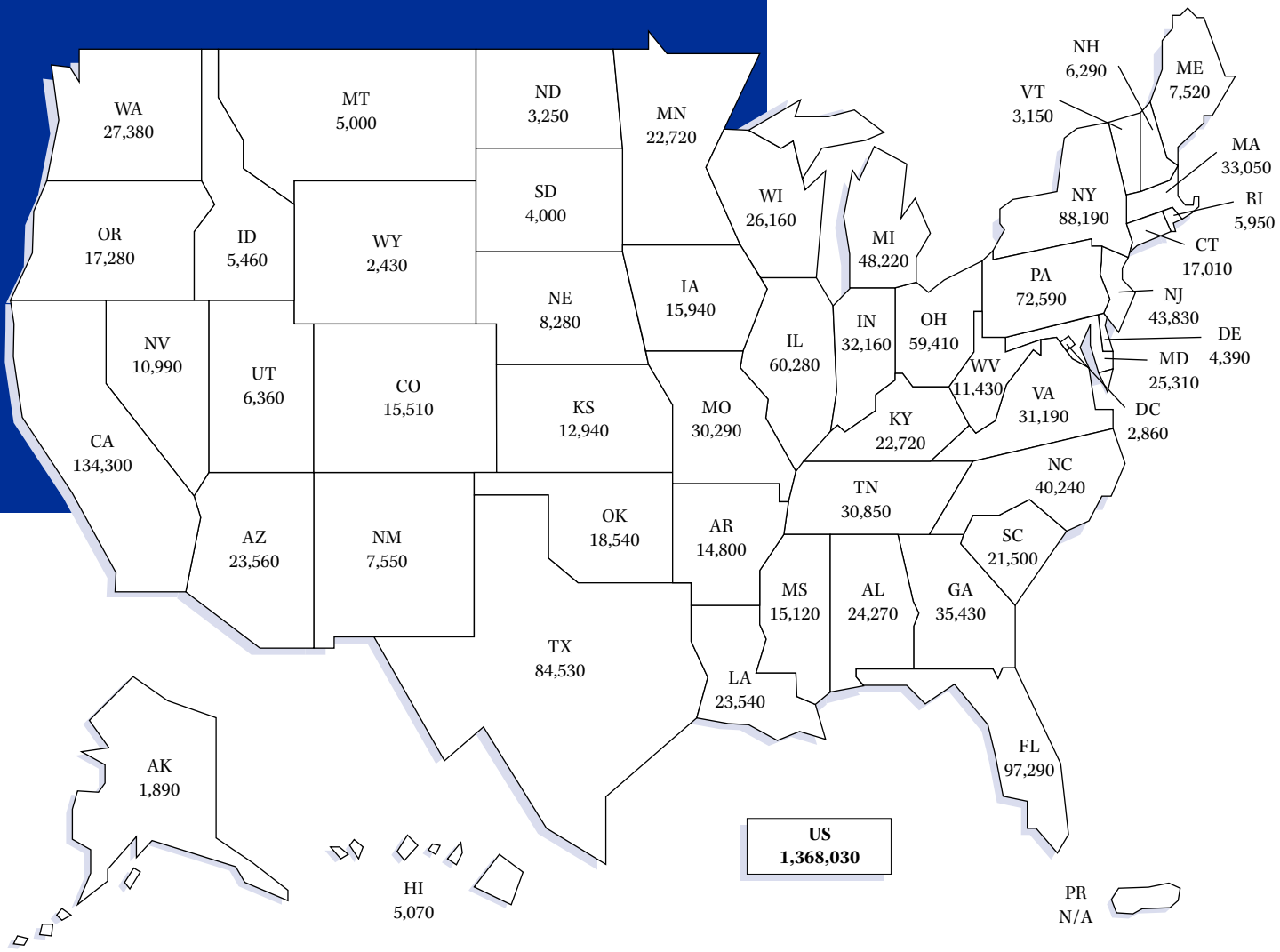
Cancer Facts & Figures 2004



Rates are age-adjusted to the 2000 US standard population.

Estimated number of new cancer cases for 2004, excluding basal and squamous cell skin cancers and in situ carcinomas except urinary bladder.
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 2004 by state. State estimates may not add to US total due to rounding.

American Cancer Society®

Special Section:
Cancer Disparities
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**Indicates a figure or table*

This publication attempts to summarize current scientific information about cancer. Except when specified, it does not represent the official policy of the American Cancer Society.

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Cancer: Basic Facts

What Is Cancer?

Cancer is a group of diseases characterized by uncontrolled growth and spread of abnormal cells. If the spread is not controlled, it can result in death. Cancer is caused by both external factors (tobacco, chemicals, radiation, and infectious organisms) and internal factors (inherited mutations, hormones, immune conditions, and mutations that occur from metabolism). These causal factors may act together or in sequence to initiate or promote carcinogenesis. Ten or more years often pass between exposures or mutations and detectable cancer. Cancer is treated by surgery, radiation, chemotherapy, hormones, and immunotherapy.

Can Cancer Be Prevented?

All cancers caused by cigarette smoking and heavy use of alcohol could be prevented completely. The American Cancer Society estimates that in 2004 more than 180,000 cancer deaths are expected to be caused by tobacco use.

Scientific evidence suggests that about one-third of the 563,700 cancer deaths expected to occur in 2004 will be related to nutrition, physical inactivity, overweight or obesity, and other lifestyle factors, and thus could also be prevented. Certain cancers are related to infectious exposures, e.g., hepatitis B virus (HBV), human papillomavirus (HPV), human immunodeficiency virus (HIV), helicobacter, and others, and could be prevented through behavioral changes, vaccines, or antibiotics. In addition, many of the more than 1 million skin cancers that are expected to be diagnosed in 2004 could have been prevented by protection from the sun's rays.

Regular screening examinations by a health care professional can result in the detection of cancers of the breast, colon, rectum, cervix, prostate, oral cavity, and skin at earlier stages, when treatment is more likely to be successful. A heightened awareness of breast changes or skin changes may also result in detection of these tumors at earlier stages. Cancers that can be detected earlier by screening account for about half of all new cancer cases. The 5-year relative survival rate for these cancers is about 84%. If all of these cancers were diagnosed at a localized stage through regular cancer screenings, 5-year survival would increase to about 95%.

Who Is at Risk of Developing Cancer?

Anyone can develop cancer. Since the occurrence of cancer increases as individuals age, most cases affect adults beginning in middle age. About 76% of all cancers are diagnosed at age 55 and older. Cancer researchers use the word *risk* in different ways. *Lifetime risk* refers to the probability that an individual, over the course of a lifetime, will develop cancer or die from it. In the US, men have a little less than 1 in 2 lifetime risk of developing cancer; for women the risk is a little more than 1 in 3.

Relative risk is a measure of the strength of the relationship between risk factors and the particular cancer. It compares the risk of developing cancer in persons with a certain exposure or trait to the risk in persons who do not have this exposure or trait. For example, male smokers are about 20 times more likely to develop lung cancer than nonsmokers, so their relative risk is 20. Most relative risks are not this large. For example, women who have a first-degree (mother, sister, or daughter) family history of breast cancer have about a 2-fold increased risk of developing breast cancer compared with women who do not have a family history.

All cancers involve the malfunction of genes that control cell growth and division. About 5% to 10% of cancers are clearly hereditary, in that an inherited faulty gene predisposes the person to a very high risk of particular cancers. The remainder of cancers are not hereditary, but result from damage to genes (mutations) that occurs throughout our lifetime, either due to internal factors, such as hormones or the digestion of nutrients within cells, or external factors, such as tobacco, chemicals, and sunlight.

How Many People Alive Today Have Ever Had Cancer?

The National Cancer Institute estimates that approximately 9.6 million Americans with a history of cancer were alive in January 2000. Some of these individuals were cancer-free, while others still had evidence of cancer and may have been undergoing treatment.

How Many New Cases Are Expected to Occur This Year?

About 1,368,030 new cancer cases are expected to be diagnosed in 2004. Since 1990, more than 18 million new cancer cases have been diagnosed. These estimates do not include carcinoma in situ (noninvasive cancer) of any site except urinary bladder, and they do not include basal and squamous cell skin cancers. More than 1 million cases of basal and squamous cell skin cancers are expected to be diagnosed this year.

How Many People Are Expected to Die of Cancer This Year?

This year about 563,700 Americans are expected to die of cancer, more than 1,500 people a day. Cancer is the second leading cause of death in the US, exceeded only by heart disease. In the US, cancer causes 1 of every 4 deaths.

What Percentage of People Survive Cancer?

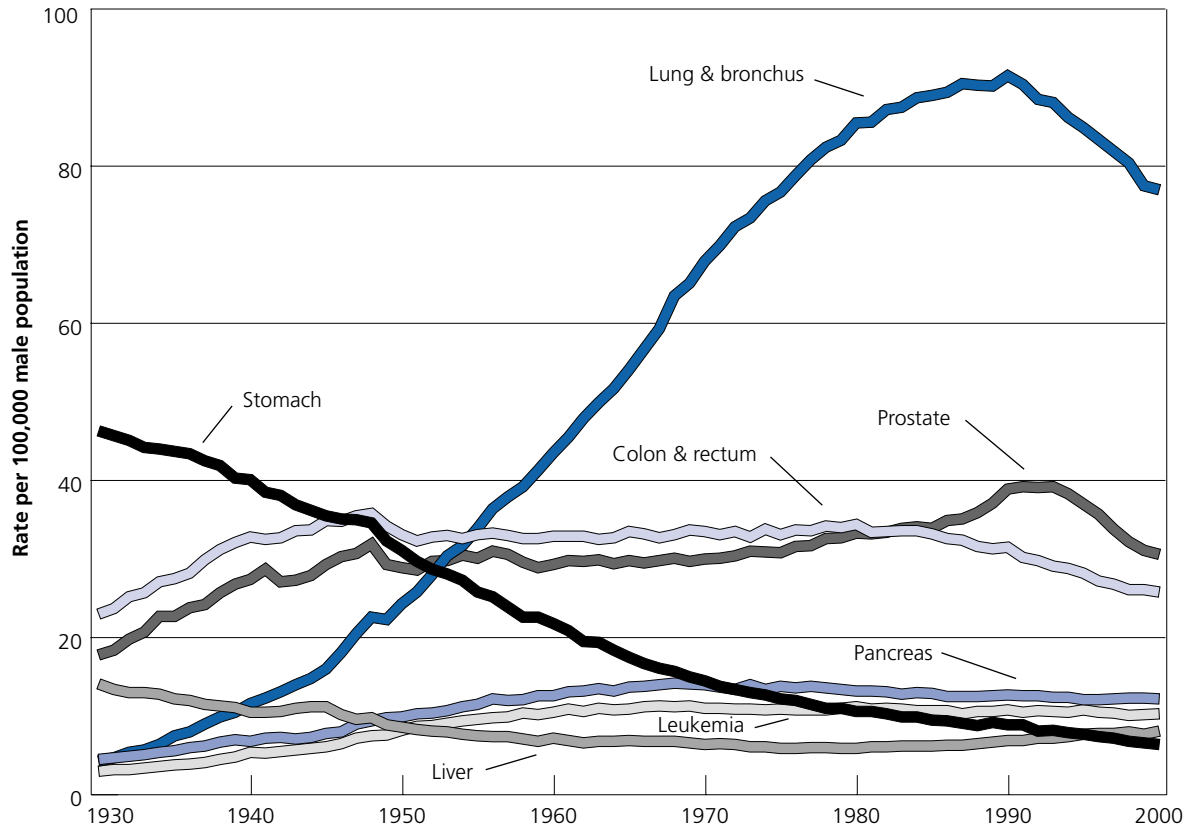
The 5-year relative survival rate for all cancers combined is 63%, with rates varying greatly by cancer type and stage at diagnosis. After adjusting for normal life expectancy (factors such as dying of heart disease, accidents, and diseases of old age), the 5-year relative survival rate represents persons who are living five years after diagnosis, whether disease-free, in remission, or under treatment with evidence of cancer. While 5-year relative survival rates are useful in monitoring progress in the early detection and treatment of cancer, they do not represent the proportion of people who are cured permanently, since cancer can affect survival beyond five years after diagnosis.

Although these rates provide some indication about the average survival experience of cancer patients in a given population, they are less informative when used to predict individual prognosis and should be interpreted with caution. First, 5-year relative survival rates are based on patients who were diagnosed and treated at least five years ago and do not reflect trends toward more favorable stage at diagnosis or recent advances in detection and treatment. Second, information about prognostic factors that influence survival other than stage at diagnosis, including treatment protocols, additional illnesses, biological differences, and behavioral characteristics of each individual, are not taken into account in the estimation of stage-specific survival rates. (For more information about survival rates, see Sources of Statistics on page 54.)

How Is Cancer Staged?

Staging is the process of describing the extent or spread of the disease from the site of origin. It is essential in

Age-Adjusted Cancer Death Rates,* Males by Site, US, 1930-2000



*Per 100,000, age-adjusted to the 2000 US standard population.

Note: Due to changes in ICD coding, numerator information has changed over time. Rates for cancers of the liver, lung & bronchus, and colon & rectum are affected by these coding changes.

Source: US Mortality Public Use Data Tapes 1960-2000, US Mortality Volumes 1930-1959, National Center for Health Statistics, Centers for Disease Control and Prevention, 2003.

American Cancer Society, Surveillance Research, 2004

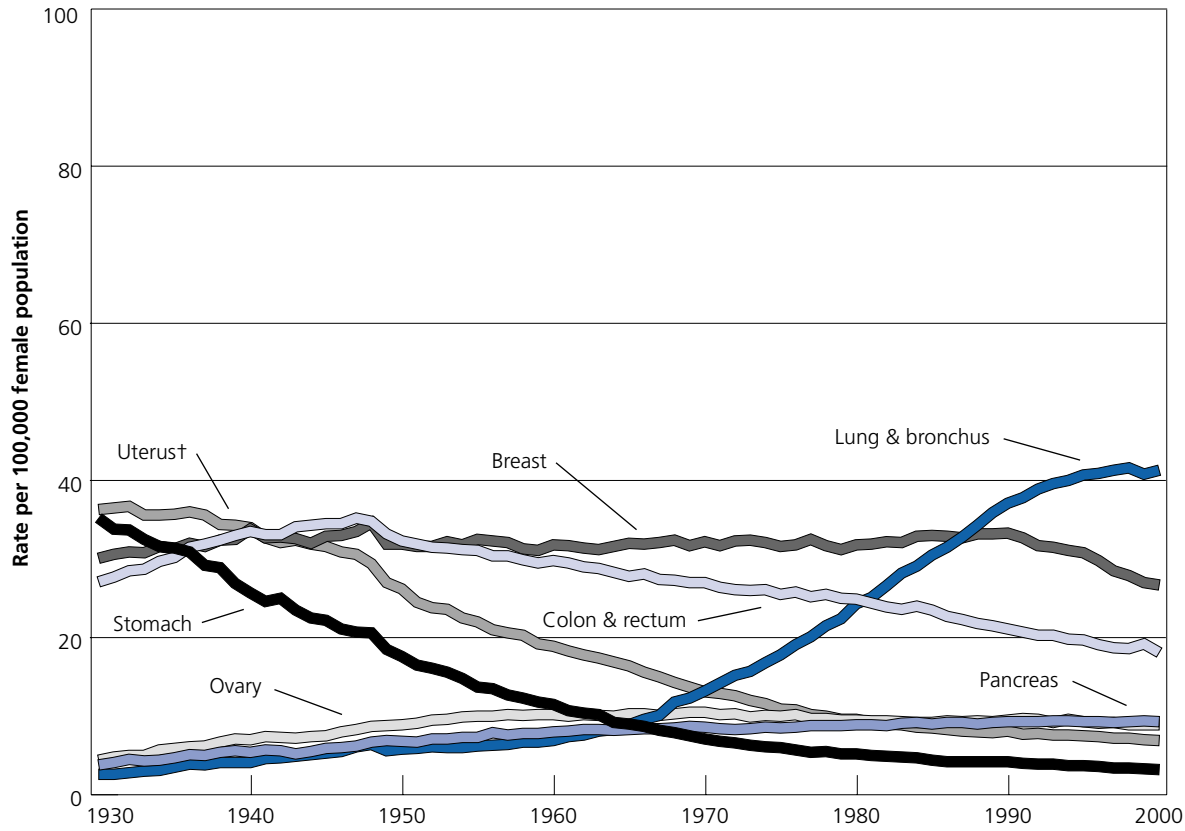
determining the choice of therapy and in assessing prognosis. A cancer's stage is based on the primary tumor's size and location in the body and whether it has spread to other areas of the body. A number of different staging systems are used to classify tumors. The TNM staging system assesses tumors in three ways: extent of the primary tumor (T), absence or presence of regional lymph node involvement (N), and absence or presence of distant metastases (M). Once the T, N, and M are determined, a stage of I, II, III, or IV is assigned, with stage I being early stage and IV being advanced. Summary staging (in situ, local, regional, and distant) is useful for descriptive and statistical analysis of tumor registry data. If cancer cells are present only in the layer of cells where they developed and they have not spread, the stage is in situ. If cancer cells have spread beyond the original layer of tissue, the cancer is invasive. See Five-Year Relative Survival Rates by Stage at Diagnosis, 1992-1999, page 17, for a description of the other summary stage categories.

What Are the Costs of Cancer?

The National Institutes of Health estimate overall costs for cancer in the year 2003 at $189.5 billion: $64.2 billion for direct medical costs (total of all health expenditures); $16.3 billion for indirect morbidity costs (cost of lost productivity due to illness); and $109 billion for indirect mortality costs (cost of lost productivity due to premature death). Lack of health insurance and other barriers prevent many Americans from receiving optimal health care.

According to the 2002 National Health Interview Survey data, about 16% of Americans under age 65 have no health insurance coverage, and about one-third of persons 65 and older have Medicare coverage only. In 2002, almost 18% of Americans aged 18 to 64 years reported not having a regular source of health care. Additionally, about 6% of 18- to 64-year-old adults say cost was a barrier to obtaining needed health care in the previous year.

Age-Adjusted Cancer Death Rates,* Females by Site, US, 1930-2000



*Per 100,000, age-adjusted to the 2000 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 cancers of the liver, lung & bronchus, colon & rectum, and ovary are affected by these coding changes.

Source: US Mortality Public Use Data Tapes 1960-2000, US Mortality Volumes 1930-1959, National Center for Health Statistics, Centers for Disease Control and Prevention, 2003.

American Cancer Society, Surveillance Research, 2004

Estimated New Cancer Cases and Deaths by Sex for All Sites, US, 2004*

	Estimated New Cases			Estimated Deaths		
	Both Sexes	**Male**	**Female**	**Both Sexes**	**Male**	**Female**
All sites	1,368,030	699,560	668,470	563,700	290,890	272,810
Oral cavity & pharynx	28,260	18,550	9,710	7,230	4,830	2,400
Tongue	7,320	4,860	2,460	1,700	1,100	600
Mouth	10,080	5,410	4,670	1,890	1,070	820
Pharynx	8,250	6,330	1,920	2,070	1,460	610
Other oral cavity	2,610	1,950	660	1,570	1,200	370
Digestive system	255,640	135,410	120,230	134,840	73,240	61,600
Esophagus	14,250	10,860	3,390	13,300	10,250	3,050
Stomach	22,710	13,640	9,070	11,780	6,900	4,880
Small intestine	5,260	2,750	2,510	1,130	610	520
Colon†	106,370	50,400	55,970	56,730	28,320	28,410
Rectum	40,570	23,220	17,350			
Anus, anal canal, & anorectum	4,010	1,890	2,120	580	210	370
Liver & intrahepatic bile duct	18,920	12,580	6,340	14,270	9,450	4,820
Gallbladder & other biliary	6,950	2,960	3,990	3,540	1,290	2,250
Pancreas	31,860	15,740	16,120	31,270	15,440	15,830
Other digestive organs	4,740	1,370	3,370	2,240	770	1,470
Respiratory system	186,550	102,730	83,820	165,130	95,460	69,670
Larynx	10,270	8,060	2,210	3,830	3,010	820
Lung & bronchus	173,770	93,110	80,660	160,440	91,930	68,510
Other respiratory organs	2,510	1,560	950	860	520	340
Bones & joints	2,440	1,230	1,210	1,300	720	580
Soft tissue (including heart)	8,680	4,760	3,920	3,660	2,020	1,640
Skin (excluding basal & squamous)	59,350	31,640	27,710	10,250	6,590	3,660
Melanoma-skin	55,100	29,900	25,200	7,910	5,050	2,860
Other nonepithelial skin	4,910	2,400	2,510	2,340	1,540	800
Breast	217,440	1,450	215,990	40,580	470	40,110
Genital system	323,210	240,660	82,550	59,250	30,530	28,720
Uterine cervix	10,520		10,520	3,900		3,900
Uterine corpus	40,320		40,320	7,090		7,090
Ovary	25,580		25,580	16,090		16,090
Vulva	3,970		3,970	850		850
Vagina & other genital, female	2,160		2,160	790		790
Prostate	230,110	230,110		29,900	29,900	
Testis	8,980	8,980		360	360	
Penis & other genital, male	1,570	1,570		270	270	
Urinary system	98,400	68,290	30,110	25,880	17,060	8,820
Urinary bladder	60,240	44,640	15,600	12,710	8,780	3,930
Kidney & renal pelvis	35,710	22,080	13,630	12,480	7,870	4,610
Ureter & other urinary organs	2,450	1,570	880	690	410	280
Eye & orbit	2,090	1,130	960	180	110	70
Brain & other nervous system	18,400	10,540	7,860	12,690	7,200	5,490
Endocrine system	25,520	6,950	18,570	2,440	1,140	1,300
Thyroid	23,600	5,960	17,640	1,460	620	840
Other endocrine	1,920	990	930	980	520	460
Lymphoma	62,250	33,180	29,070	20,730	11,090	9,640
Hodgkin disease	7,880	4,330	3,550	1,320	700	620
Non-Hodgkin lymphoma	54,370	28,850	25,520	19,410	10,390	9,020
Multiple myeloma	15,270	8,090	7,180	11,070	5,430	5,640
Leukemia	33,440	19,020	14,420	23,300	12,990	10,310
Acute lymphocytic leukemia	3,830	2,110	1,720	1,450	820	630
Chronic lymphocytic leukemia	8,190	5,050	3,140	4,800	2,730	2,070
Acute myeloid leukemia	11,920	6,280	5,640	8,870	4,810	4,060
Chronic myeloid leukemia	4,600	2,700	1,900	1,570	940	630
Other leukemia‡	4,900	2,880	2,020	6,610	3,690	2,920
Other & unspecified primary sites‡	31,090	15,930	15,160	45,170	22,010	23,160

*Rounded to the nearest 10; excludes basal and squamous cell skin cancers and in situ carcinomas except urinary bladder. Carcinoma in situ of the breast accounts for about 59,390 new cases annually, and in situ melanoma accounts for about 40,780 new cases annually. †Estimated deaths for colon and rectum cancers are combined. ‡More deaths than cases suggests lack of specificity in recording underlying causes of death on death certificates.

Source: Estimates of new cases are based on incidence rates from 1979 to 2000, National Cancer Institute Surveillance, Epidemiology, and End Results program. Estimates of deaths are based on data from US Mortality Public Use Data Tapes, 1969 to 2001, National Center for Health Statistics, Centers for Disease Control and Prevention, 2003.

Estimated New Cancer Cases for Selected Cancer Sites by State, US, 2004*

State	All Cases	Female Breast	Uterine Cervix	Colon & Rectum	Uterine Corpus	Leukemia	Lung & Bronchus	Melanoma of the Skin	Non-Hodgkin Lymphoma	Prostate	Urinary Bladder
Alabama	24,270	3,980	190	2,330	680	530	3,350	840	840	4,850	810
Alaska	1,890	270	†	210	60	†	240	70	80	230	90
Arizona	23,560	3,980	190	2,490	510	590	2,760	1,180	950	3,920	1,140
Arkansas	14,800	2,050	160	1,630	340	370	2,230	560	640	2,150	570
California	134,300	21,860	1,210	13,880	3,920	3,240	15,650	5,020	5,550	23,160	5,730
Colorado	15,510	2,580	110	1,610	400	440	1,740	910	810	2,540	620
Connecticut	17,010	2,850	80	1,710	450	400	2,000	700	760	3,310	660
Delaware	4,390	700	†	410	110	110	550	210	200	690	†
Dist. of Columbia	2,860	590	†	340	170	†	300	70	60	620	90
Florida	97,290	13,350	730	9,950	2,450	2,500	13,390	4,250	2,690	17,090	4,550
Georgia	35,430	6,080	350	3,420	970	790	5,050	1,460	1,320	5,700	1,520
Hawaii	5,070	750	†	520	170	110	570	140	250	1,000	190
Idaho	5,460	920	†	540	170	140	660	280	250	1,080	330
Illinois	60,280	9,640	490	6,680	2,050	1,550	7,320	2,020	2,270	9,930	2,610
Indiana	32,160	4,790	130	3,520	910	790	4,490	1,320	1,430	5,390	1,230
Iowa	15,940	2,320	110	1,840	510	460	1,820	560	640	3,160	620
Kansas	12,940	1,880	80	1,480	400	340	1,690	630	640	2,690	660
Kentucky	22,720	3,340	190	2,310	510	470	3,660	1,040	980	2,620	850
Louisiana	23,540	3,930	190	2,560	510	550	3,160	700	980	3,690	760
Maine	7,520	920	†	800	230	140	950	280	250	1,150	470
Maryland	25,310	4,090	220	2,820	740	650	3,180	980	1,040	4,080	1,140
Massachusetts	33,050	5,170	130	3,520	970	760	4,050	1,460	1,150	5,700	1,800
Michigan	48,220	7,270	350	4,920	1,420	1,210	6,160	1,670	2,040	8,540	2,370
Minnesota	22,720	3,610	110	2,200	680	630	2,580	980	1,290	4,230	1,040
Mississippi	15,120	2,480	110	1,610	280	300	2,230	420	390	3,390	470
Missouri	30,290	4,680	240	3,240	850	780	4,090	1,320	1,400	3,460	1,140
Montana	5,000	590	†	470	110	140	650	210	200	1,080	330
Nebraska	8,280	1,290	†	1,010	280	230	1,040	350	360	1,460	330
Nevada	10,990	1,620	80	1,240	170	260	1,570	490	420	2,000	520
New Hampshire	6,290	920	30	670	170	140	800	280	140	1,000	380
New Jersey	43,830	7,970	380	4,770	1,760	1,030	5,110	1,810	1,820	7,930	2,040
New Mexico	7,550	1,020	†	830	230	170	750	280	310	1,690	330
New York	88,190	15,190	840	9,890	3,180	2,110	10,020	3,060	2,770	14,470	4,410
North Carolina	40,240	5,870	320	4,120	1,190	930	5,710	1,740	1,480	7,160	1,470
North Dakota	3,250	540	†	360	60	100	360	70	140	540	190
Ohio	59,410	10,070	320	6,760	1,880	1,450	7,720	2,300	2,410	8,620	2,940
Oklahoma	18,540	2,910	130	2,070	400	440	2,570	910	760	2,620	760
Oregon	17,280	2,750	110	1,790	450	400	2,140	910	920	2,920	900
Pennsylvania	72,590	11,200	400	8,570	2,500	1,620	8,560	2,720	3,030	12,010	3,510
Rhode Island	5,950	860	†	650	110	130	760	280	280	1,000	330
South Carolina	21,500	3,280	160	2,280	510	490	2,950	700	870	4,770	810
South Dakota	4,000	540	†	490	110	110	450	210	220	920	140
Tennessee	30,850	4,310	300	3,470	740	730	4,680	1,250	1,400	4,540	1,090
Texas	84,530	12,980	1,030	9,220	2,390	2,140	10,470	3,550	2,970	13,540	3,270
Utah	6,360	1,080	†	670	230	220	480	420	390	1,080	280
Vermont	3,150	590	†	340	110	70	400	140	170	460	140
Virginia	31,190	6,350	220	3,550	1,080	760	4,050	1,390	1,230	5,080	1,330
Washington	27,380	4,040	130	2,720	910	720	3,520	1,320	1,290	4,850	1,330
West Virginia	11,430	1,620	110	1,270	340	270	1,780	420	500	1,540	570
Wisconsin	26,160	4,040	110	2,900	850	750	3,050	1,110	1,290	3,850	1,280
Wyoming	2,430	270	†	280	60	60	280	140	80	620	90
United States	1,368,030	215,990	10,520	146,940	40,320	33,440	173,770	55,100	54,370	230,110	60,240

*Rounded to nearest 10. 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 2004 by state. State estimates may not add up to US total due to rounding.

Estimated Cancer Deaths for Selected Cancer Sites by State, US, 2004*

State	All Sites	Brain/ Nervous System	Female Breast	Colon & Rectum	Leukemia	Liver	Lung & Bronchus	Non-Hodgkin Lymphoma	Ovary	Pancreas	Prostate
Alabama	10,000	200	740	900	370	260	3,090	300	320	530	630
Alaska	780	†	†	80	†	†	220	†	†	†	†
Arizona	9,710	240	740	960	410	260	2,550	340	290	560	510
Arkansas	6,100	160	380	630	260	200	2,060	230	150	280	280
California	55,340	1,440	4,060	5,360	2,260	1,880	14,450	1,980	1,730	3,020	3,010
Colorado	6,390	180	480	620	310	160	1,610	290	210	380	330
Connecticut	7,010	150	530	660	280	170	1,850	270	200	380	430
Delaware	1,810	†	130	160	80	†	510	70	†	110	90
Dist. of Columbia	1,180	†	110	130	†	†	280	†	†	60	80
Florida	40,090	980	2,480	3,840	1,740	1,030	12,360	960	1,120	2,270	2,220
Georgia	14,600	260	1,130	1,320	550	300	4,660	470	430	750	740
Hawaii	2,090	†	140	200	80	100	530	90	†	150	130
Idaho	2,250	70	170	210	100	†	610	90	80	120	140
Illinois	24,840	490	1,790	2,580	1,080	650	6,760	810	660	1,400	1,290
Indiana	13,250	280	890	1,360	550	280	4,150	510	380	670	700
Iowa	6,570	160	430	710	320	110	1,680	230	210	380	410
Kansas	5,330	120	350	570	240	100	1,560	230	160	300	350
Kentucky	9,360	160	620	890	330	180	3,380	350	230	410	340
Louisiana	9,700	190	730	990	380	280	2,920	350	230	520	480
Maine	3,100	80	170	310	100	60	880	90	100	170	150
Maryland	10,430	210	760	1,090	450	240	2,940	370	300	590	530
Massachusetts	13,620	280	960	1,360	530	340	3,740	410	360	830	740
Michigan	19,870	450	1,350	1,900	840	500	5,690	730	580	1,120	1,110
Minnesota	9,360	250	670	850	440	190	2,380	460	270	540	550
Mississippi	6,230	160	460	620	210	190	2,060	140	160	320	440
Missouri	12,480	270	870	1,250	540	270	3,780	500	350	660	450
Montana	2,060	†	110	180	100	†	600	70	†	100	140
Nebraska	3,410	90	240	390	160	†	960	130	90	180	190
Nevada	4,530	80	300	480	180	110	1,450	150	110	220	260
New Hampshire	2,590	70	170	260	100	60	740	†	60	140	130
New Jersey	18,060	320	1,480	1,840	720	480	4,720	650	540	1,040	1,030
New Mexico	3,110	70	190	320	120	110	690	110	90	170	220
New York	36,340	690	2,820	3,820	1,470	890	9,250	990	1,080	2,270	1,880
North Carolina	16,580	320	1,090	1,590	650	350	5,270	530	450	900	930
North Dakota	1,340	40	100	140	70	†	330	†	†	90	70
Ohio	24,480	520	1,870	2,610	1,010	520	7,130	860	660	1,290	1,120
Oklahoma	7,640	160	540	800	310	160	2,370	270	170	360	340
Oregon	7,120	160	510	690	280	150	1,980	330	230	400	380
Pennsylvania	29,910	570	2,080	3,310	1,130	690	7,900	1,080	910	1,650	1,560
Rhode Island	2,450	†	160	250	90	60	700	100	60	160	130
South Carolina	8,860	200	610	880	340	190	2,720	310	170	500	620
South Dakota	1,650	†	100	190	80	†	420	80	60	100	120
Tennessee	12,710	300	800	1,340	510	270	4,320	500	340	660	590
Texas	34,830	940	2,410	3,560	1,490	1,120	9,670	1,060	960	1,930	1,760
Utah	2,620	80	200	260	150	60	440	140	90	150	140
Vermont	1,300	†	110	130	50	†	370	60	†	70	60
Virginia	12,850	290	1,180	1,370	530	320	3,740	440	400	750	660
Washington	11,280	340	750	1,050	500	300	3,250	460	390	700	630
West Virginia	4,710	90	300	490	190	100	1,640	180	140	190	200
Wisconsin	10,780	260	750	1,120	520	250	2,820	460	260	630	500
Wyoming	1,000	†	†	110	†	†	260	†	†	†	80
United States	563,700	12,690	40,110	56,730	23,300	14,270	160,440	19,410	16,090	31,270	29,900

*Rounded to nearest 10. †Estimate is 50 or fewer deaths. **Note:** State estimates may not add up to US total due to rounding.

Source: US Mortality Public Use Data Tapes, 1969-2001, National Center for Health Statistics, Centers for Disease Control and Prevention, 2003.

Cancer Incidence Rates by Site and State, US, 1996-2000*

	All Sites		Breast	Colon & Rectum		Lung & Bronchus		Non-Hodgkin Lymphoma		Prostate	Urinary Bladder	
State	**Male**	**Female**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Male**	**Female**
Alabama (2000)	512.9	357.8	113.6	58.9	42.9	108.0	48.6	17.4	12.6	134.9	28.3	6.3
Alaska†	553.5	447.1	138.4	65.6	53.8	92.9	64.8	22.1	17.7	161.9	39.6	10.6
Arizona†	472.1	369.6	120.9	55.0	39.4	74.4	48.6	18.8	14.0	130.0	36.6	9.6
Arkansas	499.1	353.8	114.9	56.7	41.4	112.0	52.2	18.7	13.9	134.6	32.1	6.9
California†	532.1	412.0	133.8	59.9	43.8	76.5	50.4	22.8	15.2	158.1	34.9	8.6
Colorado†	517.3	399.2	135.4	57.7	42.1	68.1	43.0	21.2	16.2	160.8	34.8	9.1
Connecticut†	595.0	450.2	143.1	72.0	51.9	88.2	56.6	24.7	17.3	170.2	46.8	12.5
Delaware‡	–	–	–	–	–	–	–	–	–	–	–	–
Dist. of Columbia	685.9	439.7	142.9	71.3	58.5	105.0	53.0	20.9	12.0	251.6	25.2	9.8
Florida†	586.8	439.3	131.1	72.5	53.2	102.7	62.4	22.7	15.4	153.0	41.3	11.0
Georgia	473.4	336.3	110.5	51.3	37.5	93.2	43.7	16.9	11.6	138.9	27.3	7.2
Hawaii†	484.2	384.2	131.1	67.6	43.7	72.3	38.3	19.0	12.9	129.8	21.3	5.9
Idaho†	516.0	395.0	129.2	54.1	42.4	73.7	43.8	21.0	16.6	160.4	38.8	8.0
Illinois†	570.0	427.4	133.3	72.1	51.6	99.3	54.6	23.0	15.9	156.7	39.0	10.3
Indiana	507.5	396.8	124.8	66.8	48.2	102.4	53.7	20.2	15.1	124.3	36.3	9.3
Iowa†	555.3	421.7	130.4	75.1	54.8	94.8	48.1	22.7	16.8	151.2	38.0	8.7
Kansas‡	–	–	–	–	–	–	–	–	–	–	–	–
Kentucky†	597.7	430.0	123.8	70.5	52.6	138.9	68.7	22.3	15.5	145.5	36.6	9.4
Louisiana†	597.3	393.7	121.6	72.4	48.1	117.0	54.3	20.6	15.0	170.3	33.3	8.4
Maine (1996-1998)	585.4	433.3	127.0	71.2	51.4	101.9	62.5	24.1	15.6	152.1	44.9	13.4
Maryland	589.2	425.7	137.0	68.5	49.6	97.9	57.5	20.9	14.6	182.2	35.9	10.3
Massachusetts	599.4	445.2	143.3	72.6	50.7	90.2	58.2	22.9	16.1	179.2	46.0	12.6
Michigan†	611.8	434.9	132.0	66.9	48.0	99.4	57.5	23.0	17.0	192.6	42.0	10.6
Minnesota†	547.9	410.5	137.3	62.1	46.5	73.5	44.4	25.0	17.6	178.8	37.3	9.8
Mississippi	484.5	327.5	104.5	54.7	42.0	101.8	42.0	17.3	12.6	140.5	25.0	6.0
Missouri	533.4	417.1	127.6	70.3	50.0	110.8	59.0	22.5	15.5	139.2	36.1	8.7
Montana†	543.4	412.8	135.1	63.0	44.0	87.0	55.7	22.4	16.3	167.3	38.5	9.6
Nebraska†	543.7	408.7	130.2	71.5	49.8	85.7	45.2	22.4	16.9	162.8	35.6	8.1
Nevada	475.5	387.6	106.3	59.2	44.1	98.1	71.0	17.2	11.9	110.7	36.8	10.4
New Hampshire	539.4	413.6	133.0	65.6	46.4	87.6	56.3	21.4	13.8	145.2	44.5	11.9
New Jersey†	626.7	452.3	138.2	78.9	54.4	92.2	55.2	25.8	18.3	193.9	44.9	11.8
New Mexico†	462.8	353.1	116.9	50.4	35.3	60.9	36.2	17.5	12.5	143.2	26.7	8.0
New York†	561.6	430.6	131.2	73.7	53.3	87.5	53.0	23.6	16.4	156.1	40.3	11.2
North Carolina†	520.2	368.8	122.0	57.9	41.9	104.8	48.4	18.4	13.0	147.6	33.0	8.2
North Dakota (1997-2000)	521.9	368.5	124.8	66.0	46.0	72.4	38.7	22.2	14.0	177.7	40.0	8.5
Ohio†	541.0	415.2	130.0	68.2	49.6	101.9	56.2	22.4	15.8	143.4	39.8	10.2
Oklahoma (1997-2000)	451.5	349.9	115.5	54.9	38.5	85.4	47.6	16.3	11.9	120.5	28.5	7.1
Oregon†	539.9	429.5	143.4	58.4	43.2	87.2	58.7	22.0	15.9	159.0	41.0	10.2
Pennsylvania†	588.0	428.5	130.6	75.9	52.9	96.1	51.5	24.1	16.6	167.0	44.1	11.5
Rhode Island†	635.3	458.4	132.5	76.1	56.4	106.4	63.7	24.3	17.8	174.0	52.1	14.2
South Carolina (1997-2000)	573.5	379.9	123.0	65.6	44.5	105.4	47.4	19.1	13.3	174.4	33.6	7.4
South Dakota‡	–	–	–	–	–	–	–	–	–	–	–	–
Tennessee‡	–	–	–	–	–	–	–	–	–	–	–	–
Texas (1996-1999)	532.0	378.2	118.6	60.5	42.6	99.3	50.6	20.8	14.5	148.5	29.9	7.4
Utah†	471.3	343.0	116.8	48.9	37.7	41.5	22.1	22.7	14.0	176.4	31.3	7.2
Vermont‡	–	–	–	–	–	–	–	–		–	–	–
Virginia	501.4	367.7	124.2	60.3	43.9	88.3	46.4	19.0	13.3	149.4	31.7	8.1
Washington†	569.7	444.5	145.2	62.3	44.1	87.2	58.8	24.3	17.0	170.5	42.1	9.5
West Virginia†	576.6	431.0	119.8	71.0	52.1	125.8	67.7	20.8	16.6	144.7	40.7	12.1
Wisconsin†	549.1	411.8	131.8	71.2	50.3	84.9	48.4	22.5	15.7	161.3	38.1	10.2
Wyoming†	539.0	393.7	125.4	60.2	42.3	74.4	46.2	18.0	16.3	175.7	38.5	10.3
United States	560.0	419.9	131.7	67.7	48.9	91.5	53.4	22.7	15.9	160.4	39.0	10.1

*Per 100,000, age-adjusted to the 2000 US standard population. Not all states submitted data for all years. † This state's registry has submitted five years of data and passed rigorous criteria for each year's data including completeness of reporting, nonduplication of records, percent unknown in critical data fields, percent of cases registered with information from death certificates only, and internal consistency among data items. ‡This state's registry did not submit incidence data to the North American Association of Central Cancer Registries (NAACCR) for 1996-2000.

Sources: Cancer in North America: 1996-2000, Volume One: Incidence, Volume Three: NAACCR Combined Incidence, North American Association of Central Cancer Registries, 2003.

American Cancer Society, Surveillance Research, 2004

Cancer Death Rates by Site and State, US, 1996-2000*

	All Sites		Breast	Colon & Rectum		Lung & Bronchus		Non-Hodgkin Lymphoma		Pancreas		Prostate
State	**Male**	**Female**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**
Alabama	294.3	167.5	26.5	24.6	16.4	100.9	38.4	9.6	6.4	13.0	9.4	41.0
Alaska	241.9	177.4	25.2	24.5	18.0	73.7	47.6	10.4	7.0	13.1	9.8	24.2
Arizona	217.9	150.5	25.2	21.7	14.6	64.3	37.6	9.8	6.7	10.7	8.0	28.2
Arkansas	281.4	168.4	25.4	25.1	17.9	104.7	43.4	11.1	7.0	12.8	9.2	34.9
California	225.2	160.7	26.5	22.2	15.7	63.0	38.8	10.1	6.6	11.3	9.0	29.4
Colorado	216.0	148.4	24.0	22.5	15.6	55.8	32.0	9.4	7.0	12.1	8.5	30.5
Connecticut	240.8	166.4	27.8	25.7	17.5	67.8	40.1	10.2	7.4	12.9	9.9	30.1
Delaware	273.0	187.8	31.2	26.1	19.4	89.2	47.8	9.7	6.9	12.7	9.0	35.2
Dist. of Columbia	318.1	199.8	37.6	32.5	22.7	83.2	41.9	7.8	4.6	16.0	10.9	54.2
Florida	240.4	159.5	25.6	23.2	16.5	77.5	42.0	10.5	6.5	11.4	8.7	28.4
Georgia	276.4	163.4	27.1	22.8	16.4	94.8	39.1	9.5	6.0	12.4	9.1	40.2
Hawaii	197.5	129.5	20.0	19.6	12.9	54.3	27.4	9.5	6.1	11.5	9.2	21.9
Idaho	226.6	152.0	26.6	23.0	15.2	61.9	33.3	10.8	7.2	10.2	8.0	34.0
Illinois	267.2	177.0	30.3	28.9	19.5	81.7	41.2	11.3	7.0	12.8	9.8	34.7
Indiana	275.6	178.2	28.4	28.1	20.0	93.7	45.6	11.8	7.5	12.7	8.8	34.6
Iowa	245.1	158.5	26.5	27.7	19.1	76.5	35.5	10.8	7.8	11.9	8.5	32.3
Kansas	240.7	158.6	26.2	23.9	16.9	78.4	37.7	10.5	7.3	12.0	8.6	30.5
Kentucky	301.8	182.1	27.3	29.4	19.7	114.3	52.3	11.4	7.4	12.4	8.7	34.0
Louisiana	308.2	184.8	30.2	30.1	19.5	102.6	44.4	10.9	7.5	15.4	10.4	39.7
Maine	268.5	181.8	26.4	27.6	20.4	82.6	47.9	11.6	7.4	13.0	9.5	30.6
Maryland	273.0	179.0	29.6	29.2	20.2	84.1	45.2	10.6	6.3	13.3	9.5	36.8
Massachusetts	265.0	176.0	28.7	29.1	19.5	75.4	43.3	11.0	7.2	12.7	9.9	33.0
Michigan	259.9	173.2	28.4	26.7	17.9	80.3	42.7	11.4	7.6	12.2	9.7	34.3
Minnesota	237.7	160.2	26.7	23.6	16.7	63.7	35.4	12.2	8.1	12.3	9.1	34.4
Mississippi	309.2	170.2	28.6	26.5	18.2	111.7	40.9	9.6	6.0	14.3	9.8	44.0
Missouri	265.9	172.7	27.2	26.3	18.9	91.2	45.2	11.2	7.3	11.7	9.2	30.9
Montana	244.3	161.0	24.9	24.5	15.4	70.3	40.3	10.0	7.5	11.8	7.6	34.8
Nebraska	233.6	154.5	25.6	27.8	18.3	72.1	33.8	10.9	7.4	11.4	8.1	28.6
Nevada	254.2	179.9	26.4	28.3	18.6	79.7	54.1	9.7	6.0	11.3	9.3	30.2
New Hampshire	262.3	176.7	28.1	27.9	19.9	75.7	44.6	12.0	6.9	13.6	9.6	31.2
New Jersey	261.4	181.7	31.3	29.5	20.1	74.9	41.6	11.6	7.4	12.6	10.1	32.9
New Mexico	212.4	149.1	25.4	21.3	15.2	52.7	30.1	7.9	5.9	11.0	8.7	31.7
New York	244.2	170.3	30.0	28.2	19.2	69.1	38.2	10.6	7.0	13.1	9.9	31.6
North Carolina	277.9	163.9	27.0	24.9	17.4	96.3	38.9	9.8	6.4	12.7	9.1	38.9
North Dakota	236.1	152.4	26.6	26.0	16.4	63.3	30.5	11.4	7.3	10.6	9.2	34.1
Ohio	273.6	179.6	29.8	28.9	20.2	88.0	44.4	12.0	7.8	11.9	9.1	33.9
Oklahoma	267.8	168.1	26.8	25.7	17.9	95.2	44.7	10.6	7.4	11.7	8.4	30.8
Oregon	244.4	171.4	26.6	22.7	16.3	75.3	46.3	10.8	7.4	11.0	9.6	34.2
Pennsylvania	266.6	175.2	29.6	29.2	20.3	80.4	39.8	11.3	7.4	12.6	9.1	33.6
Rhode Island	271.1	179.5	29.3	28.9	20.0	86.0	45.3	12.0	7.8	14.1	9.6	33.0
South Carolina	283.6	167.2	27.8	26.8	18.0	92.9	38.3	9.7	6.4	13.3	10.4	41.7
South Dakota	243.7	157.3	25.0	27.3	20.3	72.5	31.4	12.6	7.9	12.1	8.5	32.3
Tennessee	290.3	172.2	27.3	26.1	18.4	106.2	42.8	11.0	7.3	13.5	9.2	35.8
Texas	257.3	162.7	26.1	25.0	16.7	82.8	39.8	10.2	6.9	12.0	8.8	32.8
Utah	188.4	128.0	23.7	18.8	14.9	36.7	17.6	10.2	7.0	9.6	6.5	35.3
Vermont	255.8	170.9	27.2	28.4	21.1	77.8	39.9	11.8	7.9	14.4	9.3	32.1
Virginia	271.8	172.4	28.6	25.3	18.8	87.7	41.6	10.1	6.8	12.7	9.1	37.6
Washington	238.8	168.8	25.8	22.7	15.9	72.2	45.9	10.8	7.3	11.9	9.8	29.8
West Virginia	286.3	186.9	27.8	28.3	20.6	104.3	51.0	10.6	7.4	11.8	7.9	31.2
Wisconsin	247.8	162.8	26.5	26.0	17.3	68.5	36.3	11.9	7.4	12.0	9.0	34.3
Wyoming	234.7	165.5	26.3	24.6	20.3	64.2	37.9	7.5	6.0	10.2	8.4	37.4
United States	255.5	168.3	27.7	25.8	18.0	79.5	40.7	10.7	7.0	12.2	9.2	32.9

*Per 100,000, age-adjusted to the 2000 US standard population.

Source: US Mortality Public Use Data Tapes 1960-2000, National Center for Health Statistics, Centers for Disease Control and Prevention, 2003.

American Cancer Society, Surveillance Research, 2004

Selected Cancers

Breast

New cases: An estimated 215,990 new cases of invasive breast cancer are expected to occur among women in the United States during 2004. It is the most frequently diagnosed non-skin cancer in women. Breast cancer incidence rates have continued to increase since 1980, although the rate of increase slowed in the 1990s, compared to the 1980s. Furthermore, in the more recent time period (1986-2000), breast cancer incidence rates have increased only in those age 50 and older. About 1,450 new cases of breast cancer are expected in men in 2004.

In addition to invasive breast cancer, 59,390 new cases of in situ breast cancer are expected to occur among women during 2004. Of these, approximately 85% will be ductal carcinoma in situ (DCIS). The increase in detection of DCIS cases is a direct result of increased use of screening with mammography, which detects breast cancers before they can be felt.

Deaths: An estimated 40,580 deaths (40,110 women, 470 men) are anticipated from breast cancer in 2004. Breast cancer ranks second among cancer deaths in women (after lung cancer). According to the most recent data, mortality rates declined by 2.3% per year from 1990 to 2000 in all women, with larger decreases in younger (<50 years) women. These decreases are most likely the result of both earlier detection and improved treatment.

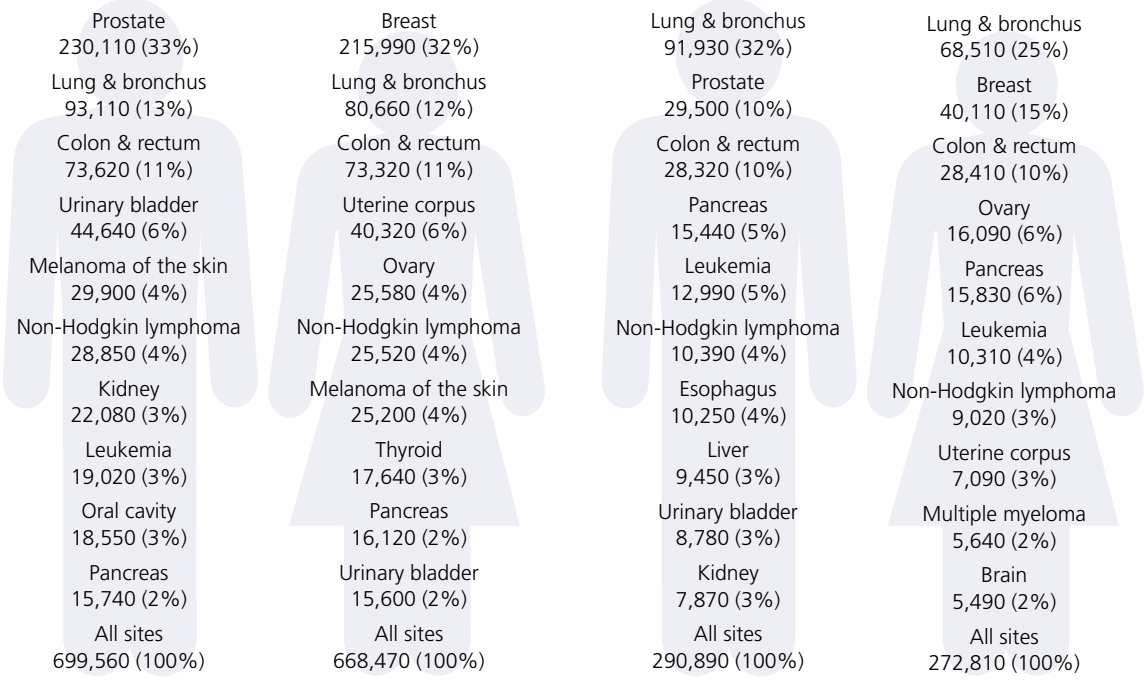
Signs and symptoms: The earliest sign of breast cancer is usually an abnormality that shows up on a mammogram before it can be felt by the woman or her health care provider. When breast cancer has grown to the point where physical signs and symptoms exist, these may include a breast lump, thickening, swelling, distortion, or tenderness; skin irritation or dimpling; and nipple pain, scaliness, ulceration, retraction, or spontaneous discharge. Breast pain is commonly due to benign conditions and is not usually the first symptom of breast cancer.

Risk factors: The risk of being diagnosed with breast cancer increases with age. Factors that increase risk of breast cancer in women include: a personal or family history of breast cancer, biopsy-confirmed atypical hyperplasia, significant mammographic breast density (which is a measure of a greater prevalence of glandular tissue), a long menstrual history (menstrual periods that started early and ended late in life), obesity after menopause, recent use of oral contraceptives, postmenopausal hormone therapy including both estrogen and progestin, never having children or having one's first child after age 30, or consumption of one or more alcoholic beverages per day. Breastfeeding, moderate or vigorous physical activity, and maintaining a healthy body weight are all associated with lower risk. A recent study suggested that women who are overweight are more likely to die from breast cancer. Current data indicate tamoxifen and raloxifene decrease breast cancer risk in women at increased risk. The inherited susceptibility genes, BRCA1 and BRCA2, account for approximately 5% of all cases, and confer a lifetime risk in these women ranging from 35% to 85%. General testing of the population for mutations of these genes is not recommended. However, testing of women with a strong family history is an option when adequate counseling is available. Recent findings suggest that prophylactic removal of the breasts and/or ovaries in BRCA1 and BRCA2 carriers decreases the risk of breast cancer considerably, although not all women who choose this surgery would have developed cancer. Women who consider this option should have an opportunity to undergo counseling before reaching a decision.

Early detection: Mammography is especially valuable as an early detection tool because it can identify breast cancer at an early stage, usually before physical symptoms develop. Numerous studies have shown that early detection saves lives and increases treatment options. The recent declines in breast cancer mortality have been attributed to the regular use of screening mammography and to improvements in cancer drugs. However, mammography also has limitations: it will miss some cancers, and it sometimes leads to follow up of findings that are not cancer. The American Cancer Society recommends that women age 40 and older have an annual mammogram and an annual clinical breast examination by a health care professional (close to and preferably before the scheduled mammogram). Women in their 20s and 30s should have a clinical breast examination by a health care professional, preferably at least every three years. Beginning in their 20s, women should be told about the benefits and limitations of breast self-examination (BSE). Women who choose to do BSE should receive instruction and have their technique reviewed at the time of their periodic health examination. All suspicious lumps should be biopsied for a definitive diagnosis.

Treatment: Taking into account the medical circumstances and the patient's preferences, treatment may involve lumpectomy (local removal of the tumor) or mastectomy (surgical removal of the breast) and removal of the lymph nodes under the arm if cancer has spread

Leading Sites of New Cancer Cases and Deaths – 2004 Estimates*



Estimated New Cases*		Estimated Deaths	
Male	**Female**	**Male**	**Female**
Prostate 230,110 (33%)	Breast 215,990 (32%)	Lung & bronchus 91,930 (32%)	Lung & bronchus 68,510 (25%)
Lung & bronchus 93,110 (13%)	Lung & bronchus 80,660 (12%)	Prostate 29,500 (10%)	Breast 40,110 (15%)
Colon & rectum 73,620 (11%)	Colon & rectum 73,320 (11%)	Colon & rectum 28,320 (10%)	Colon & rectum 28,410 (10%)
Urinary bladder 44,640 (6%)	Uterine corpus 40,320 (6%)	Pancreas 15,440 (5%)	Ovary 16,090 (6%)
Melanoma of the skin 29,900 (4%)	Ovary 25,580 (4%)	Leukemia 12,990 (5%)	Pancreas 15,830 (6%)
Non-Hodgkin lymphoma 28,850 (4%)	Non-Hodgkin lymphoma 25,520 (4%)	Non-Hodgkin lymphoma 10,390 (4%)	Leukemia 10,310 (4%)
Kidney 22,080 (3%)	Melanoma of the skin 25,200 (4%)	Esophagus 10,250 (4%)	Non-Hodgkin lymphoma 9,020 (3%)
Leukemia 19,020 (3%)	Thyroid 17,640 (3%)	Liver 9,450 (3%)	Uterine corpus 7,090 (3%)
Oral cavity 18,550 (3%)	Pancreas 16,120 (2%)	Urinary bladder 8,780 (3%)	Multiple myeloma 5,640 (2%)
Pancreas 15,740 (2%)	Urinary bladder 15,600 (2%)	Kidney 7,870 (3%)	Brain 5,490 (2%)
All sites 699,560 (100%)	All sites 668,470 (100%)	All sites 290,890 (100%)	All sites 272,810 (100%)

*Excludes basal and squamous cell skin cancers and in situ carcinoma except urinary bladder.

Note: Percentages may not total 100% due to rounding.

to the nodes or is believed to have spread to the nodes; radiation therapy; chemotherapy; or hormone therapy. Two or more methods are often used in combination. Numerous studies have shown that, unless cancer has spread to the skin, chest wall, or distant organs, long-term survival rates after lumpectomy plus radiotherapy are similar to survival rates after modified radical mastectomy. Newer options such as sentinel lymph node biopsy, where one to three key lymph nodes are excised, may reduce the need for full axillary (underarm) lymph node dissections, particularly in women with early-stage disease. Patients should discuss possible options for the best management of their breast cancer with their physicians. Significant advances in reconstruction techniques provide several options for breast reconstruction immediately after mastectomy.

While it is controversial as to how often ductal carcinoma in situ (DCIS) will progress to invasion and need to be treated, treatment options include lumpectomy and radiation therapy, with or without tamoxifen, and mastectomy with or without tamoxifen. Since doctors can't yet reliably distinguish DCIS cancers that will progress from those that won't, treatment of DCIS is recommended to prevent tumor progression.

Survival: The 5-year relative survival rate for localized breast cancer (cancer that has not spread to lymph nodes or other locations outside the breast) has increased from 72% in the 1940s to 97% today. If the cancer has spread regionally, however, the rate is 79%, and for women with distant metastases, the rate is 23%. Survival after a diagnosis of breast cancer continues to decline beyond 5 years. Survival at 10 years or more is also stage-dependent, with the best survival observed in women diagnosed with early-stage disease.

For more information about breast cancer, please inquire about the American Cancer Society's *Breast Cancer Facts & Figures 2003-2004* (8610.03) publication and Web site posting.

Childhood Cancer

New cases: An estimated 9,200 new cases are expected to occur among children aged 0-14 in 2004. Childhood cancers are rare.

Deaths: An estimated 1,510 deaths are expected to occur among children aged 0-14 in 2004, about one-third of them from leukemia. Despite its rarity, cancer is the chief cause of death by disease in children between ages

1 and 14. Mortality rates from childhood cancer have declined by about 49% since 1975.

Early detection: Cancers in children often are difficult to recognize. Parents should make sure their children have regular medical checkups and should be alert to any unusual symptoms that persist. These include an unusual mass or swelling; unexplained paleness and loss of energy; sudden tendency to bruise; a persistent, localized pain or limping; prolonged, unexplained fever or illness; frequent headaches, often with vomiting; sudden eye or vision changes; and excessive, rapid weight loss.

Childhood cancers include:

- Leukemia, which accounts for about 30% of cancer cases in children ages 0-14, and which may be recognized by pain in the bone and joints, weakness, bleeding, and fever
- Brain and spinal cord cancers (21%), which in early stages may cause headaches, nausea, vomiting, blurred or double vision, dizziness, and difficulty in walking or handling objects
- Neuroblastoma (7.3%), a cancer of the sympathetic nervous system which can appear anywhere but usually occurs in the abdomen as a swelling
- Wilms tumor (5.9%), a kidney cancer which may be recognized by a swelling or lump in the abdomen
- Hodgkin lymphoma (4.4%) and non-Hodgkin lymphoma (4.0%), which involve the lymph nodes but which also may spread to bone marrow and other organs, and may cause swelling of lymph nodes in the neck, armpit, or groin; weakness; and fever
- Rhabdomyosarcoma (3.4%), the most common childhood soft tissue sarcoma, which can occur in the head and neck area, genitourinary area, trunk, and extremities, and may be recognized by pain
- Retinoblastoma (2.8%), an eye cancer, which usually occurs in children under age 4 and which, when detected early, may be cured with appropriate treatment
- Osteosarcoma (2.7%), a bone cancer which may cause no pain at first, in which local swelling is often the first sign
- Ewing sarcoma (1.8%), another type of cancer that usually arises in bone

Treatment: Childhood cancers can be treated by a combination of therapies chosen based on the specific type and stage of the cancer. Treatment is coordinated by a team of experts including pediatric oncologists, pediatric nurses, social workers, psychologists, and others who assist children and their families.

Survival: Five-year survival rates vary considerably, depending on the site: all sites, 78%; neuroblastoma, 68%; brain and central nervous system, 70%; bone and joint, 72%; acute lymphocytic leukemia, 85%; Wilms tumor (kidney), 91%; and Hodgkin lymphoma, 94%.

Colon and Rectum

New cases: An estimated 106,370 colon and 40,570 rectal cancer cases are expected to occur in 2004. Colorectal cancer is the third most common cancer both in men and in women. Incidence rates declined marginally by 3% per year during 1998-2000. Research suggests that these declines may in part be due to increased screening and polyp removal, preventing progression of polyps to invasive cancers.

Deaths: An estimated 56,730 deaths are expected to occur in 2004, accounting for about 10% of cancer deaths. Mortality rates continued to decline in both men and women over the past 15 years, at an average of 1.7% per year. This decrease reflects the decreasing incidence rates from the mid-1980s to the mid-1990s and improvements in survival.

Signs and symptoms: In its early stages, colorectal cancer usually causes no symptoms. Rectal bleeding, blood in the stool, a change in bowel habits, and cramping pain in the lower abdomen may signal advanced disease.

Risk factors: The primary risk factor for colorectal cancer is age, with more than 90% of cases diagnosed in individuals over the age of 50. A personal or family history of colorectal cancer or polyps or of inflammatory bowel disease increases colorectal cancer risk. Other risk factors include smoking, alcohol consumption, obesity, physical inactivity, a diet high in fat and/or red meat, as well as inadequate intake of fruits and vegetables. A recent study suggested that men and women who are overweight are more likely to die from colorectal cancer. Recent studies have also suggested that estrogen (with or without progestin) replacement therapy and nonsteroidal anti-inflammatory drugs, such as aspirin, may reduce colorectal cancer risk.

Early detection: Beginning at age 50, men and women who are at average risk for developing colorectal cancer should have one of the following: fecal occult blood test (FOBT) annually, following the recommended take-home method involving sampling stool from several

consecutive bowel movements; or flexible sigmoidoscopy every 5 years; or the combination of annual FOBT and flexible sigmoidoscopy every 5 years (this combination is preferred over either method alone); colonoscopy (if normal, repeat every 10 years); or double-contrast barium enema (if normal, repeat every 5 years). FOBT in the doctor's office following a digital rectal exam is not recommended. All non-colonoscopy positive tests should be followed up with colonoscopy. These tests offer the best opportunity to both detect colorectal cancer at an early stage when successful treatment is likely, and to prevent some cancers by detecting and removing polyps. People should speak with their doctor about beginning colorectal screening earlier and/or undergoing screening more often if they have a personal history of colorectal cancer or adenomatous polyps, a strong family history of colorectal cancer or polyps, a personal history of chronic inflammatory bowel disease, or if they are a member of a family with hereditary colorectal cancer syndromes.

Treatment: Surgery is the most common treatment for colorectal cancer. For cancers that have not spread, it is frequently curative. Chemotherapy or chemotherapy plus radiation (for rectal cancer) is given before or after surgery to most patients whose cancer has deeply penetrated the bowel wall or has spread to the lymph nodes. A permanent colostomy (creation of an abdominal opening for elimination of body wastes) is very rarely needed for colon cancer and is infrequently required for rectal cancer. Oxaliplatin in combination with 5-fluorouracil (5-FU) followed by leucovorin (LV) is a new chemotherapy regimen for persons with metastatic carcinoma of the colon or rectum. Adjuvant chemotherapy for colon cancer is equally effective and no more toxic in otherwise healthy patients age 70 and older than in younger patients.

Survival: The 1- and 5-year relative survival rates for persons with colon and rectum cancer are 83% and 62%, respectively. When colorectal cancers are detected at an early, localized stage, the 5-year relative survival rate is 90%; however, only 38% of colorectal cancers are discovered at this stage. After the cancer has spread regionally to involve adjacent organs or lymph nodes, the rate drops to 66%. The 5-year survival rate for persons with distant metastases is 9%. Survival continues to decline beyond five years to 57% at 10 years after diagnosis.

Leukemia

New cases: An estimated 33,440 new cases are expected in 2004, with slightly more acute (15,750) than chronic (12,790) leukemia cases. Although often thought of as primarily a childhood disease, leukemia is diagnosed 10 times more often in adults than in children. Acute lymphocytic leukemia accounts for approximately 78% (2,230/2,860) of the leukemia cases among children. In adults, the most common types are acute myeloid leukemia (approximately 11,920 cases) and chronic lymphocytic leukemia (approximately 8,190 cases). Incidence of leukemias has decreased by 0.2% per year in females since 1975, while it has remained stable in males.

Deaths: An estimated 23,300 deaths are expected to occur in 2004. Death rates have decreased in both males and females by about 0.3% per year.

Signs and symptoms: Symptoms may include fatigue, paleness, weight loss, repeated infections, fever, bruising easily, and nosebleeds or other hemorrhages. In children, these signs can appear suddenly. Chronic leukemia can progress slowly with few symptoms.

Risk factors: Leukemia affects both sexes and people of all ages. However, it more commonly occurs in males than in females. Persons with Down syndrome and certain other genetic abnormalities have higher incidence rates of leukemia. Cigarette smoking and exposure to certain chemicals such as benzene, a chemical present in gasoline and cigarette smoke, are risk factors for myeloid leukemia. Exposure to ionizing radiation is a risk factor for several types of leukemia. Leukemia also may occur as a side effect of cancer treatment. Certain leukemias and lymphomas are caused by a retrovirus, human T-cell leukemia/lymphoma virus-I (HTLV-I).

Early detection: Because symptoms often resemble those of other, less serious conditions, leukemia can be difficult to diagnose early. When a physician does suspect leukemia, diagnosis can be made using blood tests and bone marrow biopsy.

Treatment: Chemotherapy is the most effective method of treating leukemia. Various anticancer drugs are used, either in combinations or as single agents. Imatinib mesylate (Gleevec) is a highly specific new drug that has been approved by the FDA for the treatment of chronic myeloid (or myelogenous) leukemia, which affects about 4,600 people each year. Antibiotics and transfusions of blood components are used as supportive treatments. Under appropriate conditions, bone marrow transplantation may be useful in treating certain leukemias.

Survival: Survival rates in leukemia vary by type, ranging from 5-year survival rates of 19% for people with acute myeloid leukemia to 74% for people with chronic lymphocytic leukemia. There has been a dramatic

How to Estimate Cancer Statistics Locally, 2004

To obtain the estimated number of...	Multiply community population by: All Sites	Female Breast*	Colon & Rectum	Lung	Prostate*
New cancer cases	0.0048	0.0015	0.0005	0.0006	0.0016
Cancer deaths	0.0020	0.0003	0.0002	0.0006	0.0002
People who will eventually develop cancer	0.4111	0.1351	0.0567	0.0664	0.1728
People who will eventually die of cancer	0.2054	0.0303	0.0217	0.0531	0.0305

*For female breast cancer multiply by female population, and for prostate cancer multiply by male population.

Note: These calculations provide only a rough approximation of the number of people in a specific community who may develop or die of cancer. These estimates should be used with caution because they do not reflect the age or racial characteristics of the population, access to detection and treatment, or exposure to risk factors. State cancer registries count the number of cancers that occur in localities throughout the state. The American Cancer Society recommends using data from these registries, when it is available, to more accurately estimate local cancer statistics.

Data source: DEVCAN Software, Version 5.1; NCI, Surveillance, Epidemiology, and End Results Program, 1973-2000, Division of Cancer Control and Population Sciences, National Cancer Institute, 2003.

improvement in survival for people with acute lymphocytic leukemia from a 5-year relative survival rate of 38% in the mid-1970s to 64% in the mid-1990s. Survival rates for children with acute lymphocytic leukemia have increased from 58% to 88% over the same time period.

Lung and Bronchus

New cases: An estimated 173,770 new cases are expected in 2004, accounting for about 13% of cancer diagnoses. The incidence rate is declining significantly in men, from a high of 102.1 per 100,000 in 1984 to 79.8 in 2000. In the 1990s, the increase among women reached a plateau, with incidence at 52.8 per 100,000 in 1998.

Deaths: An estimated 160,440 deaths in 2004, accounting for about 28% of all cancer deaths, are expected to occur in 2004. Lung cancer is the leading cause of cancer death in both men and women. Death rates have continued to decline significantly in men since 1991 by about 1.8% per year. Female lung cancer death rates have continued to increase in both whites and African Americans, although the rate of increase has slowed since the early 1990s in both groups. Since 1987, more women have died each year of lung cancer than from breast cancer, which for the previous 40 years had been the major cause of cancer death in women. Decreasing lung cancer incidence and mortality rates reflect decreased smoking rates over the past 30 years. However, it is worth noting that decreasing smoking patterns among women lag behind those of men and that declines in adult tobacco use have slowed. Further, declines in lung cancer mortality in those under 45 years old have also slowed.

Signs and symptoms: Symptoms may include persistent cough, sputum streaked with blood, chest pain, and recurring pneumonia or bronchitis.

Risk factors: Cigarette smoking is by far the most important risk factor in the development of lung cancer. Other risk factors include occupational or environmental exposures to substances such as arsenic; some organic chemicals; radon and asbestos (particularly among smokers); radiation exposure from occupational, medical, and environmental sources; air pollution; tuberculosis; and for nonsmokers, environmental tobacco smoke.

Early detection: Early detection has not yet been demonstrated to improve survival. Chest x-ray, analysis of cells in sputum, and fiberoptic examination of the bronchial passages have shown limited effectiveness in early lung cancer detection. Newer tests, such as low-dose spiral computed tomography (CT) scans and molecular markers in sputum, can detect lung cancer earlier. The National Lung Screening Trial (NLST), a cancer screening clinical trial funded by the National Cancer Institute, will determine if screening individuals at high risk for lung cancer – before they have symptoms – with either spiral computed tomography (spiral CT) or standard chest x-ray can reduce lung cancer deaths.

Treatment: Treatment options are determined by the type (small cell, non-small cell) and stage of the cancer and include surgery, radiation therapy, and chemotherapy. For many localized cancers, surgery is usually the treatment of choice. Because the disease has usually spread by the time it is discovered, radiation therapy and chemotherapy are often used, sometimes in combination with surgery. Chemotherapy alone or combined with radiation is the treatment of choice for small cell lung cancer; on this regimen, a large percentage of patients experience remission, which in some cases is long lasting. Gefitinib (Iressa), a drug that blocks activity of growth factor receptors, is approved for advanced non-small cell lung cancer, and several similar targeted therapies are currently under study.

Probability of Developing Invasive Cancers Over Selected Age Intervals, by Sex, US, 1998-2000*

		Birth to 39 (%)	40 to 59 (%)	60 to 79 (%)	Birth to Death (%)
All Sites†	Male	1.36 (1 in 73)	8.03 (1 in 12)	33.92 (1 in 3)	44.77 (1 in 2)
	Female	1.92 (1 in 52)	9.01 (1 in 11)	22.61 (1 in 4)	38.03 (1 in 3)
Bladder‡	Male	.02 (1 in 4603)	.40 (1 in 250)	2.36 (1 in 42)	3.46 (1 in 29)
	Female	.01 (1 in 9557)	.12 (1 in 831)	.64 (1 in 157)	1.10 (1 in 91)
Breast	Female	.44 (1 in 229)	4.14 (1 in 24)	7.53 (1 in 13)	13.36 (1 in 7)
Colon & rectum	Male	.06 (1 in 1678)	.86 (1 in 116)	3.94 (1 in 25)	5.88 (1 in 17)
	Female	.06 (1 in 1651)	.67(1 in 150)	3.05 (1 in 33)	5.49 (1 in 18)
Leukemia	Male	.15 (1 in 649)	.20 (1 in 495)	.82 (1 in 122)	1.45 (1 in 70)
	Female	.13 (1 in 789)	.14 (1 in 706)	.46 (1 in 219)	1.00 (1 in 100)
Lung & bronchus	Male	.03 (1 in 3439)	1.02 (1 in 98)	5.80 (1 in 17)	7.69 (1 in 13)
	Female	.03 (1 in 3046)	.79 (1 in 126)	3.93 (1 in 25)	5.73 (1 in 17)
Melanoma of skin	Male	.12 (1 in 809)	.49 (1 in 205)	.97 (1 in 103)	1.81 (1 in 55)
	Female	.19 (1 in 532)	.39 (1 in 255)	.51 (1 in 197)	1.22 (1 in 82)
Non-Hodgkin lymphoma	Male	.14 (1 in 739)	.45 (1 in 224)	1.27 (1 in 79)	2.10 (1 in 48)
	Female	.08 (1 in 1258)	.30 (1 in 332)	.98 (1 in 102)	1.76 (1 in 57)
Prostate	Male	.01 (1 in 12833)	2.28 (1 in 44)	14.20 (1 in 7)	17.15 (1 in 6)
Uterine cervix	Female	.16 (1 in 632)	.31 (1 in 322)	.27 (1 in 368)	.78 (1 in 128)
Uterine corpus	Female	.05 (1 in 1832)	.69 (1 in 144)	1.57 (1 in 64)	2.60 (1 in 38)

*For those free of cancer at beginning of age interval. Based on cancer cases diagnosed during 1998-2000. 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 carcinomas except urinary bladder. ‡Includes invasive and in situ cancer cases.

Source: DEVCAN: Probability of Developing or Dying of Cancer Software, Version 5.1. Statistical Research and Applications Branch, National Cancer Institute, 2003. http://srab.cancer.gov/devcan

American Cancer Society, Surveillance Research, 2004

Survival: The 1-year relative survival rate for lung cancer has increased from 37% in 1975 to 42% in 1999, largely due to improvements in surgical techniques. However, the 5-year relative survival rate for all stages combined is only 15%. The survival rate is 49% for cases detected when the disease is still localized. Only 16% of lung cancers are diagnosed at this early stage.

Lymphoma

New cases: An estimated 62,250 new cases of lymphoma will occur in 2004, including 7,880 cases of Hodgkin disease and 54,370 cases of non-Hodgkin lymphoma (NHL). Since the early 1970s, incidence rates for NHL have nearly doubled. However, incidence rates stabilized in the 1990s, due primarily to the decline in AIDS-related NHL. Overall, incidence rates for Hodgkin disease have declined significantly since the late 1980s at a rate of 0.9% per year.

Deaths: An estimated 20,730 deaths will occur in 2004 (Hodgkin disease, 1,320; non-Hodgkin lymphoma, 19,410).

Signs and symptoms: Symptoms may include enlarged lymph nodes, itching, fever, night sweats, fatigue, and weight loss, and intermittent fever.

Risk factors: Risk factors are largely unknown, but in part, involve reduced immune function and exposure to certain infectious agents, as well as age. Persons with organ transplants are at higher risk due to altered immune function. Human immunodeficiency virus (HIV) and human T-cell leukemia/lymphoma virus-I (HTLV-I) are associated with increased risk of non-Hodgkin lymphoma. Other possible risk factors include occupational exposures to herbicides and perhaps other chemicals. In Africa, Burkitt lymphoma is partly caused by the Epstein-Barr virus. A recent study suggested that men and women who are overweight are more likely to die from non-Hodgkin lymphoma.

Treatment: Hodgkin disease: Chemotherapy alone or with radiotherapy is useful for most patients. Non-Hodgkin lymphoma: In the localized stage, lymph node disease can be treated with radiotherapy. Patients with later-stage disease are treated with chemotherapy or with chemotherapy plus radiation, depending on the specific type of non-Hodgkin lymphoma. Highly specific monoclonal antibodies directed at lymphoma cells, high-dose chemotherapy with bone marrow transplantation, or low-dose chemotherapy with bone marrow transplantation (called non-myeloablative) are used if non-Hodgkin lymphoma persists or recurs after standard treatment.

Survival: Survival rates vary widely by cell type and stage of disease. The 1-year relative survival rates for Hodgkin disease and non-Hodgkin lymphoma are 91% and 77%,

respectively; the 5-year rates are 84% and 56%. Ten years after diagnosis, the relative survival rates for Hodgkin and non-Hodgkin disease decline to 76% and 42%.

Oral Cavity and Pharynx

New cases: An estimated 28,260 new cases are expected in 2004. Incidence rates are more than twice as high in men as in women and are greatest in men who are over age 50. Incidence rates for cancer of the oral cavity and pharynx continued to decline in the 1990s in African American and white males and females.

Deaths: An estimated 7,230 deaths from oral cavity and pharynx cancer are expected in 2004. Death rates have been decreasing since the late 1970s, with rates declining faster in the 1990s.

Signs and symptoms: Symptoms may include a sore that bleeds easily and does not heal; a lump or thickening; and a red or white patch that persists. Difficulties in chewing, swallowing, or moving tongue or jaws are often late symptoms.

Risk factors: Cigarette, cigar, or pipe smoking; use of smokeless tobacco; and excessive consumption of alcohol are risk factors.

Early detection: Cancer can affect any part of the oral cavity, including the lip, tongue, mouth, and throat. Dentists and primary care physicians can identify abnormal changes in oral tissues and detect cancer at an early, curable stage.

Treatment: Radiation therapy and surgery are standard treatments. In advanced disease, chemotherapy may be useful as an adjunct to surgery and/or radiation.

Survival: For all stages combined, about 84% of persons with oral cavity and pharynx cancer survive 1 year after diagnosis. The 5-year and 10-year relative survival rates are 57% and 45%, respectively.

Ovary

New cases: An estimated 25,580 new cases are expected in the United States in 2004. Ovarian cancer accounts for nearly 4% of all cancers among women and ranks second among gynecologic cancers, following cancer of the uterine corpus. During 1989-2000, ovarian cancer incidence declined at a rate of 0.7% per year. The decline was greater in women 65 years and older.

Deaths: An estimated 16,090 deaths are expected in 2004. Ovarian cancer causes more deaths than any other cancer of the female reproductive system.

Signs and symptoms: The most common sign is enlargement of the abdomen, which is caused by accumulation of fluid. Abnormal vaginal bleeding is rarely a symptom. In women over 40, vague digestive disturbances (stomach discomfort, gas, distention) that persist and cannot be explained by any other cause may indicate the need for an evaluation for ovarian cancer, including a thorough pelvic examination.

Risk factors: Risk for ovarian cancer increases with age and peaks in the late 70s. Increased death rate from ovarian cancer has been associated with increased body weight. Women who have never had children are more likely to develop ovarian cancer than those who have. Pregnancy, tubal ligation, and the use of oral contraceptives appear to reduce the risk of developing ovarian cancer, while the use of estrogen alone as postmenopausal hormone therapy increases risk. Women who have had breast cancer or who have a family history of breast or ovarian cancer are at increased risk. Mutations in BRCA1 or BRCA2 have been observed in some of these families. Recent studies suggested that preventive surgery to remove the ovaries and fallopian tubes can decrease the risk of ovarian cancers and other gynecologic cancers in women with BRCA1 and BRCA2 mutations. Another genetic syndrome, hereditary nonpolyposis colon cancer (HNPCC), also has been associated with endometrial and ovarian cancer. Ovarian cancer incidence rates are highest in industrialized countries other than Japan.

Early detection: Routine screening for women at average risk is not recommended because no accurate screening tests are available. The pelvic examination, which can detect a variety of gynecologic disorders, can only occasionally detect ovarian cancer, and generally only when the cancer is already in its advanced stages. However, the combination of a thorough pelvic exam, transvaginal ultrasound, and a blood test for the tumor marker CA125 should be offered to women who are at high risk and women who have symptoms. In women at average risk, transvaginal ultrasound and the tumor marker CA125 may help in diagnosis but are not used for routine screening. Research on specific patterns of proteins in the blood may lead to more sensitive screening tests in the future.

Treatment: Surgery, radiation therapy, and chemotherapy are treatment options. Surgery usually includes the removal of the uterus (hysterectomy), and one or both ovaries and fallopian tubes (salpingo-oophorectomy). In some very early tumors, only the involved ovary will be removed, especially in young women who wish to have children. In advanced disease, an attempt is made to remove all intra-abdominal disease to enhance the effect of chemotherapy.

Survival: Survival varies by age; women younger than 65 are about twice as likely to survive 5 years following diagnosis than women 65 and older, 66% and 33%, respectively. Overall, about 78% of new ovarian cancer patients survive 1 year after diagnosis; the 5-year relative survival rate for all stages is 53%. If diagnosed at the localized stage, the 5-year survival rate is 95%; however, only about 29% of all cases are detected at that stage. Five-year relative survival rates for women with regional and distant disease are 72% and 31%, respectively.

Pancreas

New cases: An estimated 31,860 new cases are expected to occur in the United States in 2004. Over the past 15 to 25 years, incidence rates of pancreatic cancer have declined slowly in both men and women.

Deaths: An estimated 31,270 deaths are expected to occur in 2004. The death rate from pancreatic cancer has continued to decline since the 1970s in men, while it has leveled off in women, after increasing from 1975 to 1984.

Signs and symptoms: Cancer of the pancreas generally develops without early symptoms. Tumors that develop near the common bile duct may cause blockage leading to jaundice (yellowing of the skin and eyes due to pigment accumulation). Sometimes this symptom allows the tumor to be diagnosed at an early stage.

Risk factors: Cigarette and cigar smoking increase the risk of pancreatic cancer; incidence rates are more than twice as high for smokers as for nonsmokers. Risk also appears to increase with obesity, physical inactivity, chronic pancreatitis, diabetes, and cirrhosis. Pancreatic cancer rates are higher in countries whose populations eat a diet high in fat. Rates are slightly higher in males than in females.

Early detection: At present, only biopsy yields a certain diagnosis. Because of the "silent" early course of the disease, the need for biopsy may become obvious only with advanced disease. Researchers are focusing on ways to diagnose pancreatic cancer before symptoms occur.

Treatment: Surgery, radiation therapy, and chemotherapy are treatment options that can extend survival and/or relieve symptoms in many patients, but they seldom produce a cure. Clinical trials with several new agents may offer improved survival and should be considered an option.

Survival: For all stages combined, the 1-year relative survival rate is 24%, and the 5-year rate is about 4%. Even for those people diagnosed with local stage disease, the 5-year relative survival rate is only 17%.

Prostate

New cases: An estimated 230,110 new cases will occur in the US during 2004. Prostate cancer incidence rates remain significantly higher in African American men than in white men. Between 1988 and 1992, prostate cancer incidence rates increased dramatically due to earlier diagnosis because of prostate-specific antigen (PSA) blood testing. Prostate cancer incidence rates subsequently declined and then increased at a less rapid rate since 1995 due to an increasing rate in men younger than 65. In the elderly, however, rates have leveled off. Rates peaked in 1992 among white men (237.1 per 100,000 persons) and in 1993 among African American men (340.6 per 100,000 persons).

Deaths: With an estimated 29,900 deaths in 2004, prostate cancer is the second leading cause of cancer death in men. Although death rates have been declining among white and African American men since the early 1990s, rates in African American men remain more than twice as high as rates in white men.

Signs and symptoms: Early prostate cancer usually has no symptoms. With more advanced disease, individuals may experience weak or interrupted urine flow; inability to urinate, or difficulty starting or stopping the urine flow; the need to urinate frequently, especially at night; blood in the urine; pain or burning on urination; or continual pain in lower back, pelvis, or upper thighs. Most of these symptoms are nonspecific and are similar to those caused by benign conditions.

Risk factors: The only well-established risk factors for prostate cancer are age, ethnicity, and family history of the disease. More than 70% of all prostate cancer cases are diagnosed in men over age 65. African American men and Jamaican men of African descent have the highest prostate cancer incidence rates in the world; the disease is common in North America and northwestern Europe and is rare in Asia and South America. Recent genetic studies suggest that strong familial predisposition may be responsible for 5%-10% of prostate cancers. International studies suggest that dietary fat may also be a risk factor. A recent study suggests that the risk of dying from prostate cancer increases with increased body weight.

Early detection: The prostate-specific antigen (PSA) blood test, used to detect a substance made by the prostate called prostate-specific antigen, and the digital rectal examination should be offered annually beginning at age 50 to men who have a life expectancy of at least 10 years. Men at high risk (African Americans and men who have a first-degree relative diagnosed with prostate

Five-Year Relative Survival Rates* by Stage at Diagnosis, 1992-1999

Site	All Stages %	Local %	Regional %	Distant %	Site	All Stages %	Local %	Regional %	Distant %
Breast (female)	86.6	97.0	78.7	23.3	Ovary	53.0	94.7	72.0	30.7
Colon & rectum	62.3	90.1	65.5	9.2	Pancreas	4.4	16.6	6.8	1.6
Esophagus	14.0	29.1	13.1	2.2	Prostate†	97.5	100.0	–	34.0
Kidney	62.6	89.9	60.0	9.1	Stomach	22.5	59.0	21.7	2.5
Larynx	64.7	82.6	47.9	20.0	Testis	95.5	99.1	95.0	73.1
Liver	6.9	16.3	6.0	1.9	Thyroid	95.8	99.3	95.5	59.9
Lung & bronchus	14.9	48.7	16.0	2.1	Urinary bladder	81.8	94.4	48.2	5.8
Melanoma	89.6	96.7	60.1	13.8	Uterine cervix	71.3	92.2	50.9	16.5
Oral cavity	57.2	82.1	47.9	26.1	Uterine corpus	84.4	96.2	64.7	26.0

*Rates are adjusted for normal life expectancy and are based on cases diagnosed from 1992-1999, followed through 2000. †The rate for local stage represents local and regional stages combined.

Local: An invasive malignant cancer confined entirely to the organ of origin. **Regional:** A malignant cancer that 1) has extended beyond the limits of the organ of origin directly into surrounding organs or tissues; 2) involves regional lymph nodes by way of lymphatic system; or 3) has both regional extension and involvement of regional lymph nodes. **Distant:** A malignant cancer that has spread to parts of the body remote from the primary tumor either by direct extension or by discontinuous metastasis to distant organs, tissues, or via the lymphatic system to distant lymph nodes.

Source: Surveillance, Epidemiology, and End Results Program, 1973-2000, Division of Cancer Control and Population Sciences, National Cancer Institute, Bethesda, MD, 2003.

American Cancer Society, Surveillance Research, 2004

cancer at a young age) should begin testing at age 45. Individuals should be given information about the benefits and limitations of testing so that they can make an informed decision.

Treatment: Treatment options vary, depending on age, stage of the cancer, and other medical conditions of the individual, and should be discussed with the individual's physician. Surgery and radiation may be used for early-stage disease. Hormonal therapy, chemotherapy, and radiation (or combinations of these treatments) are used for metastatic disease and as supplemental or additional therapies for early-stage disease. Hormone treatment may control prostate cancer for long periods by shrinking the size of the tumor, thus relieving pain and other symptoms. Careful observation without immediate active treatment ("watchful waiting") may be appropriate for older individuals with limited life expectancy and/or less aggressive tumors.

Survival: Eighty-six percent of all prostate cancers are discovered in the local and regional stages; the 5-year relative survival rate for patients whose tumors are diagnosed at these stages is 100%. Over the past 20 years, the 5-year survival rate for all stages combined has increased from 67% to 98%. According to the most recent data, relative 10-year survival is 84%, and 15-year survival is 56%.

Skin

New cases: More than 1 million cases of basal cell or squamous cell cancers occur annually. Most, but not all, of these forms of skin cancer are highly curable. The most serious form of skin cancer is melanoma, which is expected to be diagnosed in about 55,100 persons in 2004. During the 1970s, the incidence rate of melanoma increased rapidly at about 6% per year. Since 1981, however, the rate of increase has slowed to a little less than 3% per year. Melanoma is primarily a disease of whites, and rates are more than 10 times higher in whites than in African Americans. In addition to basal cell and squamous cell carcinomas and melanoma, other important forms of skin cancer include Kaposi sarcoma, which commonly occurred among patients with AIDS prior to the introduction of protease inhibitors, and cutaneous T-cell lymphoma.

Deaths: An estimated 10,250 deaths, 7,910 from melanoma and 2,340 from other non-epithelial skin cancers will occur this year. After increasing for several decades, melanoma mortality has stabilized since 1998 in white men. Among white women, it has stabilized since 1988.

Signs and symptoms: Symptoms may include any change on the skin, such as a new spot or one that changes in size, shape, or color; a sore that doesn't heal; a mole or other darkly pigmented growth or spot on the skin that changes; scaliness, oozing, bleeding, or change in the appearance of a bump or nodule; the spread of pigmentation beyond its border; and a change in sensation, itchiness, tenderness, or pain.

Risk factors: Risk factors vary for different types of skin cancer. For melanoma, major risk factors include a prior melanoma, one or more family members who had melanoma, and moles (especially if there are many, or if they are unusual, or large). Other risk factors for all types

Trends in Five-Year Relative Survival Rates*(%) by Race and Year of Diagnosis, US, 1974-1999

Site	Relative Five-Year Survival Rate (%)								
	White			African American			All Races		
	1974-76	1983-85	1992-99	1974-76	1983-85	1992-99	1974-76	1983-85	1992-99
All cancers	51	54	64†	39	40	53†	50	53	63†
Brain	22	26	32†	27	32	39†	22	27	33†
Breast (female)	75	79	88†	63	64	74†	75	78	87†
Cervix uterine	70	71	73†	64	61	61	69	69	71†
Colon	51	58	63†	46	49	53†	50	58	62†
Corpus uterine	89	85	86†	62	55	60	88	83	84†
Esophagus	5	9	15†	4	6	9†	5	8	14†
Hodgkin disease	72	79	85†	69	77	78†	71	79	84†
Kidney	52	56	63†	49	55	61†	52	56	63†
Larynx	66	69	67	60	55	53	66	67	65
Leukemia	35	42	48†	31	34	39	34	41	46†
Liver	4	6	7†	1	4	5†	4	6	7†
Lung & bronchus	13	14	15†	11	11	12†	13	14	15†
Melanoma of the skin	81	85	90†	67‡	74§	64‡	80	85	90†
Multiple myeloma	24	27	31†	28	31	33	24	28	32†
Non-Hodgkin lymphoma	48	54	57†	49	45	47	47	54	56†
Oral cavity	55	55	60†	36	35	36	54	53	57†
Ovary	37	40	52†	41	42	52†	37	41	53†
Pancreas	3	3	4†	3	5	4	3	3	4†
Prostate	68	76	98†	58	64	93†	67	75	98†
Rectum	49	56	62†	42	44	53†	49	55	62†
Stomach	15	16	21†	17	19	21	15	17	23†
Testis	79	91	96†	76‡	88‡	87	79	91	96†
Thyroid	92	93	96†	88	92	94	92	94	96†
Urinary bladder	74	78	83†	48	60	64†	73	78	82†

*Survival rates are adjusted for normal life expectancy and are based on cases diagnosed from 1974-1976, 1983-1985, and 1992-1999, and followed through 2000. †The difference in rates between 1974-1976 and 1992-1999 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, 1973-2000, Division of Cancer Control and Population Sciences, National Cancer Institute, Bethesda, MD, 2003.

American Cancer Society, Surveillance Research, 2004

of skin cancer include sun sensitivity (sunburn easily; difficulty tanning; natural blonde or red hair color); a history of excessive sun exposure, including sunburns; exposure to tanning booths and to diseases that suppress the immune system; a past history of basal cell or squamous cell skin cancers; and occupational exposure to coal tar, pitch, creosote, arsenic compounds, or radium.

Prevention: Limit or avoid exposure to the sun during the midday hours (10 a.m.- 4 p.m.). When outdoors, wear a hat that shades the face, neck, and ears, and a long-sleeved shirt and long pants. Wear sunglasses to protect the skin around the eyes. Use a sunscreen with a sun protection factor (SPF) of 15 or higher. Because severe sunburns in childhood may greatly increase risk of melanoma in later life, children, in particular, should be protected from the sun.

Early detection: Recognizing changes in skin growths or the appearance of new growths is the best way to find skin cancer early. Adults should practice skin self-examination regularly. Suspicious lesions should be evaluated promptly by a physician. Basal and squamous cell skin cancers often take the form of a pale, waxlike, pearly nodule, or a red, scaly, sharply outlined patch. A sudden or progressive change in a lesion's appearance should be checked by a physician. Melanomas often start as small, mole-like growths that increase in size and change color. A simple ABCD rule outlines the warning signals of the most common type of melanoma: **A** is for asymmetry: one half of the mole does not match the other half; **B** is for border irregularity: the edges are ragged, notched, or blurred; **C** is for color: the pigmentation is not uniform, with variable degrees of tan, brown, or black; **D** is for diameter greater than 6 millimeters. Any sudden or progressive increase in size should be of concern.

Treatment: Early-stage basal and squamous cell cancers can be removed in 90% of cases by surgical excision, electrodessication and curretage (tissue destruction by

heat), cryosurgery (tissue destruction by freezing), and laser therapy. Radiation therapy is also an option in some cases. For malignant melanoma, the primary growth must also be adequately excised, and in some cases, it may be necessary to remove one or more nearby lymph nodes for staging. Removal and microscopic examination of all suspicious moles is essential. Advanced cases of melanoma are treated with immunotherapy or chemotherapy.

Survival: For basal cell or squamous cell cancers, a cure is highly likely if detected and treated early. Melanoma can spread to other parts of the body quickly. When detected in its earliest stages and treated properly, however, it is highly curable. The 5-year relative survival rate for persons with melanoma is 90%. For localized melanoma, the 5-year relative survival rate is 97%; survival rates for regional and distant stage diseases are 60% and 14%, respectively. About 82% of melanomas are diagnosed at a localized stage.

Urinary Bladder

New cases: An estimated 60,240 new cases are expected to occur in 2004. Bladder cancer incidence rates among men and women combined leveled off from 1987 to 2000, after increasing by 0.7% per year from 1975 to 1987. Overall, bladder cancer incidence is about four times higher in men than in women, and 1.5 times higher in whites than in African Americans.

Deaths: An estimated 12,710 deaths will occur in 2004. Mortality rates among African Americans have continued to decrease since the 1970s, while rates among whites have stabilized since the late 1980s.

Signs and symptoms: Symptoms may include blood in the urine and increased frequency of urination.

Risk factors: Smoking is the greatest risk factor for bladder cancer. Smokers experience twice the risk of nonsmokers. Smoking is estimated to be responsible for about 48% of bladder cancer deaths among men and 28% among women. People living in urban areas and workers in dye, rubber, or leather industries also have a higher risk.

Early detection: Bladder cancer is diagnosed by examination of cells in the urine and examination of the bladder wall with a cystoscope, a slender tube fitted with a lens and light that can be inserted through the urethra. These tests are not recommended for screening people at average risk, but are used for people at increased risk due to occupational exposure, or for follow up after bladder cancer treatment to detect recurrence or secondary tumors.

Treatment: Surgery, alone or in combination with other treatments, is used in more than 90% of cases. Superficial, localized cancers may also be treated by administering immunotherapy or chemotherapy directly into the bladder. Chemotherapy alone or with radiation before cystectomy (bladder removal) has improved some treatment results.

Survival: For all stages combined, the 5-year relative survival rate is 82%.When diagnosed at a localized stage, the 5-year relative survival rate is 94%; 74% of cancers are detected at this early stage. For regional and distant stages, 5-year relative survival rates are 48% and 6%, respectively. Beyond 5 years, survival continues to decline, with 74% of patients surviving 10 years after diagnosis and 68% surviving 15 years.

Uterine Cervix

New cases: An estimated 10,520 cases of invasive cervical cancer are expected to be diagnosed in 2004. Incidence rates have decreased steadily over the past several decades in both white and African American women. In 1996-2000, the average annual incidence rate in African American women (12.7 per 100,000) was higher than in white women (8.0 per 100,000). As Pap screening has become more prevalent, pre-invasive lesions of the cervix are detected far more frequently than invasive cancer.

Deaths: An estimated 3,900 cervical cancer deaths are expected in 2004. Mortality rates have declined sharply over the past several decades.

Signs and symptoms: Symptoms usually do not appear until abnormal cervical cells become cancerous and invade nearby tissue. When this happens, the most common symptom is abnormal vaginal bleeding. Bleeding may start and stop between regular menstrual periods, or it may occur after sexual intercourse, douching, or a pelvic exam. Menstrual bleeding may last longer and be heavier than usual. Bleeding after menopause or increased vaginal discharge also may be symptoms.

Risk factors: Cervical cancer risk is closely linked to sexual behavior and to sexually transmitted infections with several strains of human papilloma virus. Women who have sex at an early age, who have many sexual partners, or who have partners who have had many sexual partners are at higher risk of developing the disease. Cigarette smoking increases cervical cancer risk. A recent study suggested that women who are overweight are more likely to die from cervical cancer.

Early detection: The Pap test is a simple procedure that can be performed by a health care professional as part of

a pelvic exam. A small sample of cells is collected from the cervix and examined under a microscope. Pap tests are good, but not perfect. Their results sometimes appear normal even when a woman has abnormal cells of the cervix. Fortunately, most cervical precancers grow slowly. The American Cancer Society recommends cervical cancer screening should begin approximately 3 years after a woman begins having vaginal intercourse, but no later than 21 years of age. It should be done every year with regular Pap tests or every two years using liquid-based tests. At or after age 30, women who have had 3 normal test results in a row may get screened every 2-3 years. But doctors may suggest getting the test more often if a woman has certain risk factors such as HIV infection or a weak immune system. Women 70 years of age and older who have had 3 or more normal Pap tests and no abnormal Pap tests in the last 10 years may choose to stop cervical cancer screening. Screening after total hysterectomy (with removal of the cervix) is not necessary unless the surgery was done as a treatment for cervical cancer or precancer. Women who have had a hysterectomy without removal of the cervix should continue cervical cancer screening at least until age 70.

Treatment: For pre-invasive lesions, changes in the cervix may be treated by electrocoagulation (the destruction of tissue through intense heat by electric current), cryotherapy (the destruction of cells by extreme cold), or laser ablation, or by local surgery. Invasive cervical cancers generally are treated by surgery or radiation, or both, as well as chemotherapy in some cases.

Survival: Survival for persons with pre-invasive lesions is nearly 100%. Ninety percent of cervical cancer patients survive 1 year after diagnosis, and 71% survive 5 years. When detected at an early stage, invasive cervical cancer is one of the most successfully treated cancers with a 5-year relative survival rate of 92% for localized cancers. Whites are more likely than African Americans to have their cancers diagnosed at this early stage. Fifty-six percent of invasive cervical cancers among white women and 47% of cancers among African American women are diagnosed at a localized stage.

Uterine Corpus (Endometrium)

New cases: An estimated 40,320 cases of cancer of the uterine corpus (body of the uterus), usually in the endometrium or lining of the uterus, are expected to be diagnosed in 2004. After increasing from 1988 to 1998, incidence rates of endometrial cancer leveled off through 2000. Incidence rates are higher among white women (26.5 per 100,000) than African Americans (17.8 per 100,000).

Deaths: An estimated 7,090 deaths are expected in 2004. Although incidence rates are higher among white women than African American women, the relationship is reversed for mortality rates. African American women have mortality rates that are nearly twice as high as rates among white women (7.0 compared to 3.8 per 100,000).

Signs and symptoms: Abnormal uterine bleeding or spotting is a frequent early sign. Pain and systemic symptoms are late signs.

Risk factors: High cumulative exposure to estrogen is the major risk factor for endometrial cancer, the most common type of cancer of the uterine corpus. Factors that increase estrogen exposure include estrogen replacement therapy, tamoxifen, early menarche, late menopause, never having children, a history of failure to ovulate, and obesity. Progesterone plus estrogen replacement therapy (called hormone replacement therapy, or HRT) is believed to largely offset the increased risk related to using only estrogen. Research has not implicated estrogen exposures in the development of other types of uterine corpus cancer, which are more aggressive and have a poorer prognosis. Other risk factors for uterine corpus cancer include infertility and hereditary nonpolyposis colon cancer (HNPCC). A recent study suggests that women who are overweight are more likely to die from endometrial cancer. Pregnancy and the use of oral contraceptives appear to provide protection against endometrial cancer.

Early detection: Most endometrial cancer is diagnosed at an early stage because of post-menopausal bleeding. All women are encouraged to report any unexpected bleeding or spotting to their physicians. Annual screening for endometrial cancer with endometrial biopsy beginning at age 35 should be offered to women with or at risk for HNPCC.

Treatment: Uterine corpus cancers are usually treated with surgery, radiation, hormones, and/or chemotherapy, depending on the stage of disease.

Survival: The 1-year relative survival rate for endometrial cancer is 94%. The 5-year relative survival rate is 96%, 65%, and 26%, if the cancer is diagnosed at local, regional, and distant stages, respectively. Relative survival rates for whites exceed those for African Americans by about 15 percentage points at every stage.

Special Section: Cancer Disparities

Introduction

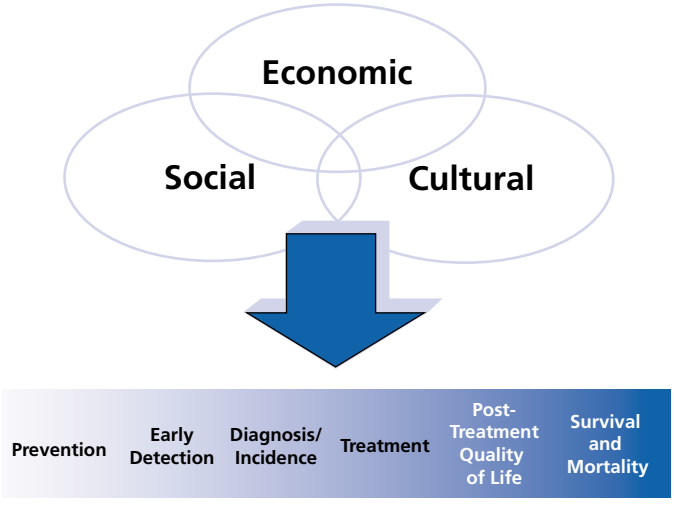
Eliminating disparities in the cancer burden is one of the overarching themes of the American Cancer Society's 2015 Challenge Goals. The goals, established by the Society's Board of Directors, include reducing cancer incidence and mortality and increasing cancer survival in socioeconomically disadvantaged people to levels comparable to the general population.[1] The US Department of Health and Human Services (DHHS) Healthy People 2010 initiative also commits the nation to the goal of eliminating health disparities.[2]

In 1991, Dr. Samuel Broder, then director of the US National Cancer Institute (NCI), declared, "Poverty is a carcinogen."[3] His statement acknowledged the complex interaction of economic, social, and cultural factors that influence individual and community health. Poor and medically underserved populations have higher risks of developing cancer and poorer chances of early diagnosis, optimal treatment, and survival. Moreover, they have not benefited equally from recent improvements in cancer prevention, early detection, and treatment.

The goal of reducing and ultimately eliminating the unequal cancer burden is ambitious, even for the collective resources of federal, state, and private health organizations; the gap in cancer mortality between African Americans and whites and between low- and high-poverty counties has widened rather than narrowed in the United States over the last 25 years.[4,5]

This special section discusses the current state of cancer-related disparities that affect millions of Americans. Its purpose is to stimulate concerted action on the part of communities, policymakers, and private and governmental health agencies to reduce and ultimately eliminate inequities in the cancer burden.

Figure 1. Factors That Influence Cancer Disparities



Source: Adapted from: Freeman, HP; Commentary on the meaning of race in science and society. *Cancer Epidemiol Biomarkers Prev* 2003;12:232S-6S and Institute of Medicine, 2003.[6]

What Is Meant by Cancer Disparities?

Many different demographic and socioeconomic characteristics are associated with health-related disparities. These include income, race/ethnicity, culture, geography (urban/rural), age, sex, sexual orientation, literacy, and other factors. In 2003, the Institute of Medicine (IOM) published a comprehensive review of racial and ethnic disparities in health care.[6] The IOM report, and other authoritative reviews,[7] describe a model in which health care disparities arise from a complex interplay of economic, social, and cultural factors (Figure 1). Poverty is the most critical factor affecting health and longevity.[8] Socioeconomic status influences the prevalence of underlying risk factors for cancer (such as tobacco use and obesity), access to appropriate early detection and cancer treatment, general medical care, and palliative care. Social inequities, such as the legacy of racial discrimination in the United States, can still influence the interactions between patients and physicians, as noted in the IOM report.[6] Cultural factors, including language, beliefs, values, and traditions, can influence underlying risk factors, health behaviors, beliefs about illness, and approaches to medical care.[6,7]

This report focuses on cancer disparities by race/ethnicity and area socioeconomic status (poverty rate by county). We describe disparities for the four most common cancer sites (lung and bronchus, colon and rectum, female breast, and prostate) and three additional sites (uterine cervix, stomach, and liver) that show large variations by race and ethnicity. Together, these sites comprise 60% of new cases and 56.3% of deaths predicted to occur in the United States in 2004. We focus on disparities in common cancer sites and broad population groups because these can be measured more accurately and have the largest impact on the Society's mission to reduce cancer incidence and mortality. We highlight differences in cancer risk factors, screening, stage at diagnosis, and treatment between population groups that could be reduced or possibly eliminated by applying current knowledge about cancer prevention,

early detection, and treatment equally to all segments of the population.

Much of the data presented in this report comes from the Surveillance, Epidemiology and End Results Program (SEER), Division of Cancer Control and Population Sciences, National Cancer Institute, which provides data on cancer incidence, mortality, stage at diagnosis, and survival for whites and African Americans from 1975 to 2000, and for Hispanic/Latino, American Indian and Alaska Native, and Asian American and Pacific Islander populations from 1992 to 2000.[5] Data on cancer occurrence by area socioeconomic status were obtained from a recently published SEER Monograph: "Area Socioeconomic Variations in US Cancer Incidence, Mortality, Stage, Treatment, and Survival, 1975-1999."[4] In the monograph, the poverty rate is defined by the percentage of the population below the poverty level, a threshold that varies by size and age composition of the household ($12,674 for a four-person household in 1990). Poverty rate was analyzed in three categories: low (<10%), middle (10-19.9%), and high (≥20%). In this document, we refer to areas with a <10% poverty rate as "affluent" and those with a ≥20% poverty rate as "poorer."

Data on behavioral risk factors and use of cancer screening tests are obtained from the National Health Interview Survey 2000, a population-based survey conducted annually by the National Center for Health Statistics, Centers for Disease Control and Prevention.[9] Some population surveys provide information for Asian Americans and Pacific Islanders combined, some for the two groups separately, and some for Asian Americans alone (often due to the small number of Pacific Islanders). Other details on methods, such as age-adjustment, can be found in the "Sources of Statistics" section at the end of *Cancer Facts & Figures 2004* (page 54).

Disparities in Cancer Mortality, Survival, and Incidence

- African Americans have the highest death rate from all cancer sites combined and from malignancies of the lung and bronchus, colon and rectum, female breast, prostate, and uterine cervix of all racial or ethnic groups in the US. The death rate from cancer among African American males is 1.4 times higher than that among white males; for African American females, it is 1.2 times higher (Table 1).[5]
- Across all racial and ethnic groups, the 5-year survival rate is more than 10% higher for persons who live in affluent census tracts (less than 10% of the population below the poverty line) than for persons who live in poorer census tracts (more than 20% of the population below the poverty line) (Figure 2). However, even when county poverty level is accounted for, African American, American Indian and Alaska Native, and Asian American and Pacific Islander men and African American and American Indian and Alaska Native women have lower 5-year survival rates than non-Hispanic whites.[4]
- Disparities for some subgroups within racial and ethnic groups are even greater than indicated by these broad categories. For example, the incidence rate for invasive cervical cancer, which is largely preventable by screening, is four times as high among Vietnamese women compared to all Asian American and Pacific Islander populations combined.[10] Cancer incidence rates among American Indian populations have historically been collected systematically only in the Southwest and may underestimate the cancer experience of Alaskan Natives or American Indians residing in other geographic areas.

Trends in Cancer Disparities

- The gap in cancer mortality (all sites) between African American and white males widened from 1975 until the early 1990s. The gap has subsequently narrowed but remains larger than it was in 1975. A similar pattern was observed for African American and white women (Figure 3). Cancer sites contributing to these gaps were colorectal and breast cancer in women and colorectal and prostate cancer in men (Figure 3).[5]
- For all cancer sites combined in 1975, total male cancer mortality was 2% higher in poorer compared to more affluent counties; by 1999, it was 13% higher. Among women, all cancer mortality was 3% lower in poorer compared to more affluent counties in 1975; in 1999, it was 3% higher.[4]
- In 1975, residents of poorer counties had lower death rates from colorectal and breast cancer than residents of affluent counties, but by 1999, residents of poorer counties had higher death rates from both cancers than residents of affluent counties.[4]
- Little variation was seen in prostate cancer mortality between poorer and more affluent counties from 1975-1989. However, since 1990 there has been a widening of the area socioeconomic gap, with men in poorer counties experiencing a 22% higher death rate from prostate cancer in 1999 compared to men in more affluent counties.[4]

Table 1. Incidence and Mortality Rates* by Site, Race, and Ethnicity, US, 1996-2000

Incidence	White	African American	Asian American and Pacific Islander	American Indian and Alaska Native	Hispanic/ Latino†
All sites					
Males	555.9	696.8	392.0	259.0	419.3
Females	431.8	406.3	306.9	229.2	312.2
Breast (female)	140.8	121.7	97.2	58.0	89.8
Colon & rectum					
Males	64.1	72.4	57.2	37.5	49.8
Females	46.2	56.2	38.8	32.6	32.9
Lung & bronchus					
Males	79.4	120.4	62.1	45.6	46.1
Females	51.9	54.8	28.4	23.4	24.4
Prostate	164.3	272.1	100.0	53.6	137.2
Stomach					
Males	11.2	19.9	23.0	14.4	18.1
Females	5.1	9.9	12.8	8.3	10.0
Liver & intrahepatic bile duct					
Males	7.3	11.0	21.1	6.1	13.8
Females	2.8	3.9	7.7	5.5	5.6
Uterine cervix	9.2	12.4	10.2	6.9	16.8

Mortality	White	African American	Asian American and Pacific Islander	American Indian and Alaska Native	Hispanic/ Latino†
All sites					
Males	249.5	356.2	154.8	172.3	176.7
Females	166.9	198.6	102.0	115.8	112.4
Breast (female)	27.2	35.9	12.5	14.9	17.9
Colon & rectum					
Males	25.3	34.6	15.8	18.5	18.4
Females	17.5	24.6	11.0	12.1	11.4
Total	20.7	28.5	13.1	14.7	14.3
Lung & bronchus					
Males	78.1	107.0	40.9	52.9	40.7
Females	41.5	40.0	19.1	26.2	15.1
Prostate	30.2	73.0	13.9	21.9	24.1
Stomach					
Males	6.1	14.0	12.5	7.0	9.9
Females	2.9	6.5	7.4	4.2	5.3
Liver & intrahepatic bile duct					
Males	6.0	9.3	16.1	7.6	10.5
Females	2.7	3.7	6.7	4.3	5.0
Uterine cervix	2.7	5.9	2.9	2.9	3.7

*Per 100,000, age-adjusted to the 2000 US standard population. †Hispanic/Latinos are not mutually exclusive from whites, African Americans, Asian Americans and Pacific Islanders, and American Indians and Alaska Natives.

Source: Ries LAG, Eisner MP, Kosary CL, Hankey BF, Miller BA, Clegg L, Mariotto A, Fay MP, Feuer EJ, Edwards BK (eds). *SEER Cancer Statistics Review, 1975-2000*, National Cancer Institute, Bethesda, Maryland. http://seer.cancer.gov/csr/1975_2000,2003.

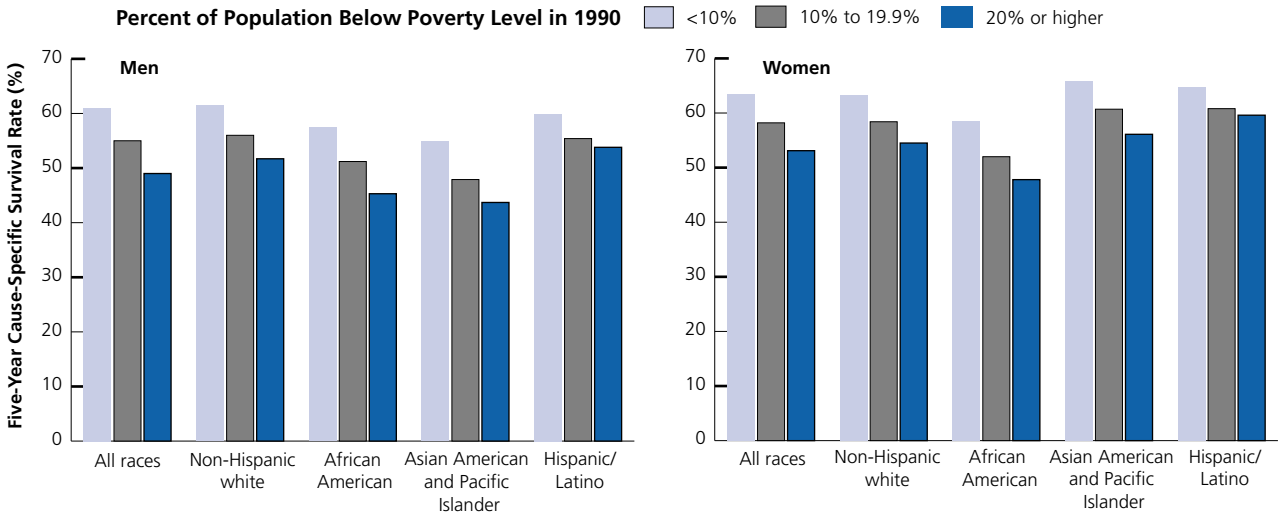
American Cancer Society, Surveillance Research, 2004

What Causes Cancer Disparities?

In 1986, the American Cancer Society published a special report, *Cancer in the Economically Disadvantaged*, which was a national study that concluded the primary cause of disparities in cancer between African Americans and whites is poverty. Biological or inherited characteristics are less important than socioeconomic factors in explaining differences in cancer incidence and mortality among the major racial and ethnic populations in the United States. Racial and ethnic classifications are largely social and political, rather than biological, and there is greater genetic variation within groups that are called races than there is between such groups.[7]

Racial and ethnic groups in the US do vary profoundly with respect to socioeconomic factors that influence

Figure 2. SEER Cancer Survival, All Sites Combined, 1988-1994



Note: Based on data from 11 SEER registries.
Source: Singh GK, Miller BA, Hankey BF, Edwards BK. Area socioeconomic status variations in US cancer incidence, mortality, stage, treatment, and survival 1975-1999; National Cancer Institute, 2003. NIH Pub. No. 03-547.

cancer occurrence. In general, when compared to non-Hispanic whites, members of racial and ethnic minority groups are more likely to be poor, to have lower education levels, and not to have health care coverage or a source of primary care (Table 2). Although it is not currently possible to analyze cancer statistics by individual socioeconomic status, recent analyses of SEER data have examined the relationship between area socioeconomic status (percent of the population of a defined residential area called a census tract or a county below the poverty line) and cancer incidence, mortality, stage at diagnosis, and survival. In the 11 SEER areas which provided data for these analyses, 49.5% of African Americans, 47.5% of American Indians and Alaska Natives, and 40.7% of Hispanic/Latinos lived in census tracts with a poverty rate of more than 20%, compared to 7% of non-Hispanic whites and 16% of Asian Americans and Pacific Islanders.[4]

Analyses by race/ethnicity and area socioeconomic status are informative because they show the interplay of factors that create disparities. For example, residential segregation by income is often compounded by racial segregation. This may result in more isolation and less access to medical and public services, employment opportunities, and adequate health insurance for members of minority groups affected by poverty than for whites with comparable education and income.[11] On the other hand, within racial and ethnic groups, there is substantial cultural and socioeconomic variation, and more affluent and educated members of racial and ethnic minorities may have a cancer experience similar to that of the generally more affluent white population. As is the case with all statistical analyses in which populations are stratified into very broad groups, the results provide an informative, but highly simplified, picture of a more complex underlying reality.

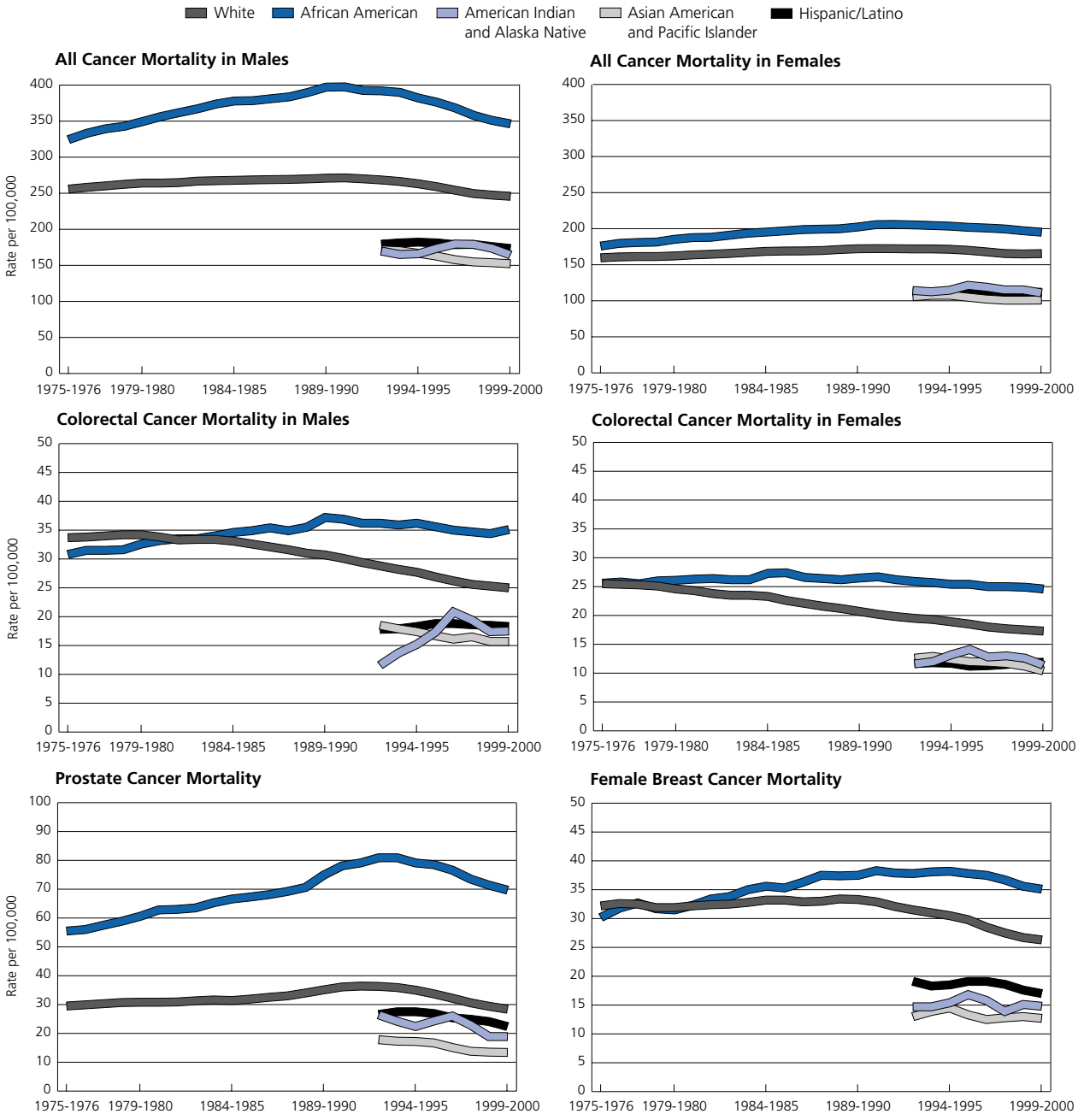
One effect of economic deprivation is the difficulty of sustaining a healthy lifestyle. Poor and minority communities, for example, are often targeted by the predatory marketing strategies of tobacco companies. These communities may have limited access to fresh and healthful foods and opportunities for recreational physical activity. The interaction of social factors, cultural factors, and poverty can influence the entire spectrum of stages in the development and course of cancer (Figure 1).[7]

Opportunities to reduce cancer disparities exist across the entire cancer spectrum, from primary prevention to palliative care.

Underlying Risk Factors That Affect Primary Prevention

The prevalence of underlying risk factors for some cancers differs among racial and ethnic groups. For example, higher rates of stomach cancer among Hispanic/Latinos and Asian Americans partly reflect the higher prevalence of *Helicobacter pylori* infection in recent immigrants' countries of origin.[12] Similarly, higher

Figure 3. Trends in Mortality for All Cancer Sites Combined, Colorectal, Prostate, and Female Breast Cancers, by Race and Ethnicity, 1975-2000



Source: Surveillance, Epidemiology, and End Results Program, 1973-2000. Division of Cancer Control and Population Sciences, National Cancer Institute, MD, 2003.

rates of liver cancer among Hispanic/Latinos, and Asian Americans largely reflect the higher prevalence of chronic hepatitis B infection among recent immigrants.[13,14] Differing rates of cervical cancer may also relate to prevalence and subtypes of human papilloma virus (HPV) infection among immigrants.[15] Methods for primary prevention that are currently available or under development include treatment of *H. pylori* infection, vaccination against hepatitis B, and in the future, HPV, and reduction of blood-borne and sexually transmitted hepatitis C and HPV.

Several other modifiable cancer risk factors, such as cigarette smoking, physical inactivity, and obesity, also vary

Table 2. Socioeconomic Characteristics and Medical Care Access, by Race and Ethnicity

Racial/ethnic group	Income below poverty level (%)†	Graduated high school (%)‡	% under age 65* with no health care coverage§	% under age 65* with no regular source of medical care§
White (non-Hispanic)	8.0	85.5	11.9	13.9
African American (non-Hispanic)	24.1	72.3	19.2	16.7
Hispanic/Latino	21.8	52.4	34.8	30.8
American Indian and Alaska Native	27.1	70.9	33.4	15.9
Pacific Islander	Not available	78.3	Not available	Not available
Asian American	10.1	80.4	17.1	18.5
Asian American and Pacific Islander	10.3	Not available	Not available	Not available

*Percentages are age-adjusted to the 2000 US standard population.

†Poverty rate as of 2002 for white (non-Hispanic), African American, Hispanic/Latino, Asian American, and Asian American and Pacific Islander populations. **Source:** Poverty in the United States, 2002, US Census Bureau, September 2003. Poverty rate as of 1999-2000 for American Indian and Alaska Native population. **Source:** Poverty in the United States, 2000. US Census Bureau, September, 2001.

‡**Source:** Educational Attainment, 2000. Census 2000 Brief, US Census Bureau, August 2000.

§**Source:** Health, United States, 2003 With Chartbook on Trends in the Health of Americans, Hyattsville, Maryland 2003.

by race/ethnicity and socioeconomic status (Table 3). The prevalence of cigarette smoking in US adults is now highest for American Indian and Alaska Native women (38.6%), followed by American Indian and Alaska Native men (27.4%). The prevalence of cigarette smoking is considerably lower for Hispanic/Latino women (12.8%) compared to men (23.2%), and Asian American women (7.9%) compared to men (19.6%). Smoking prevalence also varies by level of education, with the highest prevalence of cigarette smoking occuring among individuals with a high school education. Regardless of race/ethnicity, men and women whose income is less than twice the poverty level were also much more likely to be current smokers than those with higher incomes. These disparities result in part from targeted promotion and advertising by cigarette companies.[16]

Inadequate physical activity increases the risk of certain cancers and contributes to the development of overweight and obesity. National surveys generally have collected information only about leisure-time physical activity, which may underestimate total physical activity.[17] For example, Hispanic/Latino men and women have the highest prevalence of no leisure-time physical activity (51.9% among men and 56.5% among women) (Table 3). This measure is incomplete, however. A survey of physical activity among women, which considered occupational activity and housework as well as leisure-time physical activity, found that Hispanic/Latino women had a higher composite activity score than other groups.[17] A strong inverse relationship between no leisure-time physical activity and educational attainment is also seen for men and women in surveys that do not consider other forms of physical activity (Table 3).

There is increasing evidence of the relationship between overweight and obesity and mortality from a number of types of cancer.[18] African American women and American Indian and Alaska Native men and women have high rates of obesity (over 35%) compared to the general population (21.5% for men and 22% for women). The prevalence of obesity in the US population varies slightly with the level of education in men and widely with the level of education in women. Prevalence ranges from 12.4% in women with more than 16 years of education to 32.1% in women with 8 or fewer years of education. Variations in obesity prevalence by income are also greater among women than for men.

Secondary Prevention and Use of Recommended Screening Tests

Disparities in secondary prevention (screening and early detection) are reflected both in rates of use of recommended screening tests and in later stage at diagnosis.

Although 72.1% of non-Hispanic white women older than 40 reported having a mammogram in the past 2 years, only 56.9% reported a mammogram within the last year, consistent with the Society's recommendations (Table 4). The rate of mammography was lowest among American Indians and Alaska Natives, of whom only 52% had a mammogram within two years and only 36.6% in the last year. Only 33.7% of women who immigrated to the US in the past 10 years, and only 27.9% of women with no health insurance coverage reported having a mammogram in the last year. Rates were only slightly higher for mammography within the last 2 years (41.4% for recent immigrants and 39.5% for women with no health insurance).

Table 3. Prevalence of Major Cancer Risk Factors by Race/Ethnicity and Highest Level of Education, Adults 18 and Older, United States, 2000*

Characteristic	Current Smokers (%)		Reporting No Leisure-time Physical Activity (%)		Obese (%)†	
	Men	Women	Men	Women	Men	Women
Race/ethnicity						
White (non-Hispanic)	25.7	23.0	33.1	36.8	21.3	19.6
African American (non-Hispanic)	25.5	20.4	47.3	55.7	24.4	35.9
Hispanic/Latino	23.2	12.8	51.9	56.5	23.0	26.1
American Indian and Alaska Native‡	27.4	38.6	46.5	52.1	38.9	43.2
Asian American§	19.6	7.9	29.1	42.1	6.0	8.3
Education (years)^						
8 or fewer	29.9	16.1	68.7	71.3	22.5	32.1
9 to 11	39.2	32.1	58.7	59.9	27.5	30.8
12	31.7	26.5	44.0	47.3	23.7	24.1
13 to 15	23.2	20.3	32.9	38.3	24.4	23.4
16	13.4	12.0	22.9	27.8	17.1	15.4
More than 16	8.7	7.2	17.6	23.6	15.7	12.4
Income						
Below poverty level	36.5	30.0	52.7	58.3	21.8	30.4
100% to 200% above poverty level	34.5	26.8	49.5	51.9	22.6	27.1
More than 200% above poverty level	22.6	18.5	29.2	32.9	21.8	19.5
Unknown	23.6	20.6	44.8	49.1	19.5	21.8
Total	25.0	21.0	36.6	41.5	21.5	22.0

*Percentages are age-adjusted to the 2000 US standard population. †Body Mass Index (BMI) ≥30 kg/m^2, Age ≥20 yrs. ‡Estimates should be interpreted with caution because of the small sample sizes. §Does not include Native Hawaiians and other Pacific Islanders. ^Persons age 25 or older.

Source: National Health Interview Survey 2000, National Center for Health Statistics, Centers for Disease Control and Prevention.

Rates of colorectal cancer screening by fecal occult blood testing (FOBT) and endoscopy are low for all population groups, with lower prevalence of screening among all racial and ethnic minority groups compared to non-Hispanic whites (Table 4). Individuals with more years of education were more likely to receive colorectal cancer screening. Persons with medical insurance were about twice as likely to report endoscopy as those without. Rates of both FOBT and endoscopy were substantially lower in recent immigrants than among immigrants who had resided in the US more than 10 years.

Although 82.3% of non-Hispanic white women over the age of 18 reported a Pap test in the past 3 years, rates were lower among Asian Americans (68.2%), women with no health insurance (64.1%), and women in the US less than 10 years (59.3%).

Stage at Diagnosis

For the four cancer sites for which screening is widely recommended or practiced (colorectal, female breast, cervix, and prostate), the proportion of cases diagnosed at a localized stage is lower, and the proportion diagnosed at distant stage is higher, in high-poverty compared with low-poverty census tracts.[4] There are currently no recommended screening tests or highly specific symptoms for lung cancer. However, during 1995-1999, a significantly higher proportion of men residing in high-poverty census tracts (59%) were diagnosed with distant-stage disease compared to those residing in low-poverty census tracts (55%).[4] Earlier diagnosis may be related to increased awareness of symptoms and access to medical care.

Table 5 summarizes racial and ethnic variability in stage of diagnosis using two measures – the stage-specific incidence rate and the proportion of cases diagnosed at each stage. Although whites have the highest breast cancer incidence rates for all stages combined (Table 1), African Americans have higher rates of regional and distant-stage disease (Table 5). Although American Indian and Alaska Natives have much lower incidence of breast cancer overall than whites (Table 1), 44% of the newly diagnosed cases in this group are regional or distant-stage, compared to 33% in whites. Similar variations by race and ethnicity are seen for the other cancer sites.

Table 4. Percent* Utilization of Screening, by Race/Ethnicity and Education and Income, 2000

Characteristic	Mammography prevalence in women ≥40		Colorectal cancer screening in adults ≥50		Pap test in women ≥18†
	(within 2 years)‡	(within last year)§	Fecal occult blood test^	Endoscopy¶	(within 3 years)
Gender					
Male	–	–	17.1	33.5	–
Female			17.6	27.0	
Race/Ethnicity					
White#	72.1	56.9	18.3	31.3	83.9
African American#	68.2	52.8	14.9	27.0	85.5
Hispanic/Latino	62.6	48.0	9.8	21.8	77.9
American Indian and Alaska Native#	52.0	36.6	14.0**	25.2**	78.4
Asian American	57.0	47.8	14.5	19.2	68.2
Education (years)					**age 25+**
11 or fewer	56.8	41.7	12.1	22.0	74.3
12	68.9	54.7	16.4	28.1	82.5
13-15	73.3	58.2	19.4	31.9	86.2
16 or more	80.1	65.1	23.0	40.4	90.1
Health insurance coverage					
Yes	73.6	58.3	17.9	31.0	85.2
No	39.5	27.9	13.0	14.4	64.1
Immigration					
Born in US	71.6	56.2	18.1	30.9	84.1
In US ≤10 years	41.4	33.7**	3.3**	14.3**	59.3
In US 10+ years	65.0	50.9	12.7	23.8	79.2
Total	70.3	55.3	17.3	30.0	82.3

*Percentages are adjusted to the 2000 US standard population. †Pap test for women with intact uterus. ‡A mammogram within the past two years. §A mammogram within the past year. ^A fecal occult blood test within the past year. ¶An endoscopy (tests include sigmoidoscopy, colonoscopy, or proctoscopy) within the past five years. #Non-Hispanic. **Wide confidence intervals reflect small sample size.

Source: National Health Interview Survey, 2000, National Center for Health Statistics, Centers for Disease Control and Prevention.

Treatment

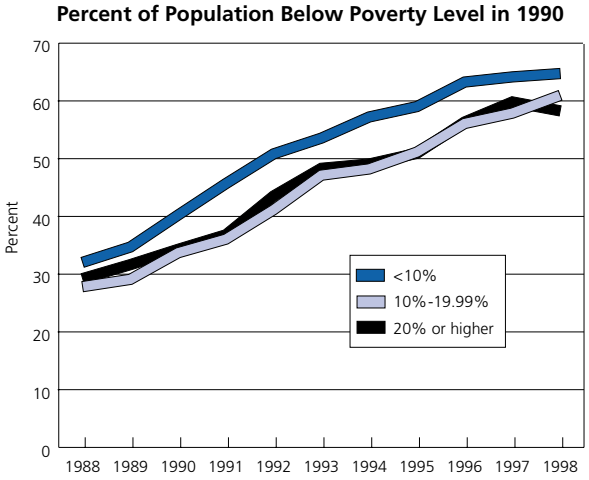
For many cancers, African Americans have lower stage-specific survival than whites.[19] Factors that may influence stage-specific survival include accuracy of staging, differences in tumor characteristics within stage, comorbidities, and receipt of optimal treatment.[20] For breast cancer in particular, numerous studies have been conducted to investigate factors associated with lower survival in African American women, with somewhat inconsistent results.[21-23] These inconsistencies may result from limitations of available data on prognostic factors other than stage (such as grade, tumor size, and estrogen receptor status for female breast cancer), comorbidities, and indicators of socioeconomic status, as well as analytic approaches in various studies.

Racial and ethnic differences in treatment outcome among patients with similar disease status (e.g., stage, grade, and comorbidities) are an unlikely cause of survival disparities.[24] Carefully designed clinical studies have documented that equal treatment results in equal outcome for several cancers.[25,26] A recent comprehensive review found limited evidence that racial and ethnic populations differ in their response to treatment.[27] However, the review did document substantial differences in receipt of optimal treatment, including definitive primary therapy, adjuvant therapy, conservative surgery, and follow up after potentially curative treatment.[27] Although more difficult to measure, the availability and quality of supportive general medical care may affect patient survival.

Examples of well-documented treatment disparities are:

- Between 1988 and 1998, women with stage I and stage II breast cancer were less likely to be treated with breast-conserving surgery (BCS) and radiation if they resided in poorer, compared to more affluent, areas (Figure 4).[4]
- African Americans with stage I or stage II non-small cell lung cancer are less likely to receive the recommended treatment of surgery than whites, a disparity that accounts for much of the difference in survival rates.[4,28]

Figure 4. Percentage of Stage I and Stage II Female Breast Cancer Patients with Tumor Size ≤2cm Undergoing Breast-Conserving Surgery, 1988-1998



Note: Based on data from 11 SEER registries. Los Angeles registry data from 1988-1991 were not available.

Source: Singh GK, Miller BA, Hankey BF, Edwards, BK. Area socioeconomic status variations in US cancer incidence, mortality, stage, treatment, and survival 1975-1999: National Cancer Institute; 2003. NIH Pub. No. 03-547.

- African Americans with cervical cancer are more likely than whites to go unstaged and receive no treatment.[29]
- Whites are more likely to receive aggressive treatment for colorectal cancer.[27]

Factors that potentially influence the availability and quality of cancer care may be categorized as structural barriers, factors that influence physician recommendations, and those that affect patient freedom of choice and/or decision making.[27] Structural barriers include considerations such as health insurance, geographical distance to the treatment facility, and access to transportation. Physician recommendations vary according to both clinical considerations (stage of disease, presence of certain prognostic indicators, presence of other health conditions) and nonclinical factors (perception of a patient's willingness or ability to comply with treatment recommendations, personal preferences, and biases). Patient decision making is influenced by attitudes and beliefs about specific treatments, ability to navigate the medical system, resilience in the face of structural and other barriers, and personal perspectives and biases. Even for well-documented disparities in cancer treatment, the relative importance of different factors is not well understood. It has been suggested that efforts to improve quality of cancer care and reduce disparities may share a common solution, one that involves the development of better methods to monitor care and ensure that all individuals have the opportunity to receive optimal treatment.[30]

Palliative and End-of-Life Care

A number of studies have documented lower levels of pain management and use of hospice care among African Americans and members of other racial and ethnic minority groups compared to whites. A study of 1,308 outpatients being treated for recurrent or metastastic cancer in 1990-1991 found that patients seen at outpatient centers that treated predominantly minorities were three times more likely than those treated elsewhere to have inadequate pain management.[31] A follow-up study in 1997 found that 65% of a population of African Americans and Hispanic/Latinos with a range of malignancies did not receive guideline-recommended prescriptions for analgesics (pain medications) compared with 50% of nonminority patients.[32] One survey, conducted in 1998, found that only 25% of pharmacies in predominantly nonwhite New York neighborhoods stocked morphine, whereas 72% of pharmacies in affluent white neighborhoods had sufficient stocks.[33]

Studies have also shown lower use of hospice care among minority persons, including African Americans, Asian Americans, and Hispanic/Latinos.[34-37] A study of barriers to hospice care among older patients dying from lung and colorectal cancer found individuals who were neither African American nor white entered hospice care later.[37] Research is very limited on factors related to lower use of hospice care by racial and ethnic minorities, many of which overlap with factors that may explain disparities in treatment. In order to provide culturally effective end-of-life care and planning and to alleviate pain and suffering, cultural differences in attitudes toward illness or death between health care providers and patients and families must be understood.[38]

Strategies to Reduce Cancer Disparities

Over the past decade, there has been increasing awareness of cancer disparities. In 1999 the Institute of Medicine (IOM) published *The Unequal Burden of Cancer: An Assessment of NIH Research and Programs for Ethnic Minorities and the Medically Underserved*,[39] and in 2002 the IOM published *Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care*.[6] The National Institutes of Health (NIH), National Cancer Institute (NCI), Centers for Disease Control and

Table 5. Stage at Diagnosis of Colorectal, Breast, Prostate, and Cervical Cancer, by Race and Ethnicity, 1996-2000

	Localized		Regional		Distant	
	Rate*	%	Rate*	%	Rate*	%
Colorectal						
White	21.4	42	19.7	39	9.6	19
African American	22.4	39	21.0	36	14.2	25
Hispanic/Latino†	14.6	39	14.4	39	7.9	22
American Indian and Alaska Native	11.8	35	13.2	40	8.5	25
Asian American and Pacific Islander	18.9	42	17.9	40	7.7	18
Breast (female)						
White	90.2	66	39.8	29	7.5	5
African American	65.6	55	40.6	36	10.6	9
Hispanic/Latino†	50.7	57	29.2	35	6.2	7
American Indian and Alaska Native	32.4	56	19.9	36	4.8	8
Asian American and Pacific Islander	63.1	65	28.2	30	4.3	5
Prostate‡						
White	145.2	95			8.2	5
African American	225.9	93			20.0	7
Hispanic/Latino†	112.1	93			9.7	7
American Indian and Alaska Native	42.6	88			7.2	12
Asian American and Pacific Islander	84.9	92			8.0	8
Uterine cervix						
White	5.0	58	2.9	33	0.8	9
African American	5.5	51	4.4	39	1.2	10
Hispanic/Latino†	8.1	57	5.8	34	1.6	9
American Indian and Alaska Native	3.3	57	2.5	36	0.5	7
Asian American and Pacific Islander	5.0	54	3.8	38	0.9	8

*Per 100,000, age-adjusted to the 2000 US population. †Hispanics/Latinos are not mutually exclusive from whites, African Americans, Asian Americans and Pacific Islanders, and American Indians and Alaska Natives. ‡The rate and percent for localized stage represents local and regional stages combined.

Source: Ries LAG, Eisner MP, Kosary CL, Hankey BF, Miller BA, Clegg L, Mariotto A, Fay MP, Feuer EJ, Edwards BK (eds). SEER Cancer Statistics Review, 1975-2000, National Cancer Institute, Bethesda, Maryland. http://seer.cancer.gov/csr/1975_2000,2003.

Prevention (CDC), the American Cancer Society, and other public, private, and nonprofit organizations have all recognized the importance of reducing or eliminating disparities in the fight against cancer.

In principle, equal application of existing knowledge about cancer prevention, early detection, and treatment to all segments of the population should substantially reduce cancer disparities. This will require a health care delivery system that provides access to diagnosis and treatment for all. Research is needed to improve the methodology for public health interventions, including community-based, participatory research, and to better understand how the environment influences health behaviors, how economic barriers to health care can be overcome, and how cancer treatment can be monitored to ensure that all patients receive optimal care.

Research is also needed on how to prevent, detect, and cure cancers about which knowledge is limited, some of which disproportionately affect minority communities. Two relevant questions are: why are African American men at greater risk of developing advanced prostate cancer, and what markers of genetic susceptibility and tumor prognosis may improve current approaches to prevention and treatment? Developing safe and effective vaccines against HPV, the most important cause of cervical cancer, would reduce the toll of this disease that disproportionately affects poor and minority women.

Table 6 lists selected programs and organizations with important roles in national efforts to eliminate the unequal burden of cancer among racial and ethnic minorities and the medically underserved. A key component of many of these programs is support for cancer control at the community level, with community members playing major roles in developing health programs and policies intended for their communities.

Highlights of the American Cancer Society's Efforts to Reduce Disparities

Achieving the Society's 2015 goal to eliminate disparities will require sustained commitment to advocacy, research, education, and community involvement. Following are highlights of the Society's activities that address cancer disparities.

Advocacy

Advocacy activity at the federal, state, and local levels plays a vital role in the Society's efforts to reduce the burden of cancer for racial and ethnic minorities and underserved populations. By applying effective advocacy tools, such as information, media, lobbying, and coalitions, the Society works both independently and collaboratively with others to help create, change, and influence public policies and legislation that can have a significant impact on reducing the cancer disparities that exist in this country. Highlights of the Society's 2003 state and federal advocacy efforts included increasing support and adequate funding for state and federal agencies and programs focused on reducing existing disparities and improving the health of the medically underserved.

At the federal level, the Society led the fight to continue the investment the nation has made in biomedical research following the doubling of the NIH budget. This includes increased funding for NIH's National Center on Minority Health and Health Disparities – a center the Society was instrumental in helping to establish. The center leads and coordinates efforts to improve the health of minority and medically underserved populations. Protecting funding for cancer programs within the CDC's National Center for Chronic Disease Prevention and Health Promotion remains an important priority for the Society to ensure that we put our research knowledge to use for all populations. CDC programs include education and screening targeted toward cancers disproportionately affecting minority communities, including prostate, breast, colorectal, cervical, and ovarian cancers. For example, the CDC's National Breast and Cervical Cancer Early Detection Program ensures that low-income, uninsured women have access to community-based cancer screening, outreach, and case-management services. To date, the program has provided more than four million screening examinations to underserved women and diagnosed approximately 14,446 breast cancers; 55,210 precancerous cervical lesions; and 1,020 cervical cancers.

The Society also advocates for federal funding of two important federal programs managed by the Health Resources and Services Administration, its Federal Consolidated Health Centers, and the National Health Service Corps programs, which help improve access to cancer prevention, screening, and treatment by creating a point of entry into the health care system for more than 15 million minority and medically underserved individuals. Recognizing that medically underserved populations face significant challenges in negotiating the complicated health care system, the Socety helped develop and is working to enact the bipartisan Patient Navigator, Outreach, and Chronic Disease Prevention Act. This landmark legislation was designed to reduce barriers and give people in minority and medically underserved communities expanded access to culturally competent cancer and chronic disease prevention and early detection services delivered by health care professionals and trained navigators located in their communities.

On the state level, the Society is actively involved in numerous advocacy initiatives to reduce cancer disparities. Through these initiatives, the Society continues to work and collaborate with leading organizations also committed to improving access to care in medically underserved communities, including the NAACP, Phi Beta Sigma, the National Council of La Raza, the National Black Caucus of State Legislators, American Indian tribes and health organizations, faith communities, and other community-based organizations.

Across the country, Society staff work to enact legislation to improve access for minority and medically underserved populations. One example is the successful passage of and funding for the Breast and Cervical Cancer Prevention and Treatment Act in all states except Oklahoma, plus the District of Columbia. Other current state initiatives include advocating for Medicaid coverage for treatment of all cancers; supporting increased funding of health care programs serving low-income populations; and ensuring the availability of appropriate cancer pain control medications for the medically underserved and the elderly.

The Society is also working to develop relationships within minority communities to address tobacco control issues at the local, state, and federal levels. Tobacco use adversely affects medically underserved and minority communities and is a major contributor to deaths from heart attack, cancer, and stroke. Legislation promoted by the Society to provide cessation coverage under

Table 6. Selected Programs and Resources Targeting Cancer Disparities

Name of program and Web site	Sponsors/partners	Description
Intercultural Cancer Council (ICC) http://iccnetwork.org	Baylor College of Medicine	The ICC promotes policies, programs, partnerships, and research to eliminate the unequal cancer burden among racial and ethnic minorities and medically underserved populations in the United States and its associated territories. Prepares *Cancer Fact Sheets* that provide detailed information on cancer occurrence and risk factors among racial and ethnic minorities and the medically underserved.
Center to Reduce Cancer Health Disparities (CRCHD) http://crchd.nci.nih.gov	National Cancer Institute	The CRCHD was created in 2001 to carry out NCI's Strategic Plan for Reducing Cancer Health Disparities. NCI's goal is to nearly triple the funding for cancer health disparities in four years. Research will investigate social, cultural, environmental, biological, and behavioral determinants of cancer disparities across the cancer control continuum from prevention to end-of-life care.
Special Populations Networks for Cancer Awareness, Research, and Training http://crchd.nci.nih.gov/spn	National Cancer Institute	The purpose of the special populations networks is to build relationships between large research institutions and community-based programs and to find ways of addressing important questions about the burden of cancer in minority communities. The major goal is to build infrastructure to promote cancer awareness within minority and medically underserved communities and to launch from these communities more research and cancer control activities aimed at specific population subgroups. Currently the special populations networks consists of 18 projects in 15 states.
Racial and Ethnic Approaches to Community Health (REACH) http://www.cdc.gov/reach2010	Centers for Disease Control and Prevention	The REACH program funds community coalitions to develop and implement activities to reduce the level of disparities in one or more of six priority areas, which include breast and cervical cancer screening. The program emphasizes the importance of working more closely with communities to identify culturally sensitive implementation strategies.
National Breast and Cervical Cancer Early Detection Program (NBCCEDP) http://www.cdc.gov/cancer/nbccedp	Centers for Disease Control and Prevention	The NBCCEDP was created by Congress in 1990 to help improve access to breast and cervical cancer screening among underserved women. This program, funded at $200.6 million for fiscal year 2003, provides both screening and diagnostic services and has been implemented in all 50 states, 5 US territories, the District of Columbia, and 15 American Indian and Alaskan Native organizations.

Medicare, Medicaid, and Maternal and Child Health Block Grant will significantly decrease the impact of tobacco use on these populations. At the state level, the Society advocates for increasing tobacco taxes for allocation to health care programs for the medically underserved. Finally, the Society is working to enact clean indoor air legislation at both the community and state levels to ensure smoke-free air. To date, five states and more than 1,600 communities have enacted significant smoke-free laws.

Find out how you can participate with other concerned Americans in advocacy efforts that will save lives by visiting www.cancer.org/takeaction.

Until now, the American Cancer Society has been limited in its ability to use advocacy to protect the interests of cancer patients and their families. That's why the Society created a 501(c)4 sister organization, the American Cancer Society Cancer Action Network℠ (ACS CAN) to take advocacy efforts to the next level. (www.acscan.org)

Research

In 2003, for the fourth consectutive year, cancer in the poor and underserved was designated the targeted research area for extramural research support. Sixty applications were received, and 7 grants totaling $7,773,000 were awarded, compared with 55 applications and 11 awards at $12,027,000 in 2001-2002. The 2002-2003 awards for cancer in the poor and underserved constituted 7.4% of the total grants expenditures.

The Society's Behavioral Research Center has launched several studies to better understand quality of life among cancer survivors. Participants in these studies are recruited from population-based cancer registries, with at least one-third of selected participants being members of racial and ethnic minority groups.

The Behavioral Research Center includes a special populations division, as well. These scientists focus on research addressing complex issues that influence disparities in cancer prevention and early detection among medically underserved populations. Special Populations has launched studies evaluating patient, provider, and system barriers to cancer screening at primary care centers, as well as initiated efforts to build community-based research partnerships.

Education

The Society provides accurate and up-to-date information in English and Spanish through its Web site, www.cancer.org, and through its call center, the National Cancer Information Center (NCIC), at 1-800-ACS-2345. The NCIC use a translation service to answer calls in other languages.

The Society produces two educational publications annually, *Cancer Facts & Figures* and *Cancer Prevention & Early Detection Facts & Figures*, that provide information about cancer risks and risk factors by racial and ethnic group. On a less frequent basis, the organization publishes *Cancer Facts & Figures for African Americans*, *Cancer Facts & Figures for Hispanics/Latinos,* and *Breast Cancer Facts & Figures*. The Society also developed a Special Populations Directory, providing statistics, resources, and information on other organizations working with medically underserved groups.

The Society has developed its colon cancer public awareness campaign, featuring Polyp Man®, for African American and Hispanic/Latino audiences, particularly those age 40 and older. In addition, it has created prostate cancer ads targeting African American men through use of the "spoken word" to raise awareness that they are at greater risk and need to talk to their doctors. The "Mi Vida" campaign was created for Hispanic/Latinos using cancer survivors to empower members of that community to take control of their personal health.

The Society continues to work toward the 2015 goal of eliminating disparities in cancer morbidity and mortality by educating the nation about the unequal burden ethnic minorities and medically underserved communities face. National Minority Cancer Awareness Week, held annually during the third week in April, is dedicated to increasing the awareness of both the public and health professionals about cancer disparities and the successes achieved through early detection and treatment.

Programs and Services

Many Society programs and services have been developed or tailored to be culturally appropriate and language-specific for ethnic and medically underserved audiences. Examples include:

Quitline®: It provides tobacco cessation assistance and materials in Spanish and English. Quitline also offers a TTY line and self-help materials, such as audiotapes, for low-literate individuals.

Cancer Survivors Network℠: It provides Mandarin, Cantonese, and Spanish language content, as well as shows/stories for gay and lesbian cancer survivors and their partners, American Indians, Japanese Americans, and Pacific Islanders.

Impacting Urban School Systems: This project enhances the leadership skills of urban school health leaders to provide effective health programs and address the cancer-related health disparities faced by urban students.

Let's Talk About It®: This is a project developed in collaboration with The 100 Black Men of America, Inc., to talk to African American men about prostate health.

Asian Tell A Friend®: The Society's Tell A Friend breast cancer program has tailored a component for Korean, Filipino, Vietnamese, and Chinese women.

Aconseje a su Amiga®: This program encourages Hispanic/Latina women to get a mammogram and a Pap test.

Look Good…Feel Better®: A category of cosmetic offerings is available to meet the needs of African American women.

Luzca Bien…Sientase Mejor® (Look Good…Feel Better®): This program is for Hispanic/Latina women undergoing cancer treatment.

Circle of Life℠: The American Cancer Society offers this breast health program for American Indian women.

Body & Soul: A Celebration of Healthy Living: This is a 12-14 week nutrition program designed especially for African American churches, developed in collaboration with the National Cancer Institute.

Pilot projects and initiatives: To reach more historically underserved communities, the Society just concluded a 3-year project based on working with and learning from people in four African American communities (Bridgeport, CT; East Baltimore, MD; LeFiore

County, MS; and Haywood County, TN) to increase breast and colon cancer screening, volunteerism, and income development. In addition, the Society is engaged in a 3-year pilot initiative designed to increase breast and cervical cancer screening, culturally appropriate media campaigns, and Relay For Life® in Hispanic/Latino communities. The organization is also developing a similar initiative for Asian American and Pacific Islander populations.

Collaborations

At the national, state, and local levels, the Society works with organizations to reach more underserved individuals and to eliminate disparities. Examples include:

Phi Beta Sigma: The Society and Phi Beta Sigma fraternity have created Sigmas Waging War Against Cancer (SWAAC), a project designed to reach the African American community with cancer prevention and early detection messages by working through fraternity brothers and their community contacts.

Alpha Kappa Alpha: The Society developed a 4-year collaboration with Alpha Kappa Alpha (AKA) sorority to leverage our mutual commitment to saving lives and reducing health disparities that exist among African Americans.

The Mautner Project for Lesbians with Cancer: The Society worked with the Mautner Project to recruit lesbian cancer survivors and their partners to participate in focus groups.

NCI, CDC, and USDA: The Society is collaborating with these agencies on a project to reduce cervical and breast cancer mortality in high-mortality counties, particularly in rural areas, by developing collaborations/partnerships at the state and community levels.

National Center for Primary Care at Morehouse School of Medicine: The Society is collaborating with Morehouse on projects designed to identify and overcome barriers to colorectal cancer screening in primary care practices, with an emphasis on medical practices in underserved communities.

National Dialogue on Cancer: The Society participates in the National Dialogue on Cancer Work Group on Quality of Care. This group has developed an objective for 2005 to decrease the national gap between those who receive quality care and those who do not by 50%.

Health Resources Services Administration (HRSA): The Society is engaged in HRSA's "Cancer Collaborative" pilot, which focuses on improvement in screening and follow up for breast, cervical, and colorectal cancer through HRSA's network of primary health care centers in impoverished communities.

Diversity and Outreach Training for Staff and Volunteers

The Society developed a variety of diversity modules to help staff and volunteers gain knowledge, develop skills, and increase competence in working with diverse populations. It also developed Opening Doors: Reaching the Not-Yet-Reached in Your Community, a training designed to help staff and volunteers reach out and work with underserved communities to eliminate cancer disparities.

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The International Fight Against Cancer

The heart of the American Cancer Society's mission is to wipe out cancer. Because cancer knows no boundaries, this mission extends around the world. Better prevention, early detection, and treatment options, as well as improved immunization plans and sanitation, have helped some nations to lower incidence and death rates of certain cancers, such as cervix and stomach. Yet these and other cancers are still a problem in developing countries, where many other factors also contribute to an increasing overall cancer burden. For instance, Western lifestyle behaviors are becoming more common in developing countries – including tobacco smoking, diets high in fat and low in fruits and vegetables, and lack of exercise – leading to increased risk for cancers of

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

	All Sites		Oral Cavity		Colon & Rectum		Breast	Prostate
Country	Male	Female	Male	Female	Male	Female	Female	Male
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
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)
Trinidad & 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)
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)
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)
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)

Note: Figures in parentheses are in order of rank within site and gender group.

*Rates are age-adjusted to the World Health Organization world standard population.

the lung and colon, among others. (See also Worldwide Tobacco Use, page 41.)

The Society collaborates with other cancer-related organizations worldwide in the global fight against cancer, especially in the developing world where survival rates are low and resources are limited. Our international mission includes:

- Capacity building with developing cancer societies
- Tobacco control
- Information exchange and delivery
- Conferences and knowledge-sharing
- Resource development and fundraising for international efforts

Cancer Around the World (continued)

Country	Lung & Bronchus		Uterus		Stomach		Leukemia	
	Male	Female	Cervix	Corpus	Male	Female	Male	Female
United States	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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.	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	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	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	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	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 & Tobago	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	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	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	19.4 (41)	9.2 (22)	15.2 (2)	3.7 (12)	17.5 (22)	10.0 (14)	3.9 (40)	3.2 (35)

Source: GLOBOCAN 2000, Cancer Incidence, Mortality, and Prevalence Worldwide, Version 1.0.

American Cancer Society, Surveillance Research, 2004

Tobacco Use

Smoking is the most preventable cause of death in our society. In 2000, about 4.9 million smoking-related, premature deaths occurred throughout the world. The number of deaths were almost evenly divided between the industrialized and the developing nations and were greater in men (84% of smoking-attributable deaths) than in women.[1] Approximately half of all Americans who continue to smoke will die from their cigarette smoking addiction.[2] In the United States, tobacco use is responsible for nearly one in five deaths or an estimated 440,000 deaths per year during 1995 to1999.[3,4] Smoking accounts for at least 30% of all cancer deaths and 87% of lung cancer deaths.[5,6]

Lung cancer mortality rates are about 22 times higher for current male smokers and 12 times higher for current female smokers compared with lifelong nonsmokers.[6] Smoking is associated with increased risk for cancers of the mouth, pharynx, larynx, esophagus, pancreas, uterine cervix, kidney, and bladder. In addition to cancer, smoking is a major cause of heart disease, cerebrovascular disease, chronic bronchitis, and emphysema, and is associated with gastric ulcers.[6] Decreasing cigarette smoking among adolescents and adults in a major public health objective for the nation.

A recent US Surgeon General's report on reducing tobacco use outlines the components of comprehensive tobacco control. Health education combined with social, economic, and regulatory approaches is essential to counterbalance the tobacco industry's advertising and promotion and to foster nonsmoking environments.[7]

Trends in Smoking

- Cigarette smoking among adults aged 18 and older declined 40% between 1965 and 2000 – from 42% to 22%. Smoking prevalence among adults decreased by an average of 1% per year from 1993 to 2000.[8]
- Between 1979 and 2000, cigarette smoking prevalence declined for white males (37% to 26%), white females (30% to 22%), African American males (44% to 26%), and African American females (31% to 21%).[8] Between 1990 and 2000, cigarette smoking prevalence declined for Hispanic/Latino males (26% to 23%), Hispanic/Latino females (16% to 12%), American Indian and Alaska Native males (34% to 30%), and Asian American males (25% to 22%), while remaining stable for American Indian and Alaska Native females (37%) and Asian American females (7%).[8] Smoking prevalence for Native Hawaiian and other Pacific Islanders were not available due to survey sampling limitations.
- Although cigarette smoking became prevalent in men before women, the gender gap narrowed in the mid-1980s and has remained constant.[9]
- Between 1996 and 2001, the prevalence of current smoking was relatively stable in 41 states and the District of Columbia (DC), while the proportion of current smokers who were some day smokers increased significantly in 31 of those states and DC. This apparent shift in the prevalence of smoking frequency (from daily to some day smoking) may have been influenced by various tobacco control measures, such as increases in the retail price of cigarettes and smoking bans in public places.[10]
- Between 1983 and 1999, smoking among college graduates decreased almost 50% from 21% to 11%, but among adults without a high school education, the percentage decreased only 22% from 41% to 32%.[8]
- Per capita consumption of cigarettes continues to decline. After peaking at 4,345 cigarettes per capita in 1963, consumption among Americans 18 years and older decreased 53% to an estimated 2,037 cigarettes per capita in 2001.[11,12]
- Current cigarette smoking among US high school students increased significantly from 28% in 1991 to 36% in 1997. However, current cigarette smoking declined significantly to 29% in 2001. In addition, current frequent cigarette smoking (smoked cigarettes on at least 20 of the 30 days preceding the survey) among US high school students increased from 13% in 1991, peaked at 17% in 1997 and 1999, and declined significantly to 14% in 2001.[13]
- In 1997, nearly one-half (48%) of male students and more than one-third (36%) of female students reported using some form of tobacco – cigarettes, cigars, or smokeless tobacco – in the past month. The percentages declined to 39% for male students and to 30% for female students in 2001.[14,15]

Profile of Smokers

Over 80% of adult smokers surveyed in 1991 had begun smoking by age 18. In addition, 35% had become daily smokers by age 18.[16] Among adults in 2001 (most recent data available), national data showed:[17]

- An estimated 46.2 million US adults (22.8% of the population) were current smokers.
- Men were more likely to smoke (25.2%) than women (20.7%).

- Adults who earned a General Education Development diploma (48%) and high school dropouts (34%) have high percentages of cigarette smoking.
- Cigarette smoking was highest among American Indians and Alaska Natives (32.7%) and lowest among Asian Americans (12.4%).
- Within the American Indian and Alaska Native group with the highest smoking prevalence, there are significant regional variations in smoking: 21% in the Southwest to 44% in the Northern Plains.[18]
- In 2001, states and territories where the prevalence of current smoking was under 13% were the Virgin Islands (10%), Puerto Rico (12%), and Utah (13%).[10]

Among US high school students in 2001, national data showed:[15]

- Nearly one-fourth (22%) smoked a whole cigarette before age 13.
- Nearly two-thirds (64%) have tried cigarette smoking.
- White (32%) and Hispanic/Latino (27%) students were more likely to be current cigarette smokers (smoked at least one cigarette in the past month) than African American (15%) students.
- White (17%) students were more likely to smoke cigarettes frequently than Hispanic/Latino (7%) and African American (5%) students.

Among US middle school students in 2000, national data showed:[19]

- Before age 11, 8% smoked a whole cigarette.
- In the month preceding the survey, 15% reported using some form of tobacco – cigarettes, cigars, smokeless tobacco, tobacco in pipes, bidis, or kreteks.
- More than one-third (36%) have tried cigarette smoking.
- Eleven percent smoked cigarettes currently (smoked at least one cigarette in the past month).

Smokeless Tobacco

In 1986, the US Surgeon General concluded that the use of smokeless tobacco is not a safe substitute for smoking cigarettes or cigars, as these products cause various cancers and non-cancerous oral conditions, and can lead to nicotine addiction.[20]

- Oral cancer occurs several times more frequently among snuff dippers compared with non-tobacco users. [20]
- The risk of cancer of the cheek and gums may increase nearly 50-fold among long-term snuff users.[20]
- According to the US Department of Agriculture, US output of moist snuff has risen over 40% in the past decade from 48 million pounds in 1991 to an estimated 68 million pounds in 2001.[12]
- Among adults aged 18 and older, national data showed 6% of men and 1% of women were current users of chewing tobacco or snuff. Among men, American Indians and Alaska Natives (8%) and whites (7%) were more likely to use smokeless tobacco than African Americans (3%), Hispanic/Latinos (2%), and Asian Americans and Pacific Islanders (1%).[21]
- Nationwide, 15% of US male high school students were currently using chewing tobacco, snuff, or dip in 2001. White male students (19%) were more likely to use smokeless tobacco than Hispanic/Latino (6%) and African American (3%) male students.[15]
- Nationwide, 6% of US male middle school students were currently using chewing tobacco, snuff, or dip in 2000.[19]

Cigars

The consumption of large cigars and cigarillos increased from 1993 to 1999. An estimated 3.8 billion large cigars and cigarillos were consumed in 2001. Small-cigar production increased from 1.5 billion pounds in 1997 to an estimated 2.4 billion pounds in 2001.[12]

- In 1998, the median percentage of adults aged 18 years and older who ever smoked cigars was 39%. More men than women had ever smoked cigars in all 50 states.[22]
- In 1998, the median percentage of adults aged 18 years and older who have smoked cigars in the past month was 5%. More men than women smoked cigars in the past month in all 50 states.[22]
- Nationwide, 15% of US high school students had smoked cigars, cigarillos, or little cigars on at least one of the past 30 days. Male students (22%) were more likely than female students (9%) to smoke cigars currently. White male students (24%) were significantly more likely than African American male students (16%) to report current cigar use.[15]
- Nationwide, 7% of US middle school students had smoked cigars on at least one of the past 30 days; male students (10%) were more likely than female students (5%) to smoke cigars currently.[19]

In 2001, seven major cigar manufacturers began to provide five rotating health warnings on labels of cigars sold in the US. The companies agreed to the warnings in June 2000 to settle a lawsuit brought by the Federal Trade Commission for failure to warn consumers of the

dangers of cigar smoking. Cigar smoking has health consequences and hazards similar to those of cigarettes and smokeless tobacco such as:[23]

- Cancer of the lung, oral cavity, larynx, esophagus, and pancreas.
- Four to 10 times the risk of dying from laryngeal, oral, or esophageal cancers compared with non-cigar smokers

Smoking Cessation

In 1990, the US Surgeon General outlined the benefits of smoking cessation:[24]

- People who quit, regardless of age, live longer than people who continue to smoke.
- Smokers who quit before age 50 cut their risk of dying in the next 15 years in half compared with those who continue to smoke.
- Quitting smoking substantially decreases the risk of lung, laryngeal, esophageal, oral, pancreatic, bladder, and cervical cancers.
- Quitting lowers the risk for other major diseases including coronary heart disease and cardiovascular disease.

Among adults 18 and older in 2000, national data showed:[17]

- An estimated 44.7 million adults were former smokers, representing 49.2% of persons who ever smoked.
- Among current smokers, 70% reported they wanted to quit completely.
- About 41% of current smokers had stopped smoking at least one day during the preceding 12 months because they were trying to quit.
- Nearly five percent (4.7%) of smokers who had smoked every day or some days during the preceding year quit and maintained abstinence for 3-12 months.

In 2000, among US high school students who were current cigarette smokers, national data showed:[19]

- More than one-half (59%) had tried to quit smoking cigarettes during the 12 months preceding the survey, with female students (63%) more likely than male students (55%) to have made a quit attempt.
- Nearly two-thirds (61%) said that they wanted to stop smoking cigarettes.

In 2000, among US middle school students who were current cigarette smokers, national data showed:[19]

- Approximately 60% had tried to quit smoking cigarettes during the 12 months preceding the survey.
- More than one-half (55%) of students wanted to stop smoking cigarettes.

Secondhand Smoke

Secondhand smoke, or environmental tobacco smoke (ETS), contains numerous human carcinogens for which there is no safe level of exposure. Scientific consensus groups have repeatedly reviewed the data on ETS. These include the US Environmental Protection Agency,[25] California Environmental Protection Agency,[26] and the National Institute of Environmental Sciences' National Toxicology Program.[27] Public policies to protect people from secondhand smoke are based on the following effects of ETS:

- Each year, about 3,000 nonsmoking adults die of lung cancer as a result of breathing secondhand smoke.[25]
- ETS causes an estimated 35,000 to 40,000 deaths from heart disease in people who are not current smokers.[28]
- ETS causes coughing, phlegm, chest discomfort, and reduced lung function in nonsmokers.[25]
- Each year, exposure to secondhand smoke causes 150,000 to 300,000 lower respiratory tract infections (such as pneumonia and bronchitis) in US infants and children younger than 18 months of age. These infections result in 7,500 to 15,000 hospitalizations every year.[25]
- Secondhand smoke increases the number of asthma attacks and the severity of asthma in about 200,000 to 1 million asthmatic children.[25]
- Secondhand smoke contains over 4,000 substances, more than 40 of which are known or suspected to cause cancer in humans and animals and many of which are strong irritants.[25]

Momentum to regulate public smoking began to increase in 1990. Forty-five states have approved some form of clean indoor air law affecting public schools, and 43 states have laws regulating smoking in health care facilities. State laws that regulate smoking in government worksites have been enacted in 39 states.[29]

- During 1998-1999, 79% of worksites with at least 50 or more employees had formal policies that prohibited smoking or limited it to separately ventilated areas.[30]
- As compared to more educated indoor workers, less educated workers are more likely to work at worksites with less restrictive nonsmoking policies. Among indoor workers with a high school degree or less education, 63% reported that their workplace had a smoke-free policy, while among indoor workers with a

college degree or greater, 84% reported to work in places with a smoke-free policy.[31]

Worldwide Tobacco Use

While the prevalence of smoking has been slowly declining in the United States and most other high-income countries over the past 20 years, smoking prevalence rates have been steadily rising in many developing nations.

- Tobacco consumption rates are increasing in developing nations at a rate of about 3.4% per year.[32]
- Smoking prevalence rates among men in some developing countries are about 50% or higher; rates among women are often substantially lower but are increasing.[32]
- Based on current patterns, smoking-related diseases will kill about 500 million of the world's 1.2 billion smokers alive today.[32]
- In 2000, there were 5 million smoking-related premature deaths worldwide.[1] It is expected that this number will increase to about 10 million per year by 2030, with 70% of these deaths occurring in developing nations. By 2030, tobacco's annual death toll will be higher than the combined mortality due to malaria, pneumonia, tuberculosis, and diarrheal diseases.[33]
- In China, for example, where approximately two-thirds of the male population smokes, tobacco currently kills 800,000 people per year and will eventually kill 100 million of the 300 million Chinese males now aged 0-29 if rates are not reduced.[34]
- Today, about 9% of women in developing countries and 15% of women in developed countries smoke.[35] It is predicted that by 2025, both figures will rise to 20%, with a total of 532 million female smokers worldwide.[36]
- Recent increases in female smoking prevalence have been reported in many developing countries including Cambodia, Malaysia, and Bangladesh.[37]
- In some countries, smoking prevalence is actually higher in women than in men, including Paraguay, the Cook Islands, Nauru, Norway, Papua New Guinea, and Sweden.[37]
- In a survey of European countries, girls aged 15-16 were more likely to have smoked 40 times or more compared to boys in Bulgaria, Denmark, Greenland, Ireland, Italy, Malta, Norway, Slovenia, and the United Kingdom.[38]
- The first Global Youth Tobacco Survey (GYTS) found that among youth aged 13-15, current tobacco use prevalence ranged from 3.3% to 62.8%. Nearly 25% of youths who smoke reported smoking their first cigarette before age 10.[39]

To curtail the global tobacco pandemic, World Health Organization member states started negotiating in 1999 to promulgate the first global public health treaty, the Framework Convention on Tobacco Control (FCTC).[40] On May 21, 2003, the FCTC was endorsed by member states. The treaty features specific provisions to control both the global supply and demand for tobacco, including regulation of tobacco product contents, packaging, labeling, advertising, promotion, sponsorship, taxation, smuggling, access as well as provisions related to youth, exposure to secondhand tobacco smoke, and environmental and agricultural impacts.

US Costs of Tobacco Use

The number of people who prematurely die or suffer illness from tobacco use results in substantial health-related economic costs to society. From 1995-1999, adult male and female smokers lost an average of 13.2 and 14.5 years of life, respectively, due to smoking.[4] Additional data showed:[4]

- Smoking caused approximately $157.7 billion in annual health-related economic costs, including adult mortality-related productivity costs, adult medical expenditures, and medical expenditures for newborns.
- Mortality-related productivity losses in the US amounted to $81.9 billion annually during 1995-1999 or $1,760 in lost productivity per adult smoker in 1999.
- Smoking-related medical costs totaled $75.5 billion in 1998, and accounted for 8% of personal health care medical expenditures. This translates to $1,623 in excess medical expenditures per adult smoker in 1999.
- Smoking-attributable costs for newborns were $366 million in 1996 or $704 per maternal smoker.
- For each pack of cigarettes sold in 1999, $3.45 was spent on medical care due to smoking and $3.73 in productivity losses, for a total of $7.18 per pack.
- A recent review of the costs of treating smoking-attributable diseases in the United States showed that they range from 6%-8% of personal health expenditures.[41]

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Nutrition and Physical Activity

Scientific evidence suggests that about one-third of the cancer deaths that occur in the US each year are due to nutrition and physical activity factors, including obesity. For the majority of Americans who do not use tobacco, dietary choices and physical activity are the most important modifiable determinants of cancer risk.

Evidence also indicates that although inherited genes do influence cancer risk, heredity alone explains only a fraction of all cancers. Most of the variation in cancer risk across populations cannot currently be explained by inherited factors; behavioral factors such as cigarette smoking, certain dietary patterns, physical activity, and weight control can substantially affect the risk of developing cancer. These factors modify cancer risk at all stages of its development.

The American Cancer Society reviewed the scientific evidence and updated its nutrition and physical activity guidelines in 2001. Changes from the Society's 1996 guidelines include increased emphasis on the role of physical activity and weight control in reducing cancer risk and the addition of a physical activity recommendation for youth due to increasing trends in overweight and obesity in this age group. Because healthful individual behaviors are most likely to occur when there is social and environmental support in communities, these 2001 guidelines included, for the first time, an explicit *Recommendation for Community Action* to facilitate healthful food choices and opportunities for physical activity in schools, worksites, and communities.

The Society's recommendations are consistent in principle with the *2000 Dietary Guidelines for Americans*, and recommendations of other agencies for general health promotion and for the prevention of coronary heart disease, diabetes, and other diet-related chronic conditions. Although no diet can guarantee full protection against any disease, the Society believes that the following recommendations reflect the best nutrition and physical activity information currently available to help Americans reduce their risk of cancer.

Recommendations for Individual Choices

1. Eat a variety of healthful foods, with an emphasis on plant sources.

- Eat five or more servings of vegetables and fruits each day.
- Choose whole grains instead of processed (refined) grains and sugar.
- Limit consumption of red meats, especially high-fat and processed meats.
- Choose foods that help maintain a healthful weight.

There is strong scientific evidence that healthful dietary patterns, in combination with regular physical activity, are needed to maintain a healthful body weight and to reduce cancer risk. Many epidemiologic studies have shown that populations that eat diets high in vegetables and fruits and low in animal fat, meat, and/or calories have reduced risk of some of the most common cancers. The scientific study of nutrition and cancer is highly complex, and many important questions remain unanswered. It is not presently clear how single nutrients, combinations of nutrients, overnutrition and energy imbalance, or the amount and distribution of body fat at particular stages of life affect one's risk of specific cancers. Until more is known about the specific components of diet that influence cancer risk, the best advice is to consume a mostly plant-based diet and decrease consumption of processed foods.

2. Adopt a physically active lifestyle.

- **Adults:** Engage in at least moderate activity for 30 minutes or more on 5 or more days of the week; 45 minutes or more of moderate to vigorous activity on 5 or more days per week may further enhance reductions in the risk of breast and colon cancer.
- **Children and adolescents:** Engage in at least 60 minutes per day of moderate to vigorous physical activity at least 5 days per week.

Scientific evidence indicates that physical activity may reduce the risk of certain cancers as well as provide other important health benefits. Regular physical activity contributes to the maintenance of a healthy body weight by balancing caloric intake with energy expenditure. Other mechanisms by which physical activity may help to prevent certain cancers may involve both direct and indirect effects. For colon cancer, physical activity accelerates the movement of food through the intestine, thereby reducing the length of time that the bowel lining is exposed to potential carcinogens. For breast cancer, vigorous physical activity may decrease the exposure of breast tissue to circulating estrogen. Physical activity may also affect cancers of the colon, breast, and other sites by improving energy metabolism and reducing circulating concentrations of insulin and related growth factors. Physical activity helps to prevent Type II diabetes, which is associated with increased risk of cancers of the colon, pancreas, and possibly other sites. The benefits of physical activity go far beyond reducing the risk of cancer. They include reducing the risk of heart disease, high blood pressure, diabetes, falls, osteoporosis, stress, and depression.

3. Maintain a healthful weight throughout life.

- Balance caloric intake with physical activity.
- Lose weight if currently overweight or obese.

Overweight and obesity are associated with increased risk for cancers at several sites, including breast (among postmenopausal women), colon, endometrium, adenocarcinoma of the esophagus, and kidney. The best way to achieve a healthful body weight is to balance energy intake (food intake) with energy expended (physical activity). Excess body fat can be reduced by restricting caloric intake and increasing physical activity. Caloric intake can be reduced by decreasing the sizes of food portions and limiting the intake of high-calorie foods (e.g., those high in fat and refined sugars such as fried foods, cookies, cakes, candy, ice cream, and soft drinks). Such foods should be replaced with more healthful vegetables and fruits, whole grains, and beans. Because overweight in youth tends to continue throughout life, the increasing prevalence of overweight and obesity in pre-adolescents and adolescents may increase incidence of cancer in the future. For these reasons, efforts to establish a healthful weight and healthful patterns of weight gain should begin in childhood.

4. If you drink alcoholic beverages, limit consumption.

People who drink alcohol should limit their intake to no more than 2 drinks per day for men and 1 drink a day for women. Alcohol consumption is an established cause of cancers of the mouth, pharynx, larynx, esophagus, liver, and breast. For each of these cancers, risk increases substantially with intake of more than 2 drinks per day. Alcohol consumption combined with tobacco use increases the risk of cancers of the mouth, larynx, and esophagus far more than the independent effect of either drinking or smoking. Regular consumption of even a few drinks per week has been associated with an increased risk of breast cancer in women. The mechanism for an effect of alcohol on breast cancer is not known with certainty, but may be due to alcohol-induced increases in circulating estrogens or other hormones in the blood, reduction of folic acid levels, or to a direct effect of alcohol or its metabolites on breast tissue.

The American Cancer Society Recommendation for Community Action

Public, private, and community organizations should work to create social and physical environments that support the adoption and maintenance of healthful nutrition and physical activity behaviors.

- Increase access to healthful foods in schools, worksites, and communities.
- Provide safe, enjoyable, and accessible environments for physical activity in schools and for transportation and recreation in communities.

The American Cancer Society guidelines relate to individual choices regarding diet and physical activity patterns, but those choices occur within a community context that either facilitates or interferes with healthy behaviors. It is clear that many environments in which people live, work, play, and go to school are barriers to these healthy behaviors. Therefore, this key recommendation for community action accompanies the four guidelines for individual choices for nutrition and physical activity to reduce cancer risk. This recommendation for community action underscores the importance of community measures to support healthy behaviors by increasing access to healthful food choices and opportunities to be physically active.

Environmental Cancer Risks

Environmental factors, defined broadly to include smoking, diet, and infectious diseases as well as chemicals and radiation, cause an estimated three-quarters of all cancer deaths in the United States. Among these factors, tobacco use, obesity, and physical inactivity have a greater effect on individual cancer risk than do trace levels of pollutants in food, drinking water, and air. However, the degree of risk from pollutants depends on the concentration, intensity, and duration of exposure. Substantial increases in risk have been shown in settings where workers have been exposed to high concentrations of ionizing radiation, certain chemicals, metals, and other substances, as well as nonoccupational exposure from radiation accidents, nuclear bombs, and patients treated with certain drugs or therapies. (In some cases persons were treated with drugs or therapies which were not known to be carcinogenic, but which were later found to cause cancer.) In some cases, treatments such as radiation therapy are used even though they are known to cause cancer because the benefits of the treatment outweigh the risks.

Even low-dose exposures that pose only a small risk to individuals can still cause substantial ill health across an entire population if the exposures are widespread. For example, secondhand tobacco smoke increases risk in large numbers of people who do not smoke but who are exposed to others' smoke. Strong regulatory control and attention to safe occupational practices, drug testing, and consumer product safety play an important role in reducing risk of cancer from environmental exposures. Additional information on environmental factors associated with cancer risks can be found on several Web sites, including www.atsdr.cdc.gov, www.epa.gov, www.niehs.nih.gov, www.osha.gov, and www.who.int.

Risk Assessment

Risk assessment evaluates both the cancer-causing potential of a substance as well as the levels of the substance in the environment and the extent to which people are actually exposed. However, the process is not perfect. For most potential carcinogens, data are only available from high-dose experiments in animals or highly exposed occupational groups. To use such information to set human safety standards, regulators must extrapolate from animals to humans and from high-dose to low-dose conditions. Because both extrapolations involve much uncertainty, as does the effect of mixtures of chemicals and of especially susceptible subgroups of the population, risk assessment generally makes conservative assumptions to err on the side of safety. For cancer safety standards, regulatory agencies seek to limit exposures in the general population to levels that do not increase risk by more than one case per million persons over a lifetime.

Safety standards developed in this way for chemical or radiation exposures are the basis for federal regulatory activities at the Food and Drug Administration, the Environmental Protection Agency, and the Occupational Safety and Health Administration. The application of laws and procedures by which standards are implemented and risks are controlled is called risk management.

Chemicals

Various chemicals (for example, benzene, asbestos, vinyl chloride, arsenic, aflatoxin) show definite evidence of causing cancer in humans. Others are considered probable human carcinogens based on evidence from animal experiments (for example, chloroform, dichlorodiphenyltrichloroethane [DDT], formaldehyde, polychlorinated biphenyls [PCBs], polycyclic aromatic hydrocarbons). Often in the past, direct evidence of human carcinogenicity has come from studies of workplace conditions involving sustained, high-dose exposures. For some exposures (asbestos and arsenic), the risks are increased when combined with cigarette smoking.

Radiation

The only types of radiation proven to cause human cancer are high-frequency ionizing radiation (IR) and ultraviolet (UV) radiation. Exposure to sunlight (UV radiation) causes almost all cases of basal and squamous cell skin cancer and is a major cause of skin melanoma. Disruption of the earth's ozone layer by pollution (the "ozone hole") may cause increased levels of UV radiation.

Evidence that high-dose IR (x-rays, radon, etc.) causes cancer comes from studies of atomic bomb survivors, patients receiving radiotherapy, and certain occupational groups, such as uranium miners. Virtually any part of the body can be affected by IR, but bone marrow and the thyroid gland are particularly vulnerable. Diagnostic medical and dental x-rays are set at the lowest dose levels possible to minimize risk without losing image quality and medical usefulness. Exposure to high levels of radon, the result of working in uranium mines, increases lung cancer risk, producing an especially high rate of lung cancer among miners who smoke. Radon exposures in homes can also increase lung cancer risk. Fortunately, there are tests which can be used to detect high levels of radon. Remedial actions may be needed if those levels are too high.

Unproven Risks

Public concern about cancer risks in the environment often focuses on unproven risks or on situations in which known carcinogen exposures are at such low levels that risks are negligible, for example:

Pesticides. Many kinds of pesticides (insecticides, herbicides, etc.) are widely used in agriculture in the production of the food supply. High doses of some of these chemicals have been shown to cause cancer in animals, but the very low concentrations found in some foods have not been associated with increased cancer risk. In fact, people who eat more fruits and vegetables, which may be contaminated with trace amounts of pesticides, generally have lower cancer risks than people who eat few fruits and vegetables. Workers exposed to higher levels of pesticides, in industry or farming, may be at higher risk of certain cancers. Environmental pollution by pesticides such as DDT, which is now banned but formerly was used in agriculture, degrade slowly and can lead to accumulation in body fat. These residues have been suggested as a possible risk factor for breast cancer, although study results have been largely negative.

Continued research regarding pesticide use is essential for maximum food safety, improved food production through alternative pest control methods, and reduced pollution of the environment. In the meantime, pesticides play a major role in sustaining our food supply. When properly controlled, the minimal risks they pose are greatly overshadowed by the health benefits of a diverse diet rich in foods from plant sources.

Non-ionizing radiation. Electromagnetic radiation at frequencies below ionizing and ultraviolet levels has not been proven to cause cancer. Some studies suggest an association with cancer, but most of the now-extensive research in this area does not. Low-frequency radiation includes radiowaves, microwaves, and radar, as well as power frequency radiation arising from the electric and magnetic fields associated with electric currents, cellular phones, and household appliances.

Toxic wastes. Toxic wastes in dump sites can threaten human health through air, water, and soil pollution. Many toxic chemicals contained in such wastes can be carcinogenic at high doses, but most community exposures appear to involve very low or negligible dose levels. Cleanup of existing dumpsites and close control of toxic materials in the future are essential to ensure healthy living conditions.

Nuclear power plants. Ionizing radiation emissions from nuclear facilities are closely controlled and involve negligible levels of exposure for communities near the plants. Reports about cancer case clusters in such communities have raised public concern, but studies show that clusters do not occur more often near nuclear plants than they do by chance elsewhere.

The American Cancer Society

In 1913, 10 physicians and five laypeople founded the American Society for the Control of Cancer. Its stated purpose was to disseminate knowledge about the symptoms, treatment, and prevention of cancer; to investigate conditions under which cancer was found; and to compile statistics about cancer. Later renamed the American Cancer Society, Inc., the organization now includes more than two million friends and volunteers working to conquer cancer.

For nearly a century, the American Cancer Society has continued to make significant progress toward victory over cancer. The Society has helped lead the way in cancer research, education, advocacy, and service. As a result, we have seen remarkable strides in cancer science, prevention, and treatment and in cancer patients' quality of life. Today, more than ever, our goals of saving lives and improving the quality of lives are within reach.

Organization: The American Cancer Society consists of a National Home Office with 14 chartered Divisions throughout the country and a local presence in most communities.

The National Society: A National Assembly provides basic representation from the Divisions. The Assembly approves the charters for the 14 Divisions and elects a volunteer Board of Directors. The Board of Directors sets and approves strategic goals for the Society, ensures management accountability, and provides stewardship of donated funds. The National Home Office is responsible for overall planning and coordination of the Society's programs for cancer information delivery, cancer control and prevention, advocacy, resource development, and patient services. The National Home Office also provides technical support and materials to Divisions and local offices and administers the intramural and extramural research programs.

The Divisions: These are governed by Division Boards of Directors comprised of both medical and lay volunteers throughout the US and Puerto Rico. The Society's 14 Divisions are responsible for program delivery in their regions.

Local offices: Local offices are organized to deliver cancer prevention, early detection, and patient services programs at the community level. Descriptions of some of the Society's major programs follow.

Advocacy and Public Policy

Every day legislators make decisions affecting the lives of millions of Americans who have been touched by cancer. Laws and policies can fund cancer research, ensure access to care, offer screening and treatment to the medically underserved, and reduce suffering from tobacco-related illnesses. The Society's advocacy efforts help ensure that lawmakers at every level of government adopt policies, laws, and regulations that will help us win the fight against cancer.

Advocacy Priorities

The Society's advocacy efforts work in concert with its research, education, and service initiatives to strengthen our nation's laws and regulations in a way that will:

- Support cancer research and programs to prevent, detect, and treat cancer
- Expand access to quality cancer care, prevention, and awareness
- Reduce cancer disparities in minority and medically underserved populations
- Reduce and prevent suffering from tobacco-related illnesses

The federal government is the largest source of funding for cancer research and programs to prevent, detect, and treat cancer, providing billions of dollars each year to fuel the fight. That investment has yielded remarkable returns. Since the passage of the National Cancer Act in 1971, we have nearly doubled cancer patients' five-year survival rates. But to reach the next level of medical breakthroughs, our nation needs to invest even more in research. Scientists, doctors, nurses, and other caregivers are pushing every day to find better ways to prevent and treat cancer. The federal government must support their momentum by increasing research funding and funding for proven cancer programs that put effective research to work. By urging legislators to fund research and its application, the American Cancer Society helps move our nation that much closer to our ultimate goal – defeating cancer.

Many patients face a variety of financial and bureaucratic barriers that keep cancer prevention and early detection tools and lifesaving treatments, such as clinical trials, out of their reach. Legislation can effectively remove these barriers by ensuring that all people, regardless of their insurance status, have access to quality cancer prevention, screening, and treatment – including effective pain management, appropriate follow-up care

for cancer survivors, and comfortable, dignified end-of-life care.

Cancer is an equal opportunity disease. People who are poor, who lack adequate health insurance, who have lower education levels, who live in rural areas, or who belong to a racial or ethnic minority group are more likely to develop and die of cancer. Expanding prevention education and increasing access to and participation in cancer screening programs can dramatically reduce this unfair burden. In addition to requesting funding for research that will determine how to best reach, protect, and treat underserved groups, the Society also urges policymakers to enact and fund "patient navigator" programs that provide outreach for cancer awareness, screening, and treatment.

Tobacco is responsible for nearly one-third of all cancer deaths. Federal, state, and local governments all have a role to play in helping the Society reduce the nation's enormous tobacco-related cancer burden. Steps must be taken to help tobacco users quit and to keep children from starting. For example, the Society advocates for increased tobacco taxes, which are a proven means of reducing consumption, especially among young people. Policies that ensure all employees work in a smoke-free environment reduce illnesses from secondhand smoke and encourage smokers to quit. In addition, effective local, state, and federal tobacco control programs must be sufficiently funded, and to further protect children, the Food and Drug Administration (FDA) must have meaningful regulatory authority over tobacco products. The American Cancer Society encourages lawmakers to embrace these and other tobacco control policies.

Advocacy Successes

American Cancer Society advocacy initiatives rely on the combined efforts of a community-based grassroots network of cancer survivors and caregivers, Society volunteers and staff, health care professionals, public health organizations, and other collaborative partners. The American Cancer Society, through its local, state, and federal efforts, has successfully influenced or supported policies, laws, and regulations that:

- Restored $1 billion in cuts to the National Institutes of Health (NIH) for fiscal year 2003, ensuring the completion of the five-year effort to double the NIH budget.
- Led the effort to secure additional funding for cancer research at the NIH and the National Cancer Institute (NCI), as well as resources for the NIH Center on Minority Health and Health Disparities.
- Improved our ability to apply research findings in cancer-related screening and early detection programs provided by the Centers for Disease Control and Prevention (CDC) and the Health Resources and Services Administration (HRSA).
- Secured two new Medicare benefits: coverage for an initial physical exam for new Medicare beneficiaries and transitional coverage for oral anticancer drugs like Gleevec and tamoxifen until the full prescription drug benefit goes into effect. Once the full prescription drug benefit goes into effect in January 2006, oral anticancer drugs will be a covered benefit.
- Enabled New York, Connecticut, Maine, Florida, and Oklahoma to institute smoke-free workplaces statewide. (The cities of Boston, Dallas, Austin, Albuquerque, and Toledo also went smoke-free.)
- Expanded health care coverage for the full range of colorectal cancer screening tests to people 50 and older or at a high risk for the disease in 18 states and the District of Columbia and for many federal employees.
- Expanded access to clinical trials in a total of 18 states and for Medicare beneficiaries in all states.
- Secured passage of tobacco excise tax increases in more than 30 states since 2002.
- Developed and promoted landmark "patient navigator" legislation to reduce barriers and expand access to care for ethnic minorities and other medically underserved communities.
- Made major strides toward passage of meaningful FDA regulatory authority over tobacco products.

In addition, the Society continued to build on the success of Relay for Life® Celebration on the Hill by integrating and deploying 3,000 Relay Community Ambassadors into the Society's growing grassroots network. Grassroots volunteer power makes the Society's legislative accomplishments possible.

Cancer Information

Providing the public with up-to-date, reliable cancer information anytime, day or night, is a priority for the American Cancer Society. Through our toll-free cancer information service at 1-800-ACS-2345, trained specialists answer calls 24 hours a day, seven days a week. At www.cancer.org, visitors can find the latest cancer news, links to community resources and events, and available books. They can also email cancer questions and receive prompt answers. An online community of fellow patients, survivors, and caregivers who understand and

inspire is also available via the Cancer Survivors Network℠.

National Cancer Information Center – 1-800-ACS-2345

People facing cancer need clear, reliable information in order to understand their disease and make informed decisions about their health. Trained cancer information specialists are available 24 hours a day, seven days a week, to answer questions about cancer, link callers with resources in their communities, and provide information on local events. Cancer information specialists answer calls in both English and Spanish, and translation services are available for callers who speak languages other than English and Spanish. The National Cancer Information Center includes an email response center staffed by cancer information specialists who reply to questions and comments submitted through the Society's Web site. Last year, trained cancer information specialists received more than 1.2 million calls and responded to close to 37,000 emails.

American Cancer Society Web Site – www.cancer.org

The American Cancer Society's Web site is an important extension of the Society's mission to provide lifesaving information to the public. The user-friendly site includes an interactive cancer resource center containing in-depth information on every major cancer type. Information is also available in Spanish. Through the Web site, visitors can order American Cancer Society publications, gain access to daily cancer-related articles and personal stories of cancer, and find additional online and offline resources. Other useful sections of the Web site include a directory of medical resources; links to other sites organized by cancer type or topic; resources for media representatives; and information on the Society's research grants program, advocacy efforts, and special events. In the last year, the Society's Web site has averaged more than one million visits each month.

Publications

The Society publishes patient education brochures and pamphlets; consumer books for patients, families, and friends; and professional books and journals for health care professionals. The Society's book-publishing portfolio covers a wide array of topics: books on specific cancer types; psychosocial, quality-of-life, and caregiving issues; prevention, children's books, and cookbooks; and specialized cancer-related and clinical oncology titles for health care professionals. A complete list of book publications is available online at www.cancer.org/bookstore.

The Society also publishes three clinical journals, *Cancer*, *Cancer Cytopathology*, and *CA: A Cancer Journal for Clinicians*. In the United States, a free print subscription to *CA* is available to physicians, nurses, and other health care professionals by emailing journals@cancer.org. Free online access to all *CA* content may be obtained via the journal's Web site at http://CAonline.amcancersoc.org.

Community Cancer Control

Community Cancer Control

Community cancer control encompasses activities at the local, state, regional, and national levels that have a positive impact on the entire spectrum of cancer prevention, early detection, effective treatment, survival, and quality of life. Across the country, the Society seeks to fulfill its mission to save lives and diminish suffering from cancer through community-based programs aimed at reducing cancer risk, detecting it early, ensuring proper treatment, and empowering people facing cancer to cope with the disease and maintain the highest possible quality of life.

Prevention

Primary cancer prevention means taking the necessary precautions to prevent the occurrence of cancer in the first place. The Society's prevention programs focus on tobacco control; the relationship between diet, physical activity, and cancer; promoting coordinated school health; and reducing the risk of skin cancer. The Society also promotes colorectal and cervical cancer screening, which can find polyps in the colon and lesions on the cervix before they become cancerous. Other Society programs are designed to help adults and children make health-enhancing decisions.

The American Cancer Society collaborates with several national groups to implement comprehensive tobacco control programs. The Society advocates for social and environmental change at the national, state, and community levels to prevent youth from starting to use tobacco and to support those who wish to stop.

Tobacco control efforts include:

- Reducing tobacco advertising and promotions directed at youth
- Increasing funding to support comprehensive tobacco control programs
- Reducing environmental tobacco smoke exposure
- Supporting effective, coordinated school-based education programs

- Providing cessation programs for those who wish to quit
- Increasing tobacco taxes to offset health care costs associated with its use
- Supporting a global partnership to reduce tobacco-related death and diseases

Eating well, being physically active, and maintaining a healthy weight are also important ways to reduce cancer risk. The Society publishes *Guidelines on Nutrition and Physical Activity for Cancer Prevention* that offer the best evidence available to help people reduce their risk of cancer through healthy foods and physical activity. We work to increase public awareness of these lifestyle factors' impact on cancer risk through media, education, and programming activities. In collaboration with national, state, and local groups, we help schools, worksites, and communities increase the availability of healthy foods and opportunities for safe, enjoyable physical activity. We also collaborate to increase funding for these comprehensive strategies.

Because up to 60 percent of cancers may be prevented through healthy lifestyle behaviors that often begin in childhood, children and youth are an important audience for cancer prevention. The Society, together with the Centers for Disease Control and Prevention (CDC) and a host of other education, health, and social service agencies, has identified schools as a key system for effective cancer prevention. By helping the 15,000 school districts in the US deliver strong, coordinated school health programs and quality school health education, the American Cancer Society has the ability to positively influence more than 45 million school children.

The Society has joined other health, education, and social service agencies to promote comprehensive school health education and the National School Health Education Standards. Comprehensive school health education is a planned health education curriculum for preschool through grade 12. The standards help schools, parents, and communities create an instructional program that will enable students to become healthy and achieve academic success. The Society's school health education programs emphasize the importance of developing good health habits and can be an integral part of a comprehensive school health education curriculum.

Specific efforts the Society has developed to strengthen schools' ability to teach cancer prevention include conducting a National School Health Coordinator Leadership Institute, creating a series of social marketing campaigns on the benefits of school health, and coordinating the development of a Healthy Kids Network of parents and community members.

The Society promotes its skin cancer prevention message through a variety of media, awareness, and education activities, as well as through the National Council on Skin Cancer Prevention. Founded in 1998 by the Centers for Disease Control and Prevention, the Council has been co-sponsored by the American Cancer Society, American Academy of Dermatology, and the Skin Cancer Foundation since 2002. The Council is comprised of 30 organizations, and its purpose is to ensure consistent messages to the public about skin cancer prevention and early detection. The Council plays a crucial role in promoting skin cancer awareness and prevention efforts nationwide.

Detection and Treatment

The Society also seeks, through its early cancer detection guidelines and its cancer detection and advocacy programs, to ensure that cancer is diagnosed at the earliest possible stage – when there is the greatest likelihood of successful treatment. The Society reviews its guidelines annually to ensure that recommendations to the public and health care providers are based on the most current scientific evidence. The Society currently offers prevention and early detection recommendations for cancers of the breast, cervix, colon and rectum, prostate, and endometrium, as well as provides guidance about testing for lung cancer and general recommendations for a cancer-related checkup. (For more information, see Screening Guidelines, page 56.)

The Society also works in partnership with many public and private organizations in diverse settings to increase awareness about breast cancer and the importance of early detection, and to overcome the barriers to regular mammography. The American Cancer Society collaborates with the CDC to advocate for and support the implementation of the National Breast and Cervical Cancer Early Detection Program (NBCCEDP). Since 1990 NBCCEDP has helped low-income, uninsured, and medically underserved women gain access to lifesaving screening programs for early detection of breast and cervical cancers.

Similarly, the Society works with the CDC to lead a national initiative to increase colorectal cancer screening, which is currently inadequately used by adults. In addition to public outreach campaigns and initiatives targeting health care providers, the American Cancer

Society and the CDC have established the National Colorectal Cancer Roundtable, bringing leading government agencies, professional and medical organizations, and advocacy and patient groups together to identify collective strategies and opportunities to increase screening for colorectal cancer. Working with The Advertising Council, the premier nonprofit communications organization dedicated to stimulating action on public issues, the Society has reached millions of people with the lifesaving colorectal cancer screening message: "Get the test. Get the polyp. Get the cure." Using a larger-than-life polyp character to grab attention, this campaign is designed to educate the public that screening tests can prevent this disease by removing polyps before they become cancerous.

The availability of genetic testing for inherited risk for cancer has raised a complex set of questions about the medical, psychosocial, ethical, legal, policy, and quality-of-life implications of using genetic information. The Society is working with other national organizations to address these issues through advocacy and educational initiatives.

As the delivery of health care continues to change, the Society is working with groups in all sectors of the health care system to ensure that all individuals are offered a full range of services that enable them to reduce their risk of getting cancer or to find their cancer at an early, treatable stage. The Society also collaborates to ensure that persons with cancer receive the highest quality care.

Patient Services

The Society offers a range of practical and emotional services for patients, their families, their caregivers, and their communities from the time of diagnosis throughout life.

Cancer Survivors Network℠: Created by and for cancer survivors and their families, this "virtual" community offers unique opportunities and accessibility to survivors, caregivers, and all those touched by cancer. It is a welcoming, safe place for people to find hope and inspiration from others who have "been there." Services include radio talk show conversation and interviews, individual stories, personal Web pages, discussion forums, an Expression Gallery, and more – available online at www.cancer.org or by phone at 1-877-333-4673 (HOPE).

I Can Cope®: Adult cancer patients and their loved ones learn ways to navigate the cancer experience while building their knowledge, coping skills, and positive attitudes. In this series of educational classes, doctors and other health care professionals provide information, encouragement, and practical tips in a supportive environment.

Hope Lodge®: This home-like environment provides free, temporary sleeping accommodations for cancer patients undergoing treatment and their family members. It makes the cancer treatment process a little easier by providing a supportive environment and lifting the financial burden of an extended stay.

"tlc" Tender Loving Care®: A magazine and catalog in one, *"tlc"* supports women dealing with hair loss and other physical effects of cancer treatment. The magalog offers a wide variety of affordable products, such as wigs, hats, and prostheses, through the privacy and convenience of mail order.

Look Good…Feel Better®: Through this free service, women in active cancer treatment learn techniques to restore their self-image and cope with appearance-related side effects. Certified beauty professionals provide tips on makeup, skin care, nail care, and head coverings. This program is a partnership among the American Cancer Society, the Cosmetic, Toiletry, and Fragrance Association Foundation, and the National Cosmetology Association.

Road to Recovery℠: This service assists cancer patients and their families with transportation to and from treatment facilities. Volunteer drivers donate their time and resources to take patients to appointments and to return them to their homes.

Reach to Recovery®: Breast cancer survivors provide one-on-one support and information to help individuals cope with breast cancer. Specially trained survivors serve as volunteers, responding in person or by phone to the concerns of people facing breast cancer diagnosis, treatment, recurrence, or recovery.

Man to Man®: This comfortable, community-based setting for discussion and education provides men facing prostate cancer with support individually or in groups. Man to Man also offers men the opportunity to educate their communities about prostate cancer and to advocate with lawmakers for stronger research and treatment policies.

Children's Camps: In some areas, the Society sponsors camps for children who have, or have had, cancer. These camps are equipped to handle the special needs of children undergoing treatment.

Pain Control

Cancer pain management is a serious public health problem and a major priority for the Society. Approximately 50 to 70 percent of people with cancer experience some degree of pain. Fewer than half of them get adequate relief from their pain, and this negatively affects their quality of life. The Society is working aggressively to eliminate barriers to cancer-related pain relief across the survivorship continuum and to enhance and expand tools that educate the public, patients, families, and health care providers about the availability of treatments that effectively manage most cancer pain.

Research

The American Cancer Society's comprehensive research program has three components: extramural grants that fund researchers at universities, research institutes, and cancer centers throughout the US; intramural epidemiology and surveillance research; and the intramural behavioral research center. The intramural programs are dedicated to research conducted by the Society's own in-house scientists.

As the largest source of private, nonprofit cancer research funds in the US, the Society dedicated more than $126 million to research and health professional training in 2002. Since 1946, when the Society awarded its first research grants, we have invested more than $2.5 billion in research. The investment has paid rich dividends: the five-year survival rate has almost tripled since 1946, and diagnosis and mortality rates have declined each year since 1990. Society-supported researchers have contributed to many of the advances that make the conquest of cancer a feasible goal.

Extramural Grants

The American Cancer Society's extramural grants program supports the best research in a wide range of disciplines at more than 160 of the top US medical schools and universities. Grant applications are solicited through a nationwide competition and are subjected to a rigorous external peer review, ensuring that only the most promising research is funded. The Society most often funds investigators at the beginning of their research careers, a time when they are less likely to receive funding from the federal government. The Society's priorities focus on needs that are unmet by other funding organizations, such as our current targeted research area of cancer in the poor and medically underserved. Thirty-two Nobel Prize winners received grant support from the Society early in their careers.

Epidemiology and Surveillance Research

For more than 50 years, the Society's intramural epidemiologic research program has evaluated trends in cancer incidence, mortality, and survival. Current information is available in several formats, including *Cancer Facts & Figures*, *Breast Cancer Facts & Figures*, and separate versions of *Cancer Facts & Figures for African Americans and Hispanic/Latinos*. *Cancer Prevention & Early Detection Facts & Figures* presents trends in cancer risk factors such as tobacco use, obesity, physical inactivity, and nutritional factors. These documents, as well as cancer statistics slides, are available on www.cancer.org.

Since 1998 the department has collaborated with the National Cancer Institute, the Centers for Disease Control and Prevention, the National Center for Health Statistics, and the North American Association of Central Cancer Registries to produce the annual Report to the Nation on progress related to cancer prevention and control in the United States. Internationally, the department collaborates with the World Health Organization to publish tobacco control country profiles and a monograph on tobacco consumption, production, and trade in 197 countries.

Researchers in the department also study factors that cause or prevent cancer in large prospective studies. Three such studies have been undertaken over the past 50 years:

- Hammond-Horn (188,000 men studied from 1952-1955)
- Cancer Prevention Study I (1 million people studied from 1959-1972 in 25 states)
- Cancer Prevention Study II (CPS-II, an ongoing study of 1.2 million people enrolled in 1982 by 77,000 volunteers in 50 states)

Nearly 300 scientific publications resulting from these studies have examined the contribution of lifestyle (smoking, nutrition, obesity, etc.), family history, illnesses, medications, and environmental exposures to various cancers. Mortality follow up of all CPS-II cohort members, as well as cancer incidence follow up and periodic updating of exposure information in the CPS-II Nutrition Cohort (a subgroup of 184,000 men and women) continues.

In 1998, the CPS-II LifeLink Study obtained blood samples from approximately 40,000 surviving members of the CPS-II Nutritional Cohort residing in urban and

suburban areas. An additional 70,000 buccal (cheek) cell samples were obtained, providing DNA specimens on more than 100,000 cohort members. These samples are being stored in liquid nitrogen for epidemiologic studies of nutritional, hormonal, and genetic factors related to cancer and other diseases. Additional information about the cancer prevention studies is available at www.cancer.org, including copies of questionnaires and publication citations.

Behavioral Research Center

The Behavioral Research Center (BRC) was established in 1995 to conduct original behavioral and psychosocial cancer research, to provide consultation to the Society, and to translate behavioral and psychosocial research and theory into effective cancer control policies.

The Center's ongoing research includes:

- An extensive nationwide, longitudinal study of adult cancer survivors to determine the unmet psychosocial needs of survivors and their significant others, to identify factors that affect their quality of life, to evaluate programs intended to meet their needs, and to examine late effects, including second cancers.
- A cross-sectional national study of cancer survivors who are two, five, and 10 years from their initial diagnosis and treatment. This study will evaluate the psychological needs, adjustment, and quality of life of cancer survivors and provide information on long-term cancer survivors.
- A family caregiver study to explore the impact of the family's involvement in cancer care on the quality of life of the cancer survivor and the family caregiver. This study will identify the prevalence of the family's involvement in cancer care, identify unmet needs of caregivers at two and five years after diagnosis, and examine the impact of the caregiving on the quality of life and health behaviors of the caregiver.
- An analysis of data from the health-related quality-of-life surveys that are conducted by the Department of Health and Human Services' Centers for Medicare and Medicaid. These data are being analyzed to examine changes in the quality of life of cancer survivors who receive Medicare-managed care.
- A study to test the Patient/Provider/System Theoretical Model (PPSTM) for cancer screening in federally funded primary care centers, which provide care for many underserved populations. Through partnership with researchers from the National Center for Primary Care, this project seeks to identify factors that influence screening behaviors (patients) and screening recommendations (providers, the health care system).
- A pilot study of cancer knowledge, attitudes, beliefs, and risk perceptions among college students. Through collaborations with selected historically black colleges and universities and faculty liaisons, this study aims to gather baseline information from students and campus health centers. The long-term goal of this program of research is to enhance knowledge and awareness of cancer risk reduction strategies and early detection.
- Research to investigate the ethnic disparity in physical activity from a theory of planned behavior perspective, with the objective of providing information needed to develop ethnic-specific exercise interventions to increase physical activity and help reduce cancer risk.
- Research to explore sedentary behavior patterns in an obese population. The objective is to identify key determinants of this population's behavior in order to increase their physical activity and reduce their cancer risk.
- A study of the use of complementary therapies by breast and prostate cancer survivors, as well as a corresponding survey of physicians who treat cancer patients. The physicians' survey will explore physician-patient communications about complementary therapies.
- A study of the effect of acupuncture on quality of life in ambulatory cancer patients at the end of life. This study is being conducted in collaboration with the Zakin Center for Integrated Therapies at the Dana-Farber Cancer Institute.
- In collaboration with the Georgia Cancer Center for Excellence, research on factors affecting women diagnosed with breast cancer's adherence to cancer treatment.

In June 2002, BRC, in collaboration with the National Cancer Institute, organized the first Biennial Cancer Survivorship Conference in Washington, DC. The conference focused on "Resilience Across the Lifespan." A second Biennial Cancer Survivorship Conference is being planned for June 2004.

A top priority of BRC is to contribute to the scientific literature on behavioral and psychosocial aspects of cancer. In 2002, BRC staff published 13 articles in peer-reviewed journals and will likely meet or exceed that number in 2003.

Sources of Statistics

Cancer Deaths. The estimated numbers of US cancer deaths are calculated by fitting the numbers of cancer deaths for 1969 through 2001 to a statistical model which forecasts the numbers of deaths that are expected to occur in 2004. The estimated numbers of cancer deaths for each state are calculated similarly, using state level data. For both the US and state estimates, data on the numbers of deaths are obtained from the National Center for Health Statistics (NCHS) at the Centers for Disease Control and Prevention.

We discourage the use of our estimates to track year-to-year changes in cancer deaths because the numbers are model-based and can vary considerably from year to year, particularly for less common cancers and for smaller states. Mortality rates reported by NCHS are generally more informative statistics to use when tracking cancer mortality trends because they are based on the actual number of deaths for the most recent year available.

Mortality Rates. Mortality rates or death rates are defined as the number of people per 100,000 dying of a disease during a given year. In this publication, mortality rates are based on counts of cancer deaths compiled by NCHS for 1930 through 2000 and population data from the US Census Bureau. Unless otherwise indicated, death rates in this publication are age-adjusted to the 2000 US standard population, to allow comparisons across populations with different age distributions. These rates should only be compared to other statistics that are age-adjusted to the US 2000 standard population.

New Cancer Cases. The estimated numbers of new US cancer cases are calculated by estimating the numbers of cancer cases that occurred each year from 1979 through 2000 and fitting these estimates to a statistical model which forecasts the numbers of cases that are expected to occur in 2004. Estimates of the numbers of cancer cases for 1979 through 2000 are used rather than actual case counts because case data are not available for all 50 states and the District of Columbia. The estimated numbers of cases for 1979 through 2000 are calculated using cancer incidence rates from the regions of the United States included in the National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) Program and population data collected by the US Census Bureau.

State case estimates are calculated by apportioning the total US case estimates for 2004 by state, based on the state distribution of estimated cancer deaths for 2004.

Like the method used to calculate cancer deaths, the methods used to estimate new US and state cases for the upcoming year can produce numbers that vary considerably from year to year, particularly for less common cancers and for smaller states. For this reason, we discourage the use of our estimates to track year-to-year changes in cancer occurrence. Incidence rates reported by SEER are generally more informative statistics to use when tracking cancer incidence trends for the United States, and rates from state cancer registries are useful for tracking local trends.

Incidence Rates. Incidence rates are defined as the number of people per 100,000 who are diagnosed with cancers during a given time period. For this publication, incidence rates for the US were calculated using data on cancer cases collected by SEER and population data collected by the US Census Bureau. State incidence rates presented in this publication are published in the North American Association of Central Cancer Registries' publication *Cancer Incidence in North America, 1996-2000*. Incidence rates for the United States were originally published in *SEER Cancer Statistics Review, 1975-2000* (CSR). This source is preferred because it provides incidence data by race/ethnicity. Unless otherwise indicated, incidence rates in this publication are age-adjusted to the 2000 US standard population, to allow comparisons across populations that have different age distributions. Note that because of delays in reporting cancer cases to the National Cancer Institute (NCI), cancer incidence rates for the most recent diagnosis years may be underestimated. Cancers most affected by reporting delays are melanoma of the skin and prostate, which are frequently diagnosed in nonhospital settings. The NCI has presented delay-adjusted trends for selected cancer sites for the first time in CSR, 1975-2000.

Survival. Five-year relative survival rates are presented in this report for cancer patients diagnosed between 1992 and 1999, followed through 2000. Relative survival rates are used to adjust for normal life expectancy (and events such as death from heart disease, accidents, and diseases of old age). These rates are calculated by dividing observed 5-year survival rates for cancer patients by 5-year survival rates expected for people in the general population who are similar to the patient group with respect to age, sex, race, and calendar year of observation. All survival statistics presented in this publication were originally published in *SEER Cancer Statistics Review, 1975-2000*.

Probability of Developing Cancer. Probabilities of developing cancer are calculated using DevCan (Probability of Developing Cancer Software) developed by the NCI. These probabilities reflect the average experience of people in the United States and do not take into account individual behaviors and risk factors. For example, the estimate of 1 man in 13 developing lung cancer in a lifetime underestimates the risk for smokers and overestimates risk for nonsmokers.

Additional Information. More information on the methods used to generate the statistics for this report can be found in the following publications:

A. For information on data collection methods used by the National Center for Health Statistics: National Center for Health Statistics. *Vital Statistics of the United States, 2001, Vol II, Mortality, Part A*. Washington, DC: Public Health Service 2003, or visit the NCHS Web site at www.cdc.gov/nchs.

B. For information on data collection methods used by the National Cancer Institute's Surveillance, Epidemiology, and End Results program: Ries LAG, Eisner MP, Kosary CL, et al. (eds). *SEER Cancer Statistic Review, 1975-2000*. National Cancer Institute. Bethesda, MD, 2003. Available at: http://seer.cancer.gov/csr/1975_2000/. Accessed August 15, 2003.

C. For information on the methods used to estimate the number of cancer deaths: Tiwari, et al. *CA Cancer J Clin*. 2004;54.

D. For information on the methods used to estimate the numbers of new cancer cases: Wingo PA, Landis S, Parker S, Bolden S, Heath CW. Using cancer registry and vital statistics data to estimate the number of new cancer cases and deaths in the United States for the upcoming year. *J Reg Management*. 1998;25(2):43-51.

E. For information on the methods used to calculate the probability of developing cancer: DEVCAN 5.1. Probability of developing or dying of cancer. Statistical Research and Applications Branch, NCI. www.srab.cancer.gov/devcan.

Factors That Influence Cancer Rates

Age Adjustment to the Year 2000 Standard

Epidemiologists use a statistical method called "age-adjustment" to compare groups of people with different age compositions. This is especially important when examining cancer rates, since cancer is generally a disease of older people. For example, without adjusting for age, it would be inaccurate to compare the cancer rates of the state of Florida, which has a large elderly population, to that of Alaska, which has a younger population. Without adjusting for age, it would appear that the cancer rates for Florida are much higher than Alaska. However, once the ages are adjusted, it appears their rates are similar.

With the publication of *Cancer Facts & Figures 2003*, we have used the 2000 US population standard for age-adjustment. This is a change from statistics previously published by the American Cancer Society. Prior to 2003, most age-adjusted rates were standardized to the 1970 census, although some were based on the 1980 census or even the 1940 census. This change has also been adopted by federal agencies that publish statistics. The new age standard applies to data from calendar year 1999 and forward. The change also requires a recalculation of age-adjusted rates for previous years to allow valid comparisons between current and past years.

The purpose of shifting to the Year 2000 Standard is to more accurately reflect contemporary incidence and mortality rates, given the aging of the US population. On average, Americans are living longer because of the decline in infectious and cardiovascular diseases. Greater longevity allows more people to reach the age when cancer and other chronic diseases become more common. Using the Year 2000 Standard in age-adjustment instead of the 1970 or 1940 standards allows age-adjusted rates to be closer to the actual, unadjusted rate in the population.

The effect of changing to the Year 2000 Standard will vary from cancer to cancer, depending on the age at which a particular cancer usually occurs. For all cancers combined, average annual age-adjusted incidence rate for 1995-99 will increase approximately 20% when adjusted to the Year 2000 compared to the Year 1970 Standard. For cancers, such as colon cancer, that occur mostly at older ages, the Year 2000 Standard will increase incidence by up to 25%, whereas for cancers such as acute lymphocytic leukemia, the new standard will decrease the incidence by about 7%. These changes are caused by the increased representation of older ages (for all cancers combined and colon cancer) or by the decreased representation of younger ages (for acute lymphocytic leukemia) in the Year 2000 Standard compared to the Year 1970 Standard.

It is important to note that in no case will the actual number of cases/deaths or age-specific rates change, only the age-standardized rates which are weighted to the different age distribution.

Change in Population Estimates

Cancer rates are also affected by changes in population estimates, which are the basis for calculating rates for new cancer cases and deaths. The Census Bureau updates and revises population estimates every year. The bureau calculates "intercensal" estimates after a new census is completed – for example, using information from both the 1990 and 2000 censuses, the bureau obtains better estimates for the 1990s. These revisions are based on the most recent census information and on the best available demographic data reflecting components of population change (namely, births, deaths, net internal migration, and net international immigration). Thus, it is customary to recalculate cancer rates based on the revised population estimates. In less populated areas, such as rural counties, or in adjacent urban and suburban areas where there was substantial migration of residents from the more populous urban area to the less populous suburban one between censuses, a change in the population estimates can affect the county rate by as much as 20%. This is in contrast with large counties, where a small change in a large population estimate will not affect rates nearly as much. More information about the influence of change in population count on US cancer rates is available on the NCI Web site (http://www.cancer.gov/newscenter/pressreleases/Census2000).

Screening Guidelines

For the Early Detection of Cancer in Asymptomatic People

Site	Recommendation
Breast	• Yearly mammograms are recommended starting at age 40 and continuing for as long as a woman is in good health. • Clinical breast exam should be part of a periodic health exam, about every three years for women in their 20s and 30s, and every year for women 40 and older. • Women should know how their breasts normally feel and report any breast change promptly to their health care providers. Breast self-exam is an option for women starting in their 20s. • Women at increased risk (e.g., family history, genetic tendency, past breast cancer) should talk with their doctors about the benefits and limitations of starting mammography screening earlier, having additional tests (i.e., breast ultrasound and MRI), or having more frequent exams.
Colon & rectum	Beginning at age 50, men and women should follow one of the examination schedules below: • A fecal occult blood test (FOBT) every year • A flexible sigmoidoscopy (FSIG) every five years • Annual fecal occult blood test and flexible sigmoidoscopy every five years* • A double-contrast barium enema every five years • A colonoscopy every 10 years **Combined testing is preferred over either annual FOBT, or FSIG every 5 years, alone. People who are at moderate or high risk for colorectal cancer should talk with a doctor about a different testing schedule.*
Prostate	The PSA test and the digital rectal examination should be offered annually, beginning at age 50, to men who have a life expectancy of at least 10 years. Men at high risk (African American men and men with a strong family history of one or more first-degree relatives diagnosed with prostate cancer at an early age) should begin testing at age 45. For both men at average risk and high risk, information should be provided about what is known and what is uncertain about the benefits and limitations of early detection and treatment of prostate cancer so that they can make an informed decision about testing.
Uterus	**Cervix:** Screening should begin approximately three years after a woman begins having vaginal intercourse, but no later than 21 years of age. Screening should be done every year with regular Pap tests or every two years using liquid-based tests. At or after age 30, women who have had three normal test results in a row may get screened every 2-3 years. However, doctors may suggest a woman get screened more often if she has certain risk factors, such as HIV infection or a weak immune system. Women 70 years and older who have had three or more consecutive normal Pap tests in the last 10 years may choose to stop cervical cancer screening. Screening after total hysterectomy (with removal of the cervix) is not necessary unless the surgery was done as a treatment for cervical cancer. **Endometrium:** The American Cancer Society recommends that all women should be informed about the risks and symptoms of endometrial cancer, and strongly encouraged to report any unexpected bleeding or spotting to their physicians. Annual screening for endometrial cancer with endometrial biopsy beginning at age 35 should be offered to women with or at risk for hereditary nonpolyposis colon cancer (HNPCC).
Cancer-related checkup	For individuals undergoing periodic health examinations, a cancer-related checkup should include health counseling, and depending on a person's age, might include examinations for cancers of the thyroid, oral cavity, skin, lymph nodes, testes, and ovaries, as well as for some nonmalignant diseases.

American Cancer Society guidelines for early cancer detection are assessed annually in order to identify whether there is new scientific evidence sufficient to warrant a re-evaluation of current recommendations. If evidence is sufficiently compelling to consider a change or clarification in a current guideline or the development of a new guideline, a formal procedure is initiated. Guidelines are formally evaluated every 5 years regardless of whether new evidence suggests a change in the existing recommendations. There are nine steps in this procedure, and these "guidelines for guideline development" were formally established to provide a specific methodology for science and expert judgment to form the underpinnings of specific statements and recommendations from the Society. These procedures constitute a deliberate process to insure that all Society recommendations have the same methodological and evidence-based process at their core. This process also employs a system for rating strength and consistency of evidence that is similar to that employed by the Agency for Health Care Research and Quality (AHCRQ) and the US Preventive Services Task Force (USPSTF).

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