mortality Public Use Data Tape, 1999, National Center for Health Statistics, Centers for Disease Control and Prevention, 2001.

and from all cancers combined (Table 10). This is true for both whites and African Americans. Cancer sites without significant improvements in survival in the past 25 years include uterine cervix, larynx, and oral cavity.

CANCER IN CHILDREN

Cancer is the second leading cause of death among children between the ages of one and 14 in the United States; accidents are the most frequent cause of death in this age group (Table 11). The most commonly occurring cancers found in children are leukemias (in particular, acute lymphocytic leukemia), tumors of the central and sympathetic nervous systems, lymphomas, soft-tissue sarcomas, and renal tumors.[9] Over the past 25 years, there have been significant improvements in the five-year relative survival rate for many childhood cancers, especially acute lymphocytic and acute myeloid leukemia, non-Hodgkin's lymphoma, and Wilms' Tumor (Table 12). Between the years 1974 to 1976 and 1992 to 1997, the five-year relative survival rate among children for all cancer sites combined improved from 55.7 to 77.1 percent.[9]

TABLE **12**

Trends in Five-Year Relative Cancer Survival Rates* (%) for Children Under Age 15, US, 1974 to 1997

	Five-Year Relative Survival Rates (%)						
	Year of Diagnosis						
Site	1974 to 1976	1977 to 1979	1980 to 1982	1983 to 1985	1986 to 1988	1989 to 1991	1992 to 1997
All Sites	56	62	65	67	70	73	77†
Acute Lymphocytic Leukemia	53	67	71	69	78	80	85†
Acute Myeloid Leukemia	14	30‡	21‡	32‡	32‡	35‡	45†
Bones and Joints	53‡	53‡	55‡	57	63‡	62	73†
Brain and Other Nervous System	55	56	56	62	63	62	69†
Hodgkin's Disease	78	83	91	90	90	94	92†
Neuroblastoma	53	54	53	55	60	68	71†
Non-Hodgkin's Lymphoma	44	50	62	71	70	75	80†
Soft Tissue	61	68	65	76	67	78	74†
Wilm's Tumor	74	78	87	87	91	93	92†

*Survival rates are adjusted for normal life expectancy and are based on follow-up of patients through 1998.
†The difference in rates between 1974 to 1976 and 1992 to 1997 is statistically significant ($p < 0.05$).
‡The standard error of the survival rate is between 5 and 10 percentage points.
Note: "All Sites" excludes basal and squamous cell skin cancers and in situ carcinomas except urinary bladder.
Source: Surveillance, Epidemiology, and End Results program, 1973 to 1998, Division of Cancer Control and Population Sciences, National Cancer Institute, 2001.

LIMITATIONS AND FUTURE CHALLENGES

When tracking trends over time, estimates of the expected numbers of new cancer cases and cancer deaths should be interpreted with caution. These estimates may vary considerably from year to year, particularly for less common cancers and for states with smaller populations. For this reason, we discourage the use of these estimates to track year-to-year changes in cancer occurrence and death. The recorded number of cancer deaths and cancer death rates from the NCHS, and SEER cancer incidence rates are generally more informative for tracking cancer trends. For example, breast cancer incidence rates stabilized between 1973 and 1980, increased by 3.8 percent per year between 1980 and 1987, and by 1.1 percent per year between 1992 and 1998, due to increasing utilization of mammography.

Our estimates are based on the most currently available cancer mortality and incidence data; however, these data are three and four years old, respectively, at the time that the estimates are calculated. Unanticipated changes that may have occurred in the three-or four-year interval between 1998 or 1999 and 2002 are not captured by our modeling efforts. Finally, our estimates of new cancer cases are based on incidence rates for the geographic locations that participate in the SEER program and, therefore, may not be representative of the entire United States.

For the 1999 mortality data, the underlying causes of deaths were coded and classified using ICD-10 coding rules, replacing ICD-9 coding designations used for deaths occurring between 1979 and 1998. Several important changes have taken place in selection and coding of primary sites of malignant neoplasm in ICD-10 codes, including the following two changes:

(1) Order of entry in the medical certificate of death is not used to identify neoplasms as primary or secondary. For example, when two or more cancer sites, which are not listed as common sites of metastasis, appear together in

Part I of a medical certificate of death, the underlying cause of death is assigned to malignant neoplasms of independent (primary) multiple sites.

(2) Lung cancer has been added to the list of common sites of metastasis and is considered secondary whenever it appears in Part I of the medical death certification with any other cancer site not on the list.

These coding changes will undoubtedly affect the temporal trends of various cancer mortalities. For the changes in the number of deaths from the most common cancer sites between 1998 and 1999, we have accounted for the change in ICD coding rules using a comparability ratio conversion method, and assumed that they are not influenced by sex.[12]

Despite these limitations, the American Cancer Society estimates do provide evidence of current patterns of cancer incidence and mortality in the United States. Such estimates will assist us in our continuing effort to reduce the public health burden of cancer. CA

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TABLE **13**

Cancer Around the World, Death Rates* per 100,000 Population for 45 Countries, 2000

COUNTRY	All Sites		Oral		Colon and Rectum		Breast	Prostate	Lung and Bronchus		Uterus		Stomach		Leukemia	
	Male	Female	Male	Female	Male	Female	Female	Male	Male	Female	Cervix	Other	Male	Female	Male	Female
United States	161.8 (22)	116.4 (10)	1.8 (34)	0.8 (17)	15.9 (27)	12.0 (20)	21.2 (12)	17.9 (18)	53.2 (13)	27.2 (1)	3.3 (33)	2.0 (32)	4.5 (45)	2.3 (45)	6.6 (4)	4.2 (5)
Australia	150.9 (28)	103.2 (25)	2.2 (27)	0.9 (10)	20.1 (12)	14.4 (12)	19.7 (18)	18.0 (17)	36.2 (31)	14.0 (10)	2.4 (41)	1.6 (38)	6.1 (44)	3.0 (44)	5.7 (14)	3.8 (14)
Austria	168.6 (20)	113.8 (12)	3.7 (15)	0.8 (18)	23.0 (8)	14.9 (10)	23.3 (9)	18.9 (12)	41.8 (25)	10.8 (16)	4.7 (26)	2.8 (19)	14.1 (24)	8.6 (22)	5.0 (25)	3.6 (18)
Azerbaijan	114.2 (41)	61.8 (45)	1.3 (41)	0.5 (42)	6.4 (40)	4.8 (42)	8.8 (43)	4.3 (43)	25.5 (37)	4.5 (42)	1.9 (44)	3.9 (10)	24.7 (8)	10.5 (10)	4.0 (38)	2.7 (39)
Bulgaria	150.3 (29)	89.4 (35)	2.9 (21)	0.5 (43)	17.8 (20)	12.0 (21)	16.7 (31)	9.0 (34)	43.7 (22)	7.1 (32)	7.4 (15)	3.2 (14)	17.8 (20)	9.0 (20)	5.2 (21)	3.3 (24)
Canada	160.5 (23)	116.7 (9)	2.3 (25)	0.8 (19)	16.4 (26)	11.6 (23)	22.7 (10)	17.1 (21)	50.4 (14)	25.0 (3)	2.8 (39)	1.8 (35)	6.4 (43)	3.2 (43)	6.2 (8)	3.9 (8)
Chile	141.2 (34)	108.7 (18)	1.1 (45)	0.4 (45)	7.0 (39)	7.1 (37)	12.7 (37)	19.9 (9)	20.3 (40)	7.0 (33)	10.6 (8)	1.4 (40)	30.1 (5)	12.7 (7)	4.0 (39)	3.0 (37)
China	143.3 (33)	76.9 (43)	2.2 (28)	1.0 (6)	7.2 (38)	5.3 (41)	4.5 (45)	1.0 (45)	33.2 (32)	13.5 (11)	3.1 (35)	0.4 (44)	27.0 (6)	13.0 (6)	2.8 (44)	2.0 (44)
Colombia	116.1 (40)	106.5 (19)	1.4 (39)	1.0 (7)	5.8 (41)	6.1 (39)	10.6 (40)	15.1 (27)	17.0 (43)	8.5 (24)	13.7 (4)	3.5 (13)	26.4 (7)	16.4 (2)	4.7 (31)	3.9 (9)
Croatia	230.1 (2)	105.4 (21)	7.2 (3)	0.8 (20)	24.8 (6)	13.0 (16)	19.9 (17)	15.3 (25)	70.3 (3)	9.4 (20)	5.7 (21)	1.9 (34)	21.7 (14)	9.1 (19)	5.8 (12)	3.5 (20)
Cuba	141.0 (35)	104.0 (23)	4.0 (12)	1.6 (1)	11.4 (32)	12.4 (18)	15.6 (35)	22.1 (5)	42.8 (23)	15.6 (8)	10.6 (9)	4.0 (9)	8.4 (38)	4.3 (38)	4.8 (30)	3.6 (19)
Czech Republic	222.2 (3)	127.6 (6)	4.4 (9)	0.8 (21)	34.2 (1)	18.5 (3)	21.0 (13)	15.7 (23)	65.3 (5)	11.5 (14)	6.2 (20)	4.4 (4)	13.5 (25)	7.5 (24)	6.7 (3)	4.4 (3)
Denmark	184.9 (14)	144.0 (2)	3.0 (20)	1.2 (3)	23.8 (7)	18.5 (4)	29.2 (1)	23.1 (4)	50.0 (15)	26.7 (2)	4.1 (28)	2.4 (22)	7.5 (40)	3.6 (41)	5.8 (13)	3.9 (10)
Estonia	201.5 (9)	104.8 (22)	5.3 (5)	1.0 (8)	16.7 (24)	12.0 (22)	19.3 (19)	15.3 (26)	64.5 (6)	8.6 (23)	9.7 (10)	2.9 (17)	24.2 (11)	10.4 (11)	5.7 (15)	3.9 (11)
Finland	145.8 (32)	92.5 (32)	1.7 (36)	0.9 (11)	12.5 (30)	9.5 (32)	17.9 (26)	19.1 (11)	41.2 (26)	7.4 (28)	1.3 (45)	2.5 (21)	10.3 (30)	5.6 (31)	4.7 (32)	3.3 (25)
France	201.5 (10)	98.0 (30)	4.4 (10)	0.8 (22)	18.3 (17)	12.1 (19)	21.4 (11)	19.2 (10)	48.5 (19)	6.7 (35)	3.5 (32)	2.1 (30)	8.0 (39)	3.6 (42)	6.1 (9)	3.9 (12)
Germany	176.6 (16)	116.9 (8)	3.2 (19)	0.8 (23)	21.7 (11)	17.0 (6)	23.7 (8)	18.4 (15)	46.2 (20)	9.6 (18)	4.2 (27)	2.1 (31)	12.9 (27)	7.8 (23)	5.7 (16)	3.9 (13)
Greece	149.5 (31)	81.8 (42)	1.5 (37)	0.5 (44)	8.4 (37)	6.7 (38)	16.7 (32)	10.7 (33)	50.0 (16)	7.4 (29)	2.2 (42)	1.1 (43)	8.5 (37)	4.7 (36)	6.3 (6)	3.8 (15)
Hungary	272.3 (1)	147.4 (1)	10.9 (1)	1.6 (2)	33.5 (2)	20.9 (1)	25.3 (7)	17.9 (19)	86.2 (1)	20.0 (5)	7.7 (14)	4.1 (8)	21.0 (16)	10.1 (13)	7.6 (1)	4.9 (1)
Ireland	170.2 (19)	127.8 (5)	3.4 (17)	0.8 (24)	22.6 (9)	15.4 (8)	25.8 (6)	21.6 (6)	38.3 (30)	17.3 (7)	3.9 (29)	1.5 (39)	10.1 (31)	5.0 (34)	5.4 (19)	3.3 (26)
Israel	135.1 (38)	111.4 (15)	1.3 (42)	0.7 (33)	19.7 (13)	15.3 (9)	26.2 (4)	14.2 (30)	27.5 (36)	9.3 (21)	3.1 (36)	1.8 (36)	9.3 (35)	5.6 (32)	6.5 (5)	4.5 (2)
Japan	159.5 (24)	83.1 (41)	2.0 (33)	0.8 (25)	17.6 (21)	11.0 (28)	7.7 (44)	5.5 (40)	33.1 (33)	9.6 (19)	3.0 (37)	1.2 (42)	31.2 (4)	13.8 (4)	4.1 (36)	2.6 (41)
Kazakhstan	201.9 (8)	102.6 (27)	2.5 (22)	1.2 (4)	12.2 (31)	8.6 (33)	13.3 (36)	5.2 (41)	59.5 (9)	8.3 (25)	8.1 (12)	2.4 (23)	32.0 (3)	13.8 (5)	3.3 (43)	2.5 (42)
Kyrgyzstan	185.6 (13)	112.6 (14)	2.1 (31)	0.7 (34)	10.9 (35)	7.9 (35)	17.0 (29)	6.4 (39)	40.7 (27)	7.3 (30)	11.3 (6)	4.9 (2)	47.0 (1)	18.9 (1)	4.1 (37)	3.2 (30)
Latvia	196.7 (11)	102.8 (26)	4.8 (8)	0.7 (35)	17.9 (19)	13.3 (15)	18.1 (24)	13.0 (31)	59.1 (10)	6.3 (37)	6.6 (17)	4.3 (6)	24.4 (10)	10.4 (12)	6.0 (10)	4.0 (6)
Lithuania	195.9 (12)	97.0 (31)	5.0 (7)	0.8 (26)	18.0 (18)	10.7 (29)	19.0 (20)	15.6 (24)	56.5 (11)	5.5 (39)	8.8 (11)	3.9 (11)	24.5 (9)	9.5 (17)	5.7 (17)	3.8 (16)
Macedonia	140.1 (36)	85.5 (38)	2.1 (32)	0.7 (36)	11.2 (34)	7.8 (36)	17.2 (28)	6.8 (37)	39.8 (28)	6.6 (36)	6.3 (18)	3.0 (15)	21.9 (13)	9.5 (18)	4.3 (35)	2.7 (40)
Mauritius	79.6 (45)	66.3 (44)	2.2 (29)	0.7 (37)	5.8 (42)	3.9 (45)	9.2 (41)	7.3 (36)	16.7 (44)	4.2 (44)	13.6 (5)	0.2 (45)	10.6 (29)	5.7 (30)	3.4 (41)	2.0 (45)
Mexico	112.5 (42)	106.3 (20)	1.4 (40)	0.7 (38)	4.7 (44)	4.6 (43)	12.2 (38)	16.6 (22)	22.1 (39)	8.2 (26)	17.1 (1)	4.5 (3)	13.2 (26)	9.8 (15)	4.9 (27)	4.0 (7)
Netherlands	182.0 (15)	120.0 (7)	1.5 (38)	0.8 (27)	19.0 (14)	14.0 (13)	27.8 (2)	20.0 (8)	59.7 (8)	14.8 (9)	2.2 (43)	2.2 (26)	9.4 (34)	4.6 (37)	4.9 (28)	3.2 (31)
New Zealand	167.2 (21)	131.1 (3)	2.3 (26)	0.9 (12)	25.7 (4)	20.2 (2)	25.9 (5)	21.2 (7)	39.3 (29)	18.7 (6)	3.9 (30)	2.2 (27)	6.8 (42)	4.0 (39)	6.3 (7)	4.4 (4)
Norway	155.7 (27)	113.1 (13)	2.4 (24)	0.9 (13)	22.0 (10)	18.0 (5)	20.7 (14)	26.8 (3)	31.7 (34)	12.8 (12)	3.3 (34)	3.0 (16)	9.6 (33)	5.5 (33)	4.6 (33)	3.2 (32)
Poland	205.2 (6)	111.4 (16)	3.7 (16)	0.8 (28)	16.6 (25)	11.6 (24)	16.8 (30)	11.2 (32)	71.5 (2)	11.3 (15)	7.8 (13)	2.9 (18)	19.2 (19)	7.3 (25)	5.6 (18)	3.5 (21)
Portugal	157.1 (26)	89.1 (37)	3.9 (13)	0.6 (41)	18.5 (16)	11.3 (26)	18.4 (22)	17.9 (20)	29.5 (35)	4.8 (40)	4.8 (25)	2.3 (25)	22.2 (12)	10.9 (8)	5.1 (23)	3.4 (22)
Rep. of Moldova	157.8 (25)	89.4 (36)	6.7 (4)	0.8 (29)	15.8 (28)	10.6 (30)	18.5 (21)	5.0 (42)	42.1 (24)	6.2 (38)	7.0 (16)	2.2 (28)	20.4 (17)	9.0 (21)	5.2 (22)	3.3 (27)

Romania	150.0 (30)	90.0 (34)	4.2 (11)	0.9 (14)	11.4 (33)	8.2 (34)	16.2 (34)	8.3 (35)	45.1 (21)	7.3 (31)	10.9 (7)	2.2 (29)	17.6 (21)	7.0 (27)	4.5 (34)	3.0 (38)
Russian Fed.	211.2 (5)	100.6 (29)	5.3 (6)	0.8 (30)	17.5 (22)	12.7 (17)	16.7 (33)	6.8 (38)	68.2 (4)	6.8 (34)	5.2 (24)	2.6 (20)	35.6 (2)	15.2 (3)	5.0 (26)	3.4 (23)
Slovakia	217.8 (4)	108.8 (17)	9.5 (2)	1.0 (9)	28.0 (3)	16.1 (7)	18.4 (23)	14.3 (29)	60.7 (7)	7.8 (27)	5.4 (23)	5.2 (1)	16.9 (23)	7.3 (26)	7.1 (2)	3.7 (17)
Slovenia	203.1 (7)	115.9 (11)	3.4 (18)	0.7 (39)	25.1 (5)	14.6 (11)	20.3 (16)	18.8 (13)	55.3 (12)	10.1 (17)	5.6 (22)	4.4 (5)	20.2 (18)	9.6 (16)	5.9 (11)	3.2 (33)
Spain	176.1 (17)	85.0 (40)	3.9 (14)	0.8 (31)	17.3 (23)	11.1 (27)	18.1 (25)	15.0 (28)	49.4 (17)	4.2 (45)	2.7 (40)	2.4 (24)	12.6 (28)	6.2 (29)	5.4 (20)	3.2 (34)
Sweden	137.9 (37)	104.0 (24)	1.3 (43)	0.7 (40)	14.4 (29)	11.5 (25)	17.5 (27)	27.3 (2)	22.6 (38)	12.6 (13)	2.9 (38)	2.0 (33)	7.4 (41)	4.0 (40)	5.1 (24)	3.3 (28)
Trinidad and Tobago	103.5 (44)	101.9 (28)	2.5 (23)	1.1 (5)	8.5 (36)	9.7 (31)	20.6 (15)	32.3 (1)	13.2 (45)	4.3 (43)	15.0 (3)	4.3 (7)	8.7 (36)	6.9 (28)	3.4 (42)	3.1 (36)
Turkmenistan	117.7 (39)	85.2 (39)	2.2 (30)	0.9 (15)	4.7 (45)	4.1 (44)	9.2 (42)	1.8 (44)	18.9 (42)	4.6 (41)	6.3 (19)	1.4 (41)	21.1 (15)	10.8 (9)	2.6 (45)	2.4 (43)
United Kingdom	171.0 (18)	128.0 (4)	1.8 (35)	0.8 (32)	18.7 (15)	13.8 (14)	26.8 (3)	18.5 (14)	48.6 (18)	21.1 (4)	3.9 (31)	1.7 (37)	10.1 (32)	4.8 (35)	4.9 (29)	3.3 (29)
Venezuela	104.1 (43)	91.8 (33)	1.3 (44)	0.9 (16)	5.8 (43)	6.1 (40)	11.6 (39)	18.2 (16)	19.4 (41)	9.2 (22)	15.2 (2)	3.7 (12)	17.5 (22)	10.0 (14)	3.9 (40)	3.2 (35)

*Rates are age adjusted to the World Health Organization world standard population.
Note: Figures in parentheses represent order of rank within site and gender.
Source: GLOBOCAN 2000, Cancer Incidence, Mortality, and Prevalence Worldwide, Version 1.0.