Cancer Statistics, 2013

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Each year, the American Cancer Society estimates the numbers of new cancer cases and deaths expected in the United States in the current year and compiles the most recent data on cancer incidence, mortality, and survival based on incidence data from the National Cancer Institute, the Centers for Disease Control and Prevention, and the North American Association of Central Cancer Registries and mortality data from the National Center for Health Statistics. A total of 1,660,290 new cancer cases and 580,350 cancer deaths are projected to occur in the United States in 2013. During the most recent 5 years for which there are data (2005-2009), delay-adjusted cancer incidence rates declined slightly in men (by 0.6% per year) and were stable in women, while cancer death rates decreased by 1.8% per year in men and by 1.5% per year in women. Overall, cancer death rates have declined 20% from their peak in 1991 (215.1 per 100,000 population) to 2009 (173.1 per 100,000 population). Death rates continue to decline for all 4 major cancer sites (lung, colorectum, breast, and prostate). Over the past 10 years of data (2000-2009), the largest annual declines in death rates were for chronic myeloid leukemia (8.4%), cancers of the stomach (3.1%) and colorectum (3.0%), and non-Hodgkin lymphoma (3.0%). The reduction in overall cancer death rates since 1990 in men and 1991 in women translates to the avoidance of approximately 1.18 million deaths from cancer, with 152,900 of these deaths averted in 2009 alone. Further progress can be accelerated by applying existing cancer control knowledge across all segments of the population, with an emphasis on those groups in the lowest socioeconomic bracket and other underserved populations. **CA Cancer J Clin 2013;63:11-30. © 2013 American Cancer Society.**

Keywords: cancer, incidence, mortality, survival, trends, deaths averted

Introduction

Cancer is a major public health problem in the United States and many other parts of the world. One in 4 deaths in the United States is due to cancer. In this article, we provide the expected numbers of new cancer cases and deaths in 2013 nationally and by state, as well as an overview of current cancer statistics using data through 2009, including incidence, mortality, and survival rates and trends. We also estimate the total number of deaths averted as a result of the decline in cancer death rates since the early 1990s, and provide the actual reported numbers of deaths in 2009 by age for the 10 leading causes of death and the 5 leading cancer types.

Materials and Methods

Incidence and Mortality Data

Mortality data from 1930 to 2009 in the United States were obtained from the National Center for Health Statistics (NCHS).[1,2] There are several sources for cancer incidence data. The Surveillance, Epidemiology, and End Results (SEER) program of the National Cancer Institute reports long-term (beginning in 1973), high-quality, population-based incidence data covering up to 26% of the US population. Cancer incidence rates for long-term trends (1975-2009), 5-year relative and cause-specific survival rates (2002-2008), and estimations of the lifetime probability of developing cancer (2007-2009) were obtained from SEER registries.[3-6] The North American Association of Central Cancer Registries (NAACCR) compiles and reports incidence data from 1995 onward for cancer registries that participate in the SEER program or the Centers for Disease Control and Prevention's National Program of Cancer Registries (NPCR). Incidence data for state-level rates (2005-2009), trends by race/ethnicity (2000-2009), and estimated new cancer cases in 2013 were obtained from NAACCR.[7] Cancer cases were classified according to the *International Classification of Diseases for Oncology*.[8] All incidence and death rates are age-standardized to the 2000 US standard population and expressed per 100,000 persons.

Cancer incidence rates in this report are delay-adjusted whenever possible in order to account for anticipated future corrections to registry data due to inherent delays and errors in case reporting. Delay-adjusted rates primarily affect the most recent years of data for cancers that are frequently diagnosed in outpatient settings (eg, melanoma, leukemia, and prostate) and provide a more

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TABLE 1. Estimated New Cancer Cases and Deaths by Sex, United States, 2013*

	ESTIMATED NEW CASES			ESTIMATED DEATHS		
	BOTH SEXES	MALE	FEMALE	BOTH SEXES	MALE	FEMALE
All sites	**1,660,290**	**854,790**	**805,500**	**580,350**	**306,920**	**273,430**
Oral cavity & pharynx	**41,380**	**29,620**	**11,760**	**7,890**	**5,500**	**2,390**
Tongue	13,590	9,900	3,690	2,070	1,380	690
Mouth	11,400	6,730	4,670	1,800	1,080	720
Pharynx	13,930	11,200	2,730	2,400	1,790	610
Other oral cavity	2,460	1,790	670	1,640	1,260	380
Digestive system	**290,200**	**160,750**	**129,450**	**144,570**	**82,700**	**61,870**
Esophagus	17,990	14,440	3,550	15,210	12,220	2,990
Stomach	21,600	13,230	8,370	10,990	6,740	4,250
Small intestine	8,810	4,670	4,140	1,170	610	560
Colon†	102,480	50,090	52,390	50,830	26,300	24,530
Rectum	40,340	23,590	16,750			
Anus, anal canal, & anorectum	7,060	2,630	4,430	880	330	550
Liver & intrahepatic bile duct	30,640	22,720	7,920	21,670	14,890	6,780
Gallbladder & other biliary	10,310	4,740	5,570	3,230	1,260	1,970
Pancreas	45,220	22,740	22,480	38,460	19,480	18,980
Other digestive organs	5,750	1,900	3,850	2,130	870	1,260
Respiratory system	**246,210**	**131,760**	**114,450**	**163,890**	**90,600**	**73,290**
Larynx	12,260	9,680	2,580	3,630	2,860	770
Lung & bronchus	228,190	118,080	110,110	159,480	87,260	72,220
Other respiratory organs	5,760	4,000	1,760	780	480	300
Bones & joints	**3,010**	**1,680**	**1,330**	**1,440**	**810**	**630**
Soft tissue (including heart)	**11,410**	**6,290**	**5,120**	**4,390**	**2,500**	**1,890**
Skin (excluding basal & squamous)	**82,770**	**48,660**	**34,110**	**12,650**	**8,560**	**4,090**
Melanoma-skin	76,690	45,060	31,630	9,480	6,280	3,200
Other nonepithelial skin	6,080	3,600	2,480	3,170	2,280	890
Breast	**234,580**	**2,240**	**232,340**	**40,030**	**410**	**39,620**
Genital system	**339,810**	**248,080**	**91,730**	**58,480**	**30,400**	**28,080**
Uterine cervix	12,340		12,340	4,030		4,030
Uterine corpus	49,560		49,560	8,190		8,190
Ovary	22,240		22,240	14,030		14,030
Vulva	4,700		4,700	990		990
Vagina & other genital, female	2,890		2,890	840		840
Prostate	238,590	238,590		29,720	29,720	
Testis	7,920	7,920		370	370	
Penis & other genital, male	1,570	1,570		310	310	
Urinary system	**140,430**	**96,800**	**43,630**	**29,790**	**20,120**	**9,670**
Urinary bladder	72,570	54,610	17,960	15,210	10,820	4,390
Kidney & renal pelvis	65,150	40,430	24,720	13,680	8,780	4,900
Ureter & other urinary organs	2,710	1,760	950	900	520	380
Eye & orbit	**2,800**	**1,490**	**1,310**	**320**	**120**	**200**
Brain & other nervous system	**23,130**	**12,770**	**10,360**	**14,080**	**7,930**	**6,150**
Endocrine system	**62,710**	**16,210**	**46,500**	**2,770**	**1,270**	**1,500**
Thyroid	60,220	14,910	45,310	1,850	810	1,040
Other endocrine	2,490	1,300	1,190	920	460	460
Lymphoma	**79,030**	**42,670**	**36,360**	**20,200**	**11,250**	**8,950**
Hodgkin lymphoma	9,290	5,070	4,220	1,180	660	520
Non-Hodgkin lymphoma	69,740	37,600	32,140	19,020	10,590	8,430
Myeloma	**22,350**	**12,440**	**9,910**	**10,710**	**6,070**	**4,640**
Leukemia	**48,610**	**27,880**	**20,730**	**23,720**	**13,660**	**10,060**
Acute lymphocytic leukemia	6,070	3,350	2,720	1,430	820	610
Chronic lymphocytic leukemia	15,680	9,720	5,960	4,580	2,750	1,830
Acute myeloid leukemia	14,590	7,820	6,770	10,370	5,930	4,440
Chronic myeloid leukemia	5,920	3,420	2,500	610	340	270
Other leukemia‡	6,350	3,570	2,780	6,730	3,820	2,910
Other & unspecified primary sites‡	**31,860**	**15,450**	**16,410**	**45,420**	**25,020**	**20,400**

*Rounded to the nearest 10; estimated new cases exclude basal cell and squamous cell skin cancers and in situ carcinomas except urinary bladder. About 64,640 carcinoma in situ of the female breast and 61,300 melanoma in situ will be newly diagnosed in 2013.

†Estimated deaths for colon and rectum cancers are combined.

‡More deaths than cases may reflect lack of specificity in recording underlying cause of death on death certificates and/or an undercount in the case estimate.

accurate portrayal of the cancer burden in the most recent time period.[9] For example, melanoma incidence rates adjusted for delays in reporting are 14% higher than unadjusted rates in the most recent reporting year. Delay-adjusted rates are available for SEER registry data and were obtained from the National Cancer Institute. Incidence trends presented for the most recent 5 years (2005-2009) are based on delay-adjusted rates from SEER 13 cancer registries.[4]

TABLE 2. Incidence Rates for All Cancers Combined (2005-2009) and Estimated New Cases* for Selected Cancers (2013) by State

STATE	INCIDENCE RATE†	ALL SITES	FEMALE BREAST	UTERINE CERVIX	COLORECTUM	UTERINE CORPUS	LEUKEMIA	LUNG & BRONCHUS	MELANOMA OF THE SKIN	NON-HODGKIN LYMPHOMA	PROSTATE	URINARY BLADDER
Alabama	473.2	27,080	3,720	200	2,390	610	640	4,550	1,300	990	3,940	960
Alaska	474.6	3,290	510	‡	310	90	100	470	90	140	440	140
Arizona	394.9	34,010	4,660	220	2,630	860	920	4,250	1,400	1,360	4,340	1,400
Arkansas§	461.8	16,330	2,280	150	1,540	370	450	2,700	530	680	2,370	610
California	444.1	171,330	25,360	1,480	14,690	5,160	5,210	18,720	8,530	7,280	23,740	6,920
Colorado	436.6	23,410	3,300	160	1,880	690	840	2,550	1,310	1,050	3,870	990
Connecticut	515.0	21,180	3,050	110	1,670	740	570	2,780	1,080	890	2,940	1,090
Delaware	519.7	5,370	770	‡	430	170	140	760	300	220	860	250
Dist. of Columbia§	468.5	2,920	450	‡	240	90	70	320	90	100	500	90
Florida	458.1	118,320	15,710	940	10,290	3,110	3,490	17,960	5,330	5,060	17,330	5,720
Georgia	467.3	49,280	7,310	420	3,970	1,230	1,290	6,690	2,360	1,810	7,930	1,610
Hawaii	443.4	6,650	960	50	730	240	180	900	380	240	800	200
Idaho	463.2	7,670	1,010	50	670	220	270	930	420	360	1,330	380
Illinois	491.4	66,090	9,350	500	6,140	2,150	2,020	9,270	2,480	2,840	9,230	2,990
Indiana	467.8	35,550	4,540	260	3,250	1,040	1,000	5,500	1,470	1,460	4,310	1,560
Iowa	489.9	17,480	2,310	90	1,640	580	590	2,350	980	790	2,270	810
Kansas	480.3	14,370	2,160	90	1,250	440	450	1,930	800	650	2,020	600
Kentucky	523.1	25,100	3,300	190	2,300	700	720	4,560	1,540	1,100	3,130	1,060
Louisiana	496.6	24,930	3,630	220	2,400	550	660	3,740	770	950	4,040	930
Maine	522.3	9,190	1,150	50	730	310	280	1,380	440	390	1,290	530
Maryland	460.6	30,680	4,760	220	2,410	950	780	4,040	1,530	1,180	4,880	1,220
Massachusetts	506.8	38,250	5,820	210	2,910	1,280	990	4,880	1,840	1,590	5,700	2,060
Michigan	492.7	57,560	8,140	330	4,730	1,920	1,750	8,250	2,900	2,530	9,490	2,860
Minnesota	483.8	28,410	4,260	120	2,220	890	950	3,860	1,020	1,210	4,090	1,190
Mississippi	485.2	15,830	2,080	130	1,580	340	390	2,630	550	560	2,490	540
Missouri	474.6	33,950	4,680	250	3,110	1,040	980	5,410	1,500	1,480	4,170	1,480
Montana	468.8	5,450	740	‡	510	160	180	700	250	260	870	280
Nebraska	475.9	9,060	1,230	50	910	290	310	1,220	460	430	1,290	420
Nevada	454.6	13,830	1,760	120	1,350	330	400	1,970	440	520	1,900	660
New Hampshire	507.6	8,470	1,180	50	640	290	240	1,150	410	350	1,180	460
New Jersey	509.0	49,440	6,960	460	4,640	1,740	1,430	5,960	2,520	2,190	7,190	2,450
New Mexico	418.8	10,090	1,360	80	860	270	330	1,050	460	400	1,610	380
New York	498.5	108,760	14,950	850	9,210	3,850	3,270	13,480	4,200	4,740	16,720	5,510
North Carolina	484.1	53,200	7,430	360	4,260	1,430	1,470	8,040	2,620	2,080	8,150	2,070
North Dakota	478.4	3,510	450	‡	370	100	120	460	150	150	550	170
Ohio	470.8	66,610	9,060	440	5,890	2,230	1,770	10,230	2,960	2,840	8,530	3,020
Oklahoma	484.2	20,160	2,690	170	1,780	500	610	3,370	770	840	2,500	790
Oregon	469.3	21,720	3,310	120	1,610	670	620	2,860	1,410	950	3,380	1,030
Pennsylvania	505.3	79,560	10,490	480	7,390	2,720	2,240	10,980	3,890	3,440	9,450	3,980
Rhode Island	514.1	6,280	900	‡	530	210	180	870	270	250	820	340
South Carolina	465.6	27,620	3,580	220	2,340	710	760	4,390	1,320	1,040	4,160	1,070
South Dakota	433.9	4,570	600	‡	430	140	150	620	200	200	730	220
Tennessee	475.7	36,580	5,070	280	3,180	900	990	6,200	1,900	1,450	4,990	1,440
Texas	452.1	112,230	14,980	1,110	9,750	2,870	3,740	15,000	3,930	4,830	15,730	4,030
Utah	400.1	10,810	1,550	70	740	320	380	800	720	490	1,960	420
Vermont	496.3	4,200	550	‡	320	130	110	590	220	170	560	210
Virginia§	460.3	40,870	6,280	300	3,270	1,240	990	5,380	2,380	1,590	6,840	1,590
Washington	486.4	37,290	5,610	230	2,730	1,140	1,160	4,700	2,350	1,650	5,690	1,690
West Virginia	496.8	11,450	1,460	80	1,180	350	330	2,100	540	470	1,470	530
Wisconsin§	463.2	31,590	4,490	190	2,610	1,080	1,050	4,310	1,250	1,400	4,370	1,530
Wyoming	444.7	2,700	380	‡	240	80	80	320	130	120	430	130
United States	**473.4**	**1,660,290**	**232,340**	**12,340**	**142,820**	**49,560**	**48,610**	**228,190**	**76,690**	**69,740**	**238,590**	**72,570**

*Rounded to the nearest 10; excludes basal cell and squamous cell skin cancers and in situ carcinomas except urinary bladder.

†Rates are per 100,000 and age adjusted to the 2000 US standard population.

‡Estimate is fewer than 50 cases.

§Rate is for cases diagnosed during 2005 to 2008.

Note: These model-based estimates are offered as a rough guide and should be interpreted with caution. State estimates may not add to US total due to rounding and the exclusion of states with fewer than 50 cases.

Projected Cancer Cases and Deaths in 2013

The precise number of cancer cases diagnosed each year in the nation and in every state is unknown because cancer registration is incomplete in some states. Furthermore, the most recent year for which incidence and mortality data are available lags 3 to 4 years behind the current year due to the time required for data collection, compilation, quality control, and dissemination. Therefore, we project the numbers of new cancer cases and

Estimated New Cases*

Males			Females		
Prostate	238,590	28%	Breast	232,340	29%
Lung & bronchus	118,080	14%	Lung & bronchus	110,110	14%
Colorectum	73,680	9%	Colorectum	69,140	9%
Urinary bladder	54,610	6%	Uterine corpus	49,560	6%
Melanoma of the skin	45,060	5%	Thyroid	45,310	6%
Kidney & renal pelvis	40,430	5%	Non-Hodgkin lymphoma	32,140	4%
Non-Hodgkin lymphoma	37,600	4%	Melanoma of the skin	31,630	4%
Oral cavity & pharynx	29,620	3%	Kidney & renal pelvis	24,720	3%
Leukemia	27,880	3%	Pancreas	22,480	3%
Pancreas	22,740	3%	Ovary	22,240	3%
All Sites	**854,790**	**100%**	**All Sites**	**805,500**	**100%**

Estimated Deaths

Males			Females		
Lung & bronchus	87,260	28%	Lung & bronchus	72,220	26%
Prostate	29,720	10%	Breast	39,620	14%
Colorectum	26,300	9%	Colorectum	24,530	9%
Pancreas	19,480	6%	Pancreas	18,980	7%
Liver & intrahepatic bile duct	14,890	5%	Ovary	14,030	5%
Leukemia	13,660	4%	Leukemia	10,060	4%
Esophagus	12,220	4%	Non-Hodgkin lymphoma	8,430	3%
Urinary bladder	10,820	4%	Uterine corpus	8,190	3%
Non-Hodgkin lymphoma	10,590	3%	Liver & intrahepatic bile duct	6,780	2%
Kidney & renal pelvis	8,780	3%	Brain & other nervous system	6,150	2%
All Sites	**306,920**	**100%**	**All Sites**	**273,430**	**100%**

FIGURE 1. Ten Leading Cancer Types for the Estimated New Cancer Cases and Deaths by Sex, United States, 2013.
*Estimates are rounded to the nearest 10 and exclude basal cell and squamous cell skin cancers and in situ carcinoma except urinary bladder.

deaths in the United States in 2013 in order to provide an estimate of the contemporary cancer burden. The methods for projecting both new cases and deaths in the current year were recently modified so estimates should not be compared from year to year.

We projected the number of new invasive cancer cases that will be diagnosed in 2013 (with the exception of urinary bladder, for which in situ cases are included) using a 2-step process that first estimates complete incidence counts by state during years for which observed data are available, and then projects these counts 4 years ahead for the United States overall and each state individually.[10] To estimate counts for each state through 2009, we used a spatiotemporal model based on incidence data for 1995 through 2009 from 49 states and the District of Columbia that met NAACCR's high-quality data standard for incidence, covering about 98% of the US population.[11] (Minnesota cancer registry data could not be included in the model because county-level data were unavailable.) This method accounts for expected delays in case reporting and considers geographic variations in sociodemographic and lifestyle factors, medical settings, and cancer screening behaviors as predictors of incidence. A temporal projection method (the vector autoregressive model) was then applied to the estimated counts to obtain projections for 2013. For the complete details of this methodology, please refer to Zhu et al.[10]

To estimate the numbers of new breast carcinoma in situ (female) and melanoma in situ cases in 2013, we first estimated the number of in situ cases occurring annually from 2000 through 2009 in the United States by applying the age-specific incidence rates in the 18 SEER areas to the corresponding US population estimates provided in SEER*Stat.[12] We then projected the total number of cases in 2013 based on the annual percent change from 2000 through 2009 generated by the joinpoint regression model.[13]

We estimated the number of cancer deaths expected to occur in 2013 in the United States overall and in each state using the joinpoint regression model based on the actual numbers of cancer deaths from 1995 through 2009 at the state and national levels as reported to the NCHS.[1] For the complete details of this methodology, please refer to Chen et al.[14]

TABLE 3. Death Rates for All Cancers Combined (2005-2009) and Estimated Deaths* for Selected Cancers (2013) by State

STATE	DEATH RATE†	ALL SITES	BRAIN & OTHER NERVOUS SYSTEM	FEMALE BREAST	COLORECTUM	LEUKEMIA	LIVER & INTRAHEPATIC BILE DUCT	LUNG & BRONCHUS	NON-HODGKIN LYMPHOMA	OVARY	PANCREAS	PROSTATE
Alabama	198.2	10,430	250	690	970	400	330	3,290	320	270	630	550
Alaska	181.3	980	‡	70	80	‡	‡	270	‡	‡	60	50
Arizona	152.8	11,210	310	790	990	480	460	2,850	400	310	740	630
Arkansas	199.7	6,650	150	420	610	270	200	2,170	200	150	390	320
California	163.1	57,290	1,590	4,220	5,150	2,460	2,980	12,700	2,000	1,540	4,010	3,390
Colorado	154.6	7,350	230	510	680	320	290	1,710	250	230	500	440
Connecticut	173.4	6,890	170	460	470	290	230	1,740	230	170	530	400
Delaware	190.4	1,940	50	120	170	70	80	580	60	50	120	100
Dist. of Columbia	196.5	1,030	‡	80	100	‡	50	240	‡	‡	80	80
Florida	170.0	42,370	880	2,660	3,640	1,770	1,550	12,070	1,400	930	2,770	2,200
Georgia	179.2	16,010	360	1,200	1,450	600	530	4,670	460	410	1,010	790
Hawaii	147.8	2,400	‡	140	230	80	120	580	80	50	210	110
Idaho	165.8	2,660	90	180	220	120	80	670	100	60	200	180
Illinois	186.6	24,000	530	1,610	2,230	1,010	750	6,560	780	550	1,620	1,230
Indiana	195.4	13,250	320	850	1,120	550	370	4,110	440	300	820	590
Iowa	178.3	6,420	190	400	580	280	200	1,780	230	170	390	350
Kansas	178.8	5,430	150	360	490	250	170	1,590	210	140	350	240
Kentucky	211.3	9,970	200	590	880	340	270	3,510	300	200	540	390
Louisiana	204.0	9,040	210	650	860	330	380	2,670	260	190	580	420
Maine	192.8	3,240	90	190	250	130	90	950	110	60	200	160
Maryland	184.1	10,480	230	800	930	410	380	2,810	310	250	730	560
Massachusetts	180.0	12,840	310	810	1,020	500	500	3,530	400	340	910	650
Michigan	187.5	20,570	540	1,360	1,700	910	670	5,940	730	490	1,460	890
Minnesota	169.9	9,610	250	610	770	440	330	2,500	340	240	630	520
Mississippi	204.7	6,300	140	420	630	250	210	2,010	170	110	380	330
Missouri	191.4	12,730	310	890	1,100	540	420	3,940	380	240	820	560
Montana	172.5	2,000	50	120	180	90	50	550	70	50	130	140
Nebraska	174.0	3,440	100	210	340	140	90	900	130	80	230	210
Nevada	183.0	4,760	140	360	450	180	210	1,480	140	100	350	290
New Hampshire	179.5	2,680	70	170	200	100	80	750	80	60	200	140
New Jersey	179.0	16,410	340	1,330	1,560	630	570	4,060	530	440	1,180	750
New Mexico	158.2	3,540	90	240	350	140	170	770	110	90	240	230
New York	166.7	34,240	780	2,390	3,020	1,450	1,410	8,790	1,090	900	2,500	1,770
North Carolina	186.3	18,620	390	1,260	1,510	710	620	5,660	550	420	1,150	910
North Dakota	171.1	1,280	‡	90	130	60	‡	310	‡	‡	90	80
Ohio	194.9	25,130	590	1,720	2,170	980	750	7,350	800	560	1,620	1,240
Oklahoma	194.8	7,850	190	490	720	300	270	2,440	260	170	440	380
Oregon	179.8	7,820	230	490	660	320	310	2,110	280	220	520	460
Pennsylvania	187.5	28,680	600	1,950	2,540	1,190	930	7,640	1,020	730	1,950	1,430
Rhode Island	180.4	2,140	50	130	170	100	80	600	60	50	130	100
South Carolina	187.9	9,800	220	660	820	360	340	2,990	280	210	600	500
South Dakota	168.2	1,590	50	110	150	60	‡	440	50	‡	110	90
Tennessee	200.6	14,080	360	910	1,220	520	460	4,600	440	280	800	630
Texas	171.3	37,180	940	2,650	3,390	1,490	1,950	9,670	1,210	850	2,340	1,650
Utah	128.4	2,790	110	260	240	150	90	450	120	80	220	210
Vermont	176.2	1,300	‡	80	100	50	50	380	‡	‡	90	60
Virginia	183.2	14,720	320	1,110	1,270	580	480	4,130	460	370	1,020	740
Washington	176.7	12,390	350	800	980	520	530	3,260	440	360	850	730
West Virginia	206.6	4,660	100	280	440	170	120	1,480	160	100	230	190
Wisconsin	178.6	11,220	310	700	880	520	370	2,980	400	300	770	630
Wyoming	169.8	950	‡	60	80	‡	‡	240	‡	‡	70	50
United States	**178.7**	**580,350**	**14,080**	**39,620**	**50,830**	**23,720**	**21,670**	**159,480**	**19,020**	**14,030**	**38,460**	**29,720**

*Rounded to the nearest 10.

†Rates are per 100,000 and age adjusted to the 2000 US standard population.

‡Estimate is fewer than 50 deaths.

Note: State estimates may not add to US total due to rounding and the exclusion of states with fewer than 50 deaths.

Other Statistics

The estimated numbers of cancer deaths averted in men and women due to the reduction in overall cancer death rates were calculated by applying the 5-year age-specific cancer death rates in the peak year for age-standardized cancer death rates (1990 in men and 1991 in women) to the corresponding age-specific populations in the subsequent years through 2009 to obtain the number of expected deaths in each calendar year if the death rates had not decreased. We then summed the difference between the number of expected and observed deaths in each age group and calendar year for men and women separately.

TABLE 4. Probability (%) of Developing Invasive Cancers Within Selected Age Intervals by Sex, United States, 2007 to 2009*

		BIRTH TO 39	40 TO 59	60 TO 69	70 AND OLDER	BIRTH TO DEATH
All sites†	Male	1.46 (1 in 69)	8.79 (1 in 11)	16.03 (1 in 6)	38.07 (1 in 3)	44.81 (1 in 2)
	Female	2.20 (1 in 46)	9.19 (1 in 11)	10.39 (1 in 10)	26.69 (1 in 4)	38.17 (1 in 3)
Urinary bladder‡	Male	0.02 (1 in 4,924)	0.37 (1 in 272)	0.92 (1 in 109)	3.69 (1 in 27)	3.81 (1 in 26)
	Female	0.01 (1 in 12,663)	0.12 (1 in 864)	0.24 (1 in 410)	0.98 (1 in 106)	1.15 (1 in 90)
Breast	Female	0.50 (1 in 202)	3.78 (1 in 26)	3.56 (1 in 28)	6.65 (1 in 15)	12.38 (1 in 8)
Colorectum	Male	0.08 (1 in 1,212)	0.94 (1 in 106)	1.40 (1 in 71)	4.19 (1 in 24)	5.17 (1 in 19)
	Female	0.08 (1 in 1,236)	0.75 (1 in 134)	0.98 (1 in 102)	3.80 (1 in 26)	4.78 (1 in 21)
Leukemia	Male	0.16 (1 in 612)	0.23 (1 in 440)	0.35 (1 in 288)	1.26 (1 in 80)	1.59 (1 in 63)
	Female	0.13 (1 in 746)	0.15 (1 in 655)	0.21 (1 in 481)	0.81 (1 in 123)	1.14 (1 in 88)
Lung & bronchus	Male	0.03 (1 in 3,552)	0.92 (1 in 109)	2.27 (1 in 44)	6.82 (1 in 15)	7.77 (1 in 13)
	Female	0.03 (1 in 3,287)	0.76 (1 in 131)	1.72 (1 in 58)	4.93 (1 in 20)	6.35 (1 in 16)
Melanoma of the skin§	Male	0.15 (1 in 691)	0.63 (1 in 160)	0.77 (1 in 130)	2.02 (1 in 50)	2.87 (1 in 35)
	Female	0.26 (1 in 391)	0.55 (1 in 181)	0.40 (1 in 248)	0.84 (1 in 120)	1.85 (1 in 54)
Non-Hodgkin lymphoma	Male	0.13 (1 in 753)	0.44 (1 in 225)	0.60 (1 in 167)	1.77 (1 in 57)	2.34 (1 in 43)
	Female	0.09 (1 in 1,147)	0.31 (1 in 322)	0.44 (1 in 229)	1.40 (1 in 72)	1.93 (1 in 52)
Prostate	Male	0.01 (1 in 7,964)	2.68 (1 in 37)	6.78 (1 in 15)	12.06 (1 in 8)	16.15 (1 in 6)
Uterine cervix	Female	0.16 (1 in 641)	0.27 (1 in 374)	0.13 (1 in 795)	0.18 (1 in 551)	0.68 (1 in 147)
Uterine corpus	Female	0.07 (1 in 1,348)	0.77 (1 in 129)	0.89 (1 in 112)	1.25 (1 in 80)	2.64 (1 in 38)

*For people free of cancer at beginning of age interval.

†All sites excludes basal cell and squamous cell skin cancers and in situ cancers except urinary bladder.

‡Includes in situ cancer cases.

§Statistics for whites only.

Selected Findings

Expected Numbers of New Cancer Cases

Table 1 presents the estimated numbers of new cases of invasive cancer expected among men and women in the United States in 2013. The overall estimate of more than 1.6 million new cases does not include carcinoma in situ of any site except urinary bladder, nor does it include basal cell or squamous cell cancers of the skin. About 64,640 cases of breast carcinoma in situ and 61,300 cases of melanoma in situ are expected to be newly diagnosed in 2013. The estimated numbers of new cancer cases by state for selected cancer sites are shown in Table 2.

Figure 1 indicates the most common cancers expected to occur in men and women in 2013. Among men, cancers of the prostate, lung and bronchus, and colorectum will account for about 50% of all newly diagnosed cancers; prostate cancer alone will account for 28% (238,590) of incident cases in men. The 3 most commonly diagnosed types of cancer among women in 2013 will be breast, lung and bronchus, and colorectum, accounting for 51% of estimated cancer cases in women. Breast cancer alone is expected to account for 29% (232,340) of all new cancer cases among women.

Expected Numbers of Cancer Deaths

Table 1 also shows the expected numbers of deaths from cancer projected for 2013. It is estimated that about 580,350 Americans will die from cancer this year, corresponding to almost 1600 deaths per day. Cancers of the lung and bronchus, prostate, and colorectum in men and cancers of the lung and bronchus, breast, and colorectum in women continue to be the most common causes of cancer death. These 4 cancers account for almost half (48%) of the total cancer deaths among men and women (Fig. 1). In 2013, lung cancer is expected to account for 26% of all female cancer deaths and 28% of all male cancer deaths. Table 3 provides the estimated numbers of cancer deaths in 2013 by state for selected cancer sites.

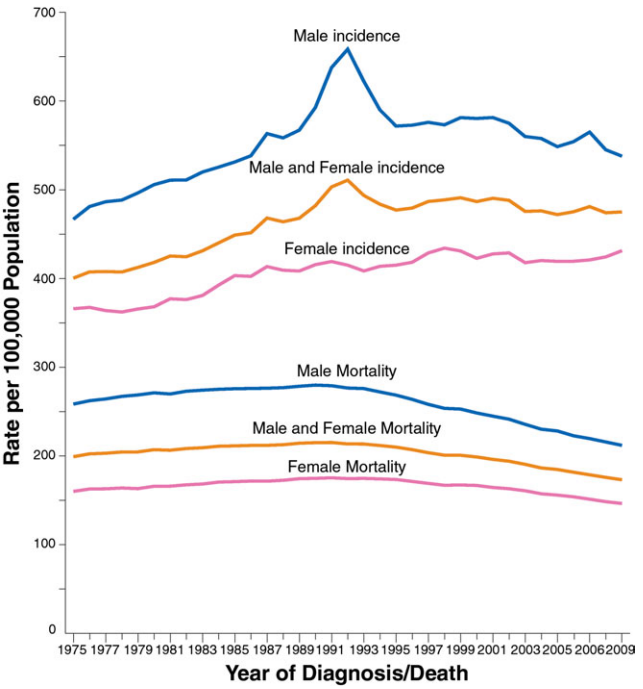

FIGURE 2. Trends in Cancer Incidence and Death Rates by Sex, United States, 1975 to 2009.
Rates are age adjusted to the 2000 US standard population. Incidence rates are adjusted for delays in reporting.

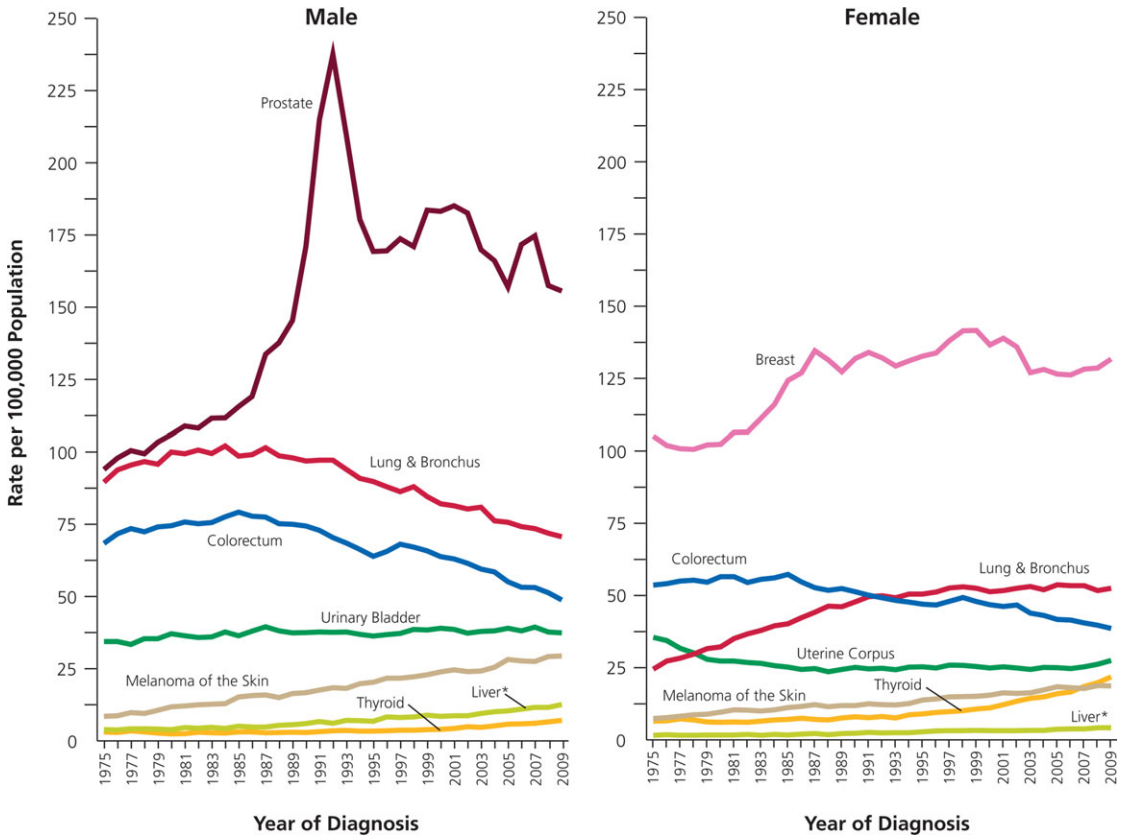

FIGURE 3. Trends in Incidence Rates for Selected Cancers by Sex, United States, 1975 to 2009.
Rates are age adjusted to the 2000 US standard population and adjusted for delays in reporting.
*Liver includes intrahepatic bile duct.

Lifetime Probability of Developing Cancer

The lifetime probability of being diagnosed with an invasive cancer is higher for men (45%) than for women (38%) (Table 4). However, because of the earlier median age at diagnosis for breast cancer compared with other major cancers, women have a slightly higher probability of developing cancer before age 60 years. These estimates are based on the average experience of the general population and may over- or underestimate individual risk because of differences in exposure (eg, smoking history) and/or genetic susceptibility.

Trends in Cancer Incidence

Figures 2 to 5 depict long-term trends in cancer incidence and death rates for all cancers combined and for selected cancer sites by sex. While incidence rates are declining for most cancer sites, they are increasing among both men and women for melanoma of the skin and cancers of the liver and thyroid (Fig. 3, Table 5). Table 5 shows incidence (delay-adjusted) and mortality trends for all cancers combined and for selected cancer sites based on joinpoint regression analysis. Joinpoint is a tool used to describe and quantify trends by fitting observed rates to lines connected at "joinpoints" where trends change in direction or magnitude.[13,15] According to data from the SEER 13 cancer registries, incidence rates in the most recent 5 years (2005-2009) decreased in males by 0.6% per year and were stable in females (Table 5). Incidence rates are decreasing for all 4 major cancer sites except female breast, for which rates remained relatively stable from 2005 to 2009 after decreasing by 2% per year from 1999 to 2005. Lung cancer incidence rates in women began declining in the late 1990s, more than a decade after the decline began in men.[6] Differences in lung cancer incidence patterns between men and women reflect historical differences in tobacco use; cigarette smoking prevalence peaked about 20 years later in women than in men.[16] Recent rapid declines in colorectal cancer incidence rates have largely been attributed to increases in screening that can detect and allow the removal of precancerous polyps.[17-19] Although joinpoint trend analysis shows that the incidence rate for prostate cancer declined steadily by 1.9% per year from 2000 to 2009, it is important to realize that annual rates fluctuate widely (Fig. 3), likely reflecting variation in the prevalence of prostate-specific antigen testing for the detection of prostate cancer. For example, in the SEER 13 areas, the delay-adjusted prostate cancer incidence rate increased from 154 (per 100,000) to 164 from 2005 to 2006, then dropped from 168 to 153 from 2007 to 2008.

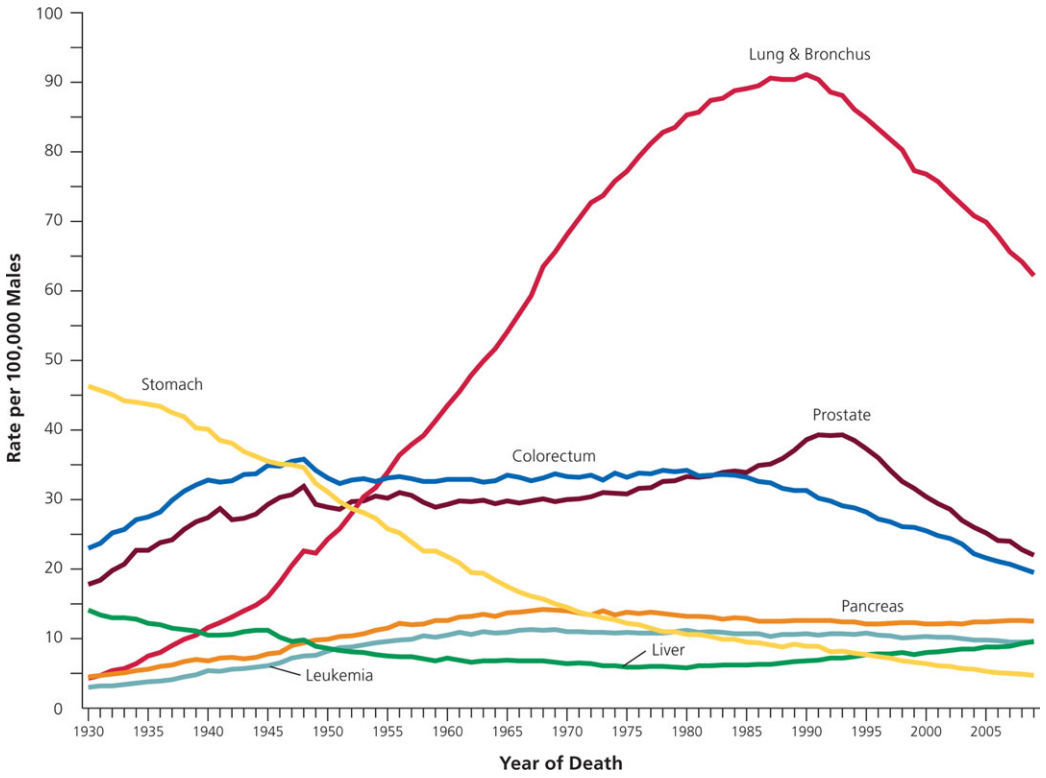

FIGURE 4. Trends in Death Rates Among Males for Selected Cancers, United States, 1930 to 2009.
Rates are age adjusted to the 2000 US standard population. Due to changes in International Classification of Diseases (ICD) coding, numerator information has changed over time. Rates for cancers of the lung and bronchus, colorectum, and liver are affected by these changes.

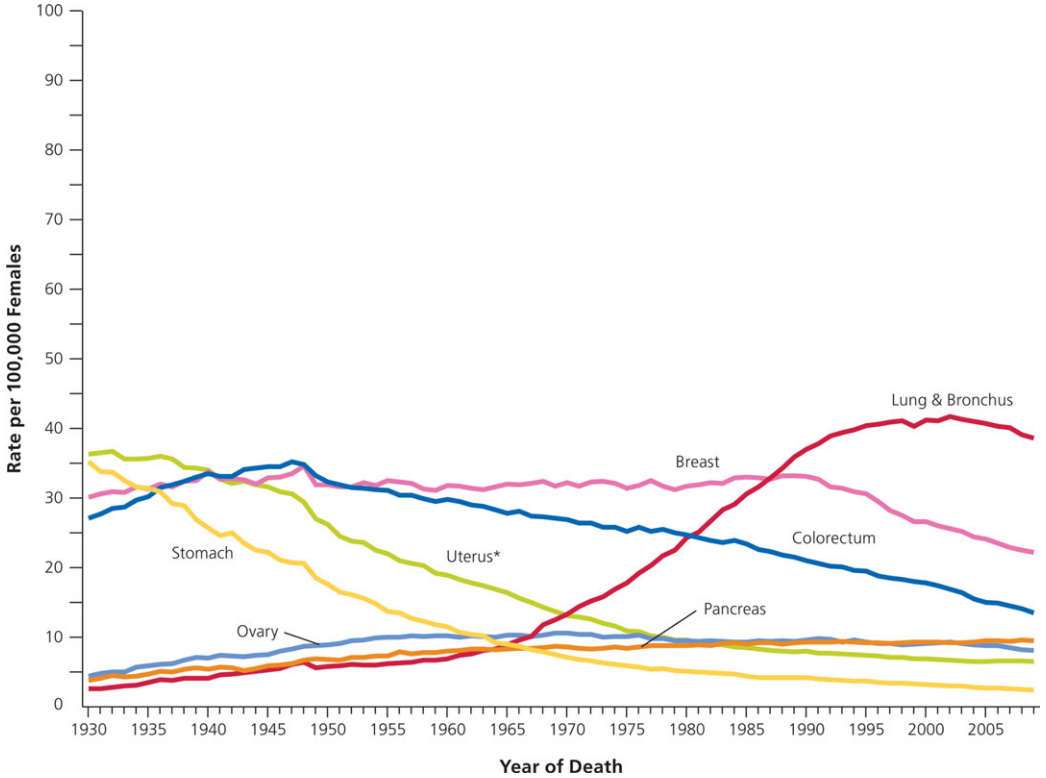

FIGURE 5. Trends in Death Rates Among Females for Selected Cancers, United States, 1930 to 2009.
Rates are age adjusted to the 2000 US standard population. Due to changes in International Classification of Diseases (ICD) coding, numerator information has changed over time. Rates for cancers of the uterus, ovary, lung and bronchus, and colorectum are affected by these changes.
*Uterus includes uterine cervix and uterine corpus.

TABLE 5. Trends in Cancer Incidence (Delay-Adjusted) and Death Rates for Selected Cancers by Sex, United States, 1992 to 2009

	TREND 1		TREND 2		TREND 3		
	YEARS	APC	YEARS	APC	YEARS	APC	2005-2009 AAPC
All sites							
Incidence							
Male	1992-1994	−5.6*	1994-2009	−0.6*			−0.6*
Female	1992-1998	0.8*	1998-2006	−0.5*	2006-2009	1.0	0.6
Death							
Male	1992-2001	−1.4*	2001-2009	−1.8*			−1.8*
Female	1992-1994	−0.2	1994-2002	−0.8*	2002-2009	−1.5*	−1.5*
Lung & bronchus							
Incidence							
Male	1992-2009	−1.9*					−1.9*
Female	1992-1997	0.7	1997-2009	−0.3*			−0.3*
Death							
Male	1992-2005	−1.9*	2005-2009	−2.8*			−2.8*
Female	1992-2002	0.6*	2002-2009	−1.0*			−1.0*
Colorectum							
Incidence							
Male	1992-1995	−2.6*	1995-1998	1.5	1998-2009	−2.6*	−2.6*
Female	1992-1995	−1.8*	1995-1998	1.9	1998-2009	−2.1*	−2.1*
Death							
Male	1992-2002	−2.0*	2002-2005	−4.0*	2005-2009	−2.4*	−2.4*
Female	1992-2001	−1.7*	2001-2009	−3.1*			−3.1*
Liver & intrahepatic bile duct							
Incidence							
Male	1992-2009	3.7*					3.7*
Female	1992-2009	3.0*					3.0*
Death							
Male	1992-2009	2.3*					2.3*
Female	1992-2009	1.3*					1.3*
Melanoma of skin							
Incidence							
Male	1992-2009	2.5*					2.5*
Female	1992-1997	3.9*	1997-2009	1.7*			1.7*
Death							
Male	1992-2009	0.4*					0.4*
Female	1992-2009	−0.5*					−0.5*
Thyroid							
Incidence							
Male	1992-1996	−1.4	1996-2009	5.6*			5.6*
Female	1992-1999	4.1*	1999-2009	7.0*			7.0*
Death							
Male	1992-2009	1.6*					1.6*
Female	1992-1994	−6.4	1994-2009	0.8*			0.8*
Female breast							
Incidence	1992-1999	1.3*	1999-2005	−2.0*	2005-2009	1.1	1.1
Death	1992-1995	−1.3*	1995-1998	−3.4*	1998-2009	−1.9*	−1.9*
Prostate							
Incidence	1992-1995	−11.1*	1995-2000	2.0	2000-2009	−1.9*	−1.9*
Death	1992-1994	−1.3	1994-2009	−3.7*			−3.7*

APC indicates annual percent change based on incidence (delay-adjusted) and mortality rates age adjusted to the 2000 US standard population; AAPC, average annual percent change.

*The APC or AAPC is significantly different from 0 ($P < .05$).

Note: Trends analyzed by the Joinpoint Regression Program, version 3.5.0, allowing up to 3 joinpoints. Incidence trends based on Surveillance, Epidemiology, and End Results (SEER) 13 areas.

Trends in Cancer Mortality

Cancer death rates decreased by 1.8% per year in males and by 1.5% per year in females during the most recent 5 years of data (2005-2009). These declines have been consistent since 2001 and 2002 in men and women, respectively, and are larger in magnitude than those occurring in the previous decade (Table 5). Death rates peaked in men in 1990 (279.8 per 100,000), in women in 1991 (175.3 per 100,000), and overall in 1991 (215.1 per 100,000). Between 1990/1991 and 2009, cancer death rates decreased 24% in men, 16% in women, and 20% overall. Figure 6 shows that as a result of almost two decades of consistent declines in cancer death rates, about 1,177,300 cancer deaths were averted, 152,900 of these in 2009 alone.

Death rates continue to decrease for the 4 major cancer sites (Figs. 4 and 5). Over the past two decades of data, death rates have decreased from their peak by more than 30% for cancers of the colorectum, female breast, and male

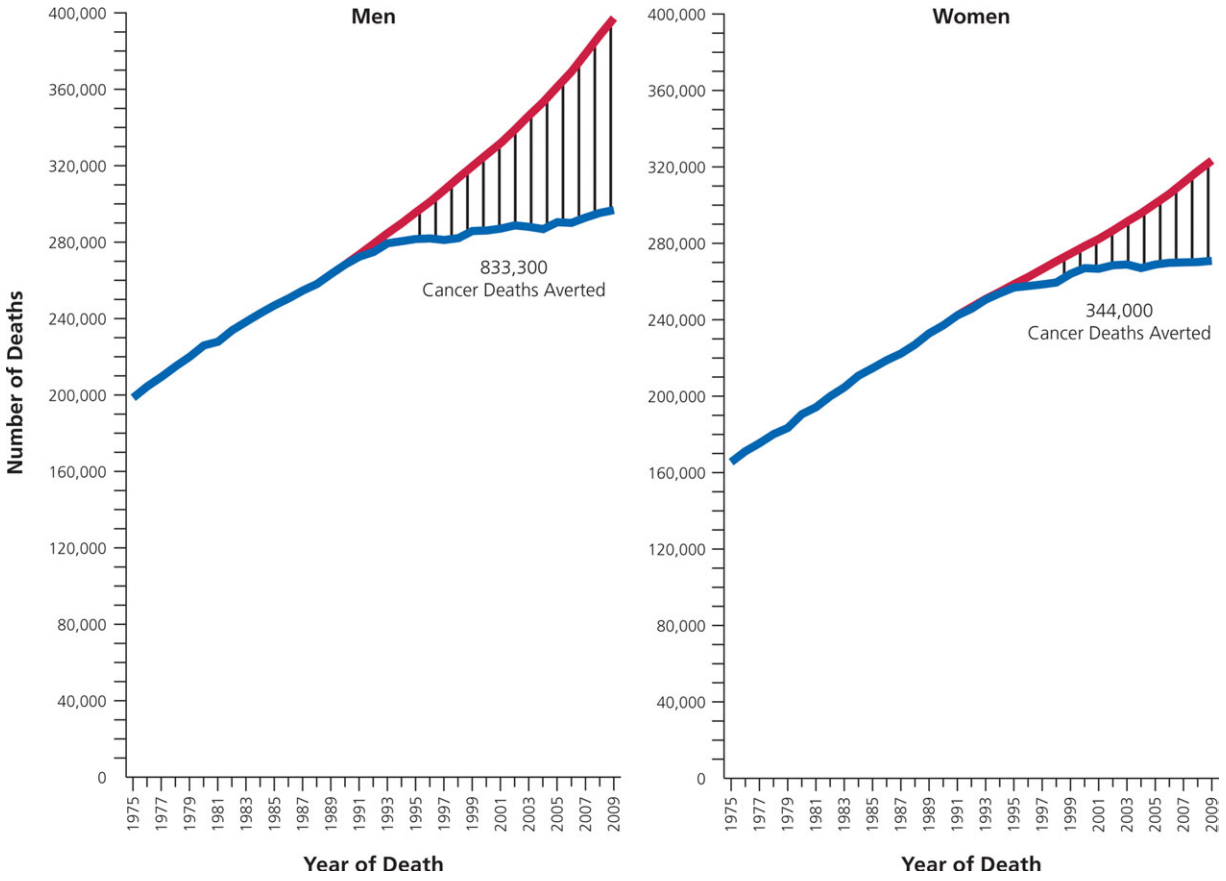

FIGURE 6. Total Number of Cancer Deaths Averted From 1991 to 2009 in Men and From 1992 to 2009 in Women.
The blue line represents the actual number of cancer deaths recorded in each year, and the red line represents the number of cancer deaths that would have been expected if cancer death rates had remained at their peak.

lung, and by more than 40% for prostate cancer. The decrease in lung cancer death rates—among men since 1990 and among women since 2002—is due to the reduction in tobacco use,[20] while the decrease in death rates for female breast, colorectal, and prostate cancers largely reflects improvements in early detection and/or treatment.[17,21,22] Over the past 10 years of data (2000-2009), the largest annual declines in death rates were for chronic myeloid leukemia (8.4%), cancers of the stomach (3.1%) and colorectum (3.0%), and non-Hodgkin lymphoma (3.0%).

Recorded Number of Deaths From Cancer in 2009

A total of 2,437,163 deaths were recorded in the United States in 2009, 567,628 of these from cancer.[23] Cancer is the second leading cause of death, following heart disease, accounting for 23% of all deaths. However, within 20-year age groups, cancer is the leading cause of death among both men and women aged 40 to 79 years (Table 6).

Table 7 presents the numbers of deaths for all cancers combined and for the 5 most common sites for each 20-year age group. Among males, leukemia is the leading cause of cancer death among those aged younger than 40 years, while lung cancer ranks first among men aged 40 years and older. Among females, tumors of the brain and other nervous system are the leading cause of cancer death among children and adolescents (aged younger than 20 years), breast cancer ranks first among women aged 20 to 59 years, and lung cancer causes the most cancer deaths in those aged 60 years and older.

Regional Variations in Cancer Rates

Tables 8 and 9 depict cancer incidence and death rates for selected cancers by state. Lung cancer shows the largest geographic variation in cancer occurrence by far, reflecting the large historical and continuing differences in smoking prevalence among states.[20] For example, lung cancer incidence rates in Kentucky, which has historically had the highest smoking prevalence, are almost 4-fold higher than those in Utah, which has the lowest smoking prevalence (128 vs 34 cases per 100,000 men). In contrast, state variations for other cancer sites are smaller in both absolute and proportionate terms. For example, the breast cancer incidence rate in Connecticut, which has the highest rate (137 per 100,000 women), is only 28% higher than that in Arizona, which has the lowest

TABLE 6. Ten Leading Causes of Death by Age and Sex, United States, 2009

	ALL AGES		AGES 1 TO 19		AGES 20 TO 39		AGES 40 TO 59		AGES 60 TO 79		AGES ≥80	
	MALE All Causes 1,217,379	FEMALE All Causes 1,219,784	MALE All Causes 13,919	FEMALE All Causes 7,702	MALE All Causes 62,116	FEMALE All Causes 28,792	MALE All Causes 227,801	FEMALE All Causes 142,628	MALE All Causes 467,962	FEMALE All Causes 373,658	MALE All Causes 430,581	FEMALE All Causes 655,337
1	Heart diseases 307,225	Heart diseases 292,188	Accidents (unintentional injuries) 5,317	Accidents (unintentional injuries) 2,645	Accidents (unintentional injuries) 21,388	Accidents (unintentional injuries) 7,228	Cancer 54,483	Cancer 50,579	Cancer 154,168	Cancer 127,506	Heart diseases 130,332	Heart diseases 193,676
2	Cancer 296,763	Cancer 270,865	Assault (homicide) 2,031	Cancer 848	Intentional self-harm (suicide) 8,977	Cancer 4,629	Heart diseases 52,826	Heart diseases 21,353	Heart diseases 118,163	Heart diseases 74,294	Cancer 82,765	Cancer 87,264
3	Accidents (unintentional injuries) 75,022	Cerebro-vascular disease 76,769	Intentional self-harm (suicide) 1,500	Assault (homicide) 569	Assault (homicide) 7,214	Heart diseases 2,393	Accidents (unintentional injuries) 24,265	Accidents (unintentional injuries) 11,333	Chronic lower respiratory diseases 31,425	Chronic lower respiratory diseases 31,457	Chronic lower respiratory diseases 27,930	Cerebro-vascular disease 51,445
4	Chronic lower respiratory diseases 65,119	Chronic lower respiratory diseases 72,234	Cancer 1,042	Congenital anomalies 495	Heart diseases 5,256	Intentional self-harm (suicide) 2,140	Intentional self-harm (suicide) 11,858	Cerebro-vascular disease 5,283	Cerebro-vascular disease 19,751	Cerebro-vascular disease 19,317	Cerebro-vascular disease 24,649	Alzheimer disease 47,856
5	Cerebro-vascular disease 52,073	Alzheimer disease 55,103	Congenital anomalies 563	Intentional self-harm (suicide) 434	Cancer 4,256	Assault (homicide) 1,443	Chronic liver disease & cirrhosis 10,562	Chronic lower respiratory diseases 5,134	Diabetes mellitus 16,646	Diabetes mellitus 13,572	Alzheimer disease 18,689	Chronic lower respiratory diseases 35,212
6	Diabetes mellitus 35,054	Accidents (unintentional injuries) 42,999	Heart diseases 411	Heart diseases 295	HIV disease 1,295	Pregnancy, childbirth & puerperium 721	Diabetes mellitus 7,346	Chronic liver disease & cirrhosis 4,654	Accidents (unintentional injuries) 12,728	Nephritis, nephrotic syndrome & nephrosis 8,254	Influenza & pneumonia 13,134	Influenza & pneumonia 18,559
7	Intentional self-harm (suicide) 29,089	Diabetes mellitus 33,651	Influenza & pneumonia 265	Influenza & pneumonia 272	Influenza & pneumonia 847	Influenza & pneumonia 718	Cerebro-vascular disease 6,730	Diabetes mellitus 4,477	Nephritis, nephrotic syndrome & nephrosis 9,174	Accidents (unintentional injuries) 7,431	Nephritis, nephrotic syndrome & nephrosis 11,482	Diabetes mellitus 15,002
8	Influenza & pneumonia 25,128	Influenza & pneumonia 28,564	Chronic lower respiratory diseases 157	Chronic lower respiratory diseases 118	Chronic liver disease & cirrhosis 825	HIV disease 686	Chronic lower respiratory diseases 5,265	Intentional self-harm (suicide) 3,813	Influenza & pneumonia 7,616	Alzheimer disease 7,060	Accidents (unintentional injuries) 10,590	Nephritis, nephrotic syndrome & nephrosis 14,302
9	Nephritis, nephrotic syndrome & nephrosis 23,930	Nephritis, nephrotic syndrome & nephrosis 25,005	Cerebro-vascular disease 109	Septicemia 99	Diabetes mellitus 812	Cerebro-vascular disease 591	HIV disease 4,462	Influenza & pneumonia 2,564	Chronic liver disease & cirrhosis 7,183	Septicemia 6,919	Diabetes mellitus 10,209	Accidents (unintentional injuries) 13,870
10	Alzheimer disease 23,900	Septicemia 19,268	Septicemia 103	Cerebro-vascular disease 72	Cerebro-vascular disease 744	Diabetes mellitus 564	Viral hepatitis 3,456	Septicemia 2,384	Septicemia 6,955	Influenza & pneumonia 6,350	Parkinson disease 7,864	Hypertension & hypertensive renal disease* 10,444

HIV indicates human immunodeficiency virus.

*Includes primary and secondary hypertension

Note: Deaths within each age group do not sum to all ages combined due to the inclusion of unknown ages. In accordance with the National Center for Health Statistics' cause-of-death ranking, "Symptoms, signs, and abnormal clinical or laboratory findings" and categories that begin with "Other" and "All other" were not ranked.

Source: US Mortality Data, 2009, National Center for Health Statistics, Centers for Disease Control and Prevention, 2012.

rate (107 per 100,000 women). For cancers that can be detected by screening or other testing practices, such as those of the prostate, female breast, and colorectum, state variation in incidence rates reflects differences in the utilization of these tests as well as differences in disease occurrence.

TABLE 7. Five Leading Types of Cancer Death by Age and Sex, United States, 2009

ALL AGES	<20	20 TO 39	40 TO 59	60 TO 79	≥80
MALE					
ALL SITES 296,758	**ALL SITES 1,086**	**ALL SITES 4,256**	**ALL SITES 54,483**	**ALL SITES 154,168**	**ALL SITES 82,765**
Lung & bronchus 87,697	Leukemia 330	Leukemia 590	Lung & bronchus 14,960	Lung & bronchus 52,272	Lung & bronchus 20,171
Prostate 28,088	Brain & ONS 281	Brain & ONS 556	Colorectum 5,495	Colorectum 13,200	Prostate 15,099
Colorectum 26,807	Other endocrine system 99	Colorectum 456	Liver & intrahepatic bile duct 4,553	Prostate 11,717	Colorectum 7,652
Pancreas 17,870	Bones & joints 93	Non-Hodgkin lymphoma 305	Pancreas 3,662	Pancreas 9,871	Urinary bladder 4,579
Liver & intrahepatic bile duct 13,035	Soft tissue 83	Lung & bronchus 279	Esophagus 2,615	Liver & intrahepatic bile duct 6,309	Pancreas 4,215
FEMALE					
ALL SITES 270,856	**ALL SITES 878**	**ALL SITES 4,629**	**ALL SITES 50,579**	**ALL SITES 127,506**	**ALL SITES 87,264**
Lung & bronchus 70,389	Brain & ONS 241	Breast 1,056	Breast 11,572	Lung & bronchus 39,782	Lung & bronchus 19,188
Breast 40,678	Leukemia 231	Uterine cervix 438	Lung & bronchus 11,174	Breast 17,165	Breast 10,882
Colorectum 25,042	Bones & joints 86	Leukemia 388	Colorectum 4,139	Colorectum 9,968	Colorectum 10,600
Pancreas 17,758	Soft tissue 81	Brain & ONS 333	Ovary 3,189	Pancreas 8,782	Pancreas 6,371
Ovary 14,436	Other endocrine system 63	Colorectum 331	Pancreas 2,523	Ovary 7,171	Non-Hodgkin lymphoma 4,129

ONS indicates other nervous system.

Note: Ranking order excludes "Miscellaneous malignant cancer" and "In situ, benign, or unknown behavior neoplasm."

Cancer Occurrence by Race/Ethnicity

Cancer incidence and death rates vary considerably among racial and ethnic groups (Table 10). For all cancer sites combined, African American men have a 14% higher incidence rate and a 33% higher death rate than white men, whereas African American women have a 6% lower incidence rate but a 16% higher death rate than white women. Cancer incidence and death rates are higher among African American men than white men for every cancer site listed in Table 10. Factors known to contribute to racial disparities in mortality vary by cancer site and include differences in exposure to underlying risk factors (eg, historical smoking prevalence for lung cancer), access to high-quality screening (breast, cervical, and colorectal cancers), and timely diagnosis and treatment.[24] The higher breast cancer incidence rate among whites compared to women of other racial or ethnic groups is thought to reflect a combination of factors that affect both diagnosis (ie, more prevalent mammography among white women) and underlying disease occurrence (eg, later age at first birth and greater use of menopausal hormone therapy among white women).[25]

Cancer incidence and death rates are lower in other racial and ethnic groups than in whites and African Americans for all cancer sites combined and for the 4 most common cancer sites. However, incidence and death rates for cancers related to infectious agents, such as uterine cervix, stomach, and liver, are generally higher in minority populations than in whites. Stomach and liver cancer incidence and death rates are twice as high in Asian Americans/Pacific Islanders as in whites, reflecting an increased prevalence of chronic infection with *Helicobacter pylori* and hepatitis B virus in this population.[26] Kidney cancer incidence and death rates are the highest among American Indians/Alaskan Natives, which may reflect the high prevalence of obesity and smoking in this population.[27]

Cancer incidence rates can only be adjusted for delayed reporting in whites and African Americans because the long-term incidence data required for delay adjustment are not available for other racial and ethnic groups. During the past 10 years of data (2000-2009), while incidence rates (unadjusted for delayed reporting) declined by 1% or more per year among men of all

TABLE 8. Incidence Rates for Selected Cancers by State, United States, 2005 to 2009

	ALL CANCERS		BREAST	COLORECTUM		LUNG & BRONCHUS		NON-HODGKIN LYMPHOMA		PROSTATE	URINARY BLADDER	
STATE	MALE	FEMALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	MALE	FEMALE
Alabama*	582.4	395.4	119.4	59.7	41.3	104.8	54.6	19.5	13.4	162.1	33.2	7.4
Alaska	523.7	435.7	130.0	55.4	44.2	83.8	63.0	22.0	18.3	139.9	38.2	9.5
Arizona	439.6	361.0	106.7	41.9	31.8	62.5	48.2	17.6	13.3	118.1	31.5	8.3
Arkansas†	551.6	381.6	109.2	54.7	39.8	107.4	59.6	21.9	15.0	153.4	32.5	7.9
California	510.5	398.9	123.3	50.7	38.1	62.4	45.2	23.0	15.6	143.0	33.9	8.0
Colorado	493.9	396.4	125.4	46.0	35.1	57.2	44.6	22.2	15.8	152.3	31.8	8.3
Connecticut	594.1	462.5	137.3	55.3	41.1	78.5	61.0	25.9	17.9	165.2	47.9	12.5
Delaware	613.1	448.2	127.9	56.4	41.4	90.6	68.8	24.0	17.1	182.8	44.2	11.3
Dist. of Columbia†	562.6	399.0	128.3	53.0	42.2	77.2	45.9	21.3	13.5	185.1	24.6	8.0
Florida	528.3	403.1	114.9	49.6	37.9	82.8	58.1	21.7	15.2	137.7	35.6	8.8
Georgia	569.8	397.2	119.7	53.4	38.8	95.6	54.7	21.6	14.2	167.8	33.0	7.8
Hawaii	504.3	401.6	125.1	59.6	38.7	68.7	40.4	20.9	13.0	128.4	26.2	6.4
Idaho	528.7	411.6	119.1	45.8	36.5	64.6	48.1	22.1	17.3	160.1	36.7	8.9
Illinois	573.5	437.8	125.4	61.3	44.8	88.9	60.6	23.8	16.3	157.9	40.2	10.3
Indiana	539.3	421.5	116.9	57.5	43.3	99.5	64.0	23.1	17.0	129.2	36.3	8.9
Iowa	568.2	436.5	123.5	59.6	45.9	87.6	56.3	26.5	18.5	142.2	43.0	8.7
Kansas	563.8	422.2	124.6	57.6	40.4	85.0	55.0	23.6	17.2	157.3	38.2	9.3
Kentucky	615.4	459.7	121.2	65.7	46.9	128.2	80.1	25.1	17.3	139.0	40.3	9.9
Louisiana*	614.5	410.9	118.9	64.6	43.7	101.9	58.2	24.2	16.8	173.7	34.4	8.2
Maine	600.1	467.3	128.5	55.8	43.9	95.5	67.6	25.6	18.4	153.6	48.1	13.5
Maryland	532.8	411.8	124.8	49.9	37.9	77.3	56.6	21.1	14.2	158.4	33.5	9.3
Massachusetts	581.1	459.2	132.8	53.3	40.3	81.0	64.0	25.1	16.3	157.5	45.0	12.3
Michigan	578.0	433.3	120.3	52.9	40.9	87.3	61.3	24.8	17.8	166.5	42.5	10.9
Minnesota	566.5	424.4	128.5	51.2	40.1	66.7	49.8	26.9	18.1	179.0	40.0	9.6
Mississippi*	612.1	395.5	114.3	62.7	44.7	116.4	56.3	21.8	14.4	174.2	31.4	7.2
Missouri	548.3	423.4	121.9	58.3	42.0	100.0	64.7	22.3	15.9	132.9	36.3	8.4
Montana	531.6	417.9	123.0	52.7	38.5	73.0	58.5	23.0	15.3	164.1	37.6	9.7
Nebraska	547.1	426.6	124.7	62.8	46.2	78.2	51.7	24.2	17.7	150.9	35.8	8.9
Nevada	514.4	405.1	114.3	52.1	39.3	76.8	65.5	20.9	15.4	138.4	38.4	11.0
New Hampshire	584.8	452.4	132.5	51.9	39.5	81.4	62.2	23.9	17.4	155.1	48.1	13.3
New Jersey	593.0	454.1	130.0	58.2	43.0	76.1	56.8	25.5	17.6	172.4	45.1	11.8
New Mexico	480.8	370.5	111.4	46.4	34.6	55.7	39.3	19.1	14.5	141.6	26.9	6.4
New York	583.3	442.7	125.8	54.6	41.5	77.1	55.1	25.9	17.8	167.2	42.5	10.9
North Carolina	579.2	418.1	125.0	54.5	38.7	100.1	58.2	23.0	15.6	158.3	37.5	9.1
North Dakota	555.6	421.0	126.4	62.9	44.1	71.5	46.2	22.0	17.8	169.4	40.9	10.1
Ohio	546.5	421.5	119.6	56.3	42.3	93.2	60.0	23.0	16.0	144.1	39.0	9.7
Oklahoma	567.8	426.7	123.9	56.1	42.1	101.9	64.7	22.6	17.6	153.2	35.5	8.7
Oregon	521.7	432.3	130.7	47.9	38.3	74.2	59.2	23.3	16.1	145.1	37.6	10.0
Pennsylvania	583.8	453.7	125.8	59.4	44.5	87.5	58.2	25.4	17.8	154.1	44.5	11.0
Rhode Island	590.8	466.7	133.2	55.2	43.0	88.2	64.7	23.9	17.6	152.6	52.4	13.8
South Carolina	559.9	397.7	121.4	52.2	38.7	96.7	53.7	20.6	13.6	159.0	30.4	8.0
South Dakota	494.3	389.8	118.4	54.2	41.0	72.2	47.1	20.5	16.0	149.1	34.2	8.0
Tennessee	565.6	413.7	119.6	56.2	41.3	106.1	61.5	23.0	16.2	145.6	34.9	8.4
Texas*	533.7	394.6	116.1	53.0	37.0	81.8	49.9	22.6	15.9	142.7	30.1	6.9
Utah	469.7	345.2	108.0	39.3	31.3	33.8	22.8	23.0	15.5	169.8	28.8	5.6
Vermont	554.3	455.5	129.4	45.8	40.4	82.0	64.6	24.0	17.7	150.9	43.6	12.6
Virginia†	537.0	396.9	124.0	49.8	37.9	85.2	54.5	21.4	14.3	157.7	33.8	8.1
Washington	552.6	438.4	131.8	48.6	37.2	73.3	57.7	26.6	17.5	155.3	39.5	9.5
West Virginia	576.5	441.6	112.2	61.8	45.4	112.7	73.6	24.0	16.8	138.4	39.3	11.4
Wisconsin†	513.8	404.6	118.8	48.2	37.4	70.6	51.2	22.5	16.5	144.4	36.4	9.3
Wyoming	513.8	388.8	113.2	49.5	38.7	59.7	47.9	20.9	15.5	162.6	42.6	10.4
United States	**550.7**	**419.3**	**122.3**	**54.0**	**40.3**	**82.7**	**55.9**	**23.3**	**16.2**	**151.4**	**37.5**	**9.3**

Rates are per 100,000 and age adjusted to the 2000 US standard population.

*Data for 2005 are limited to cases diagnosed from January through June due to the effect of large migrations of populations on this state as a result of Hurricane Katrina in September 2005.

†This state's incidence data are not included in overall US rates because registry data submitted for 2009 did not meet high-quality standards according to the North American Association of Central Cancer Registries.

racial/ethnic groups except American Indians/Alaska Natives, among women only slight declines (0.2%-0.3% per year) occurred among non-Hispanic whites and Hispanics (Table 11). In contrast, cancer death rates declined by 1.5% or more per year among men and by 1.1% or more per year among women of all races/ethnicities except American Indians/Alaska Natives, among whom rates were stable. Notably, the largest

TABLE 9. Death Rates for Selected Cancers by State, United States, 2005 to 2009

	ALL SITES		BREAST	COLORECTUM		LUNG & BRONCHUS		NON-HODGKIN LYMPHOMA		PANCREAS		PROSTATE
STATE	MALE	FEMALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE
Alabama	259.0	157.4	24.0	22.9	15.1	89.4	41.1	8.3	5.3	13.3	9.5	28.7
Alaska	209.5	159.6	23.5	20.0	14.1	62.9	45.5	7.9	5.8	12.3	10.0	22.1
Arizona	182.1	130.0	20.5	16.8	11.6	50.2	33.2	7.5	4.8	10.9	7.9	19.7
Arkansas	253.7	161.2	23.6	22.5	15.2	92.5	46.3	8.8	5.2	13.6	9.4	25.3
California	194.9	141.7	22.3	18.1	12.9	49.2	33.1	8.1	5.0	11.8	9.4	23.2
Colorado	185.0	134.4	19.9	17.4	13.0	45.1	31.9	8.0	4.4	10.9	8.9	23.8
Connecticut	212.0	149.6	22.5	17.3	13.0	55.9	38.8	8.1	5.2	14.7	10.2	24.8
Delaware	229.6	162.8	23.0	20.3	14.3	69.2	48.5	8.4	5.0	12.3	9.7	24.9
Dist. of Columbia	256.3	160.4	28.0	23.1	17.7	64.7	34.8	9.4	3.5	16.3	10.7	41.3
Florida	206.0	141.9	21.5	18.3	13.0	63.5	39.3	7.8	4.9	12.0	8.7	19.6
Georgia	230.8	146.8	23.0	20.2	13.8	75.8	38.7	7.7	4.6	12.4	8.9	27.5
Hawaii	184.6	119.6	17.8	18.7	10.8	51.2	27.0	7.5	4.2	12.9	9.4	16.2
Idaho	195.9	143.5	21.3	15.9	13.4	51.3	35.6	8.1	5.4	11.5	9.8	26.7
Illinois	229.4	160.1	24.2	22.5	15.6	67.8	41.9	8.8	5.5	13.1	10.1	25.5
Indiana	244.9	163.2	23.9	22.5	15.0	82.0	47.2	9.7	5.6	13.1	9.4	23.8
Iowa	220.1	151.0	21.8	20.6	15.2	67.5	39.4	9.2	5.5	12.0	8.8	23.9
Kansas	221.5	149.9	22.9	21.2	14.0	70.6	41.0	9.6	5.2	12.5	9.4	21.4
Kentucky	267.2	173.6	23.4	24.3	16.6	99.7	55.5	9.2	5.9	12.5	9.4	24.6
Louisiana	260.8	165.8	26.3	25.1	15.7	84.4	44.1	9.0	5.2	13.8	11.0	27.1
Maine	240.0	161.6	21.4	20.5	14.4	73.1	46.4	9.2	5.5	12.2	9.8	24.4
Maryland	226.5	157.3	24.9	22.0	14.6	65.6	41.8	7.9	4.9	12.9	10.4	26.7
Massachusetts	222.6	154.0	21.9	19.6	13.8	62.6	42.5	8.3	5.1	13.1	10.3	23.4
Michigan	228.1	160.9	24.0	20.2	14.7	70.3	43.9	9.2	6.1	13.9	10.1	22.6
Minnesota	206.8	146.0	21.3	18.0	12.6	55.2	37.2	9.6	5.2	11.8	9.5	24.3
Mississippi	274.2	158.8	24.9	24.9	16.2	97.3	42.3	8.3	4.8	13.8	9.9	31.0
Missouri	237.6	160.4	24.9	21.6	14.6	79.8	46.0	8.4	5.3	13.1	9.7	22.7
Montana	203.4	150.5	20.5	17.8	14.7	57.1	41.3	8.1	5.4	12.4	8.7	27.2
Nebraska	215.2	145.7	21.2	22.5	15.1	62.4	36.0	9.0	5.7	12.2	9.4	24.7
Nevada	213.3	158.4	23.3	20.7	15.3	62.5	48.8	6.7	4.8	12.3	9.8	23.4
New Hampshire	218.2	154.7	21.4	19.3	13.2	62.0	43.0	7.7	5.0	13.4	10.6	23.2
New Jersey	213.8	157.7	26.1	22.0	15.5	57.9	38.3	8.1	5.5	13.3	10.0	22.4
New Mexico	190.1	134.3	21.1	18.7	13.5	44.4	29.1	6.7	4.4	11.6	8.9	24.3
New York	201.3	145.2	22.5	19.4	14.0	55.2	35.8	8.0	4.9	12.6	9.7	22.2
North Carolina	236.9	152.7	23.5	19.8	13.6	79.3	41.6	7.6	5.0	12.1	9.7	25.9
North Dakota	210.2	144.1	22.0	21.6	14.8	56.5	34.3	7.4	5.5	12.8	8.7	25.2
Ohio	243.4	163.4	25.2	22.5	15.5	77.4	44.5	9.4	5.6	13.1	9.9	25.4
Oklahoma	243.0	161.2	23.8	22.9	14.8	82.7	46.9	8.9	5.9	12.0	8.7	23.6
Oregon	214.4	155.5	21.5	18.5	13.9	61.2	43.6	8.6	5.7	12.2	10.0	25.7
Pennsylvania	232.4	158.5	24.1	22.3	15.2	68.5	40.0	9.2	5.6	13.4	10.0	23.7
Rhode Island	228.8	151.3	21.9	19.6	13.3	66.3	43.0	8.8	4.6	12.4	8.4	22.5
South Carolina	241.3	151.0	24.0	20.5	14.1	79.6	40.0	8.0	4.8	12.5	9.7	26.9
South Dakota	206.0	141.5	20.9	20.1	14.2	62.2	35.5	7.8	5.1	11.1	9.1	22.9
Tennessee	257.9	162.0	24.0	22.4	15.1	91.5	47.2	9.3	5.5	13.0	9.3	25.3
Texas	212.5	142.8	22.2	20.2	13.1	63.4	35.9	8.1	5.0	11.7	8.7	21.4
Utah	154.1	109.6	21.5	14.3	10.4	28.1	16.1	7.5	4.6	9.5	8.0	24.5
Vermont	211.9	152.8	20.7	18.8	14.2	61.6	44.3	8.1	5.0	12.5	9.6	22.0
Virginia	228.5	153.9	24.8	19.9	14.2	70.6	40.7	8.3	5.0	13.0	9.9	26.0
Washington	209.6	153.9	21.9	17.7	12.7	58.1	42.8	8.8	5.5	12.4	9.8	24.9
West Virginia	254.8	173.2	23.6	24.2	16.8	87.5	51.9	9.1	6.4	11.2	7.7	21.7
Wisconsin	218.8	152.0	21.6	18.7	13.1	59.9	38.7	9.4	5.7	12.9	9.8	25.6
Wyoming	199.5	148.3	21.4	18.9	14.2	52.8	38.5	8.1	5.9	13.2	9.7	20.9
United States	**219.4**	**151.1**	**23.0**	**20.2**	**14.1**	**65.7**	**39.6**	**8.4**	**5.2**	**12.5**	**9.5**	**23.6**

Rates are per 100,000 and age adjusted to the 2000 US standard population.

declines in death rates occurred among men of African American (2.4% per year) and Hispanic (2.3% per year) heritage.

Cancer Survival

African Americans are less likely to survive cancer than whites. The 5-year relative survival is lower among African Americans for every stage of diagnosis for nearly every type of cancer (Fig. 7). These disparities may result from inequalities in access to and receipt of quality health care and/or from differences in comorbidities. As shown in Figure 8, African Americans are less likely than whites to be diagnosed with cancer at a localized stage, when treatment is usually less extensive and more successful. The extent to which factors other than stage at diagnosis contribute to the overall survival differential is unclear.[28] A study of Medicare-insured patients

TABLE 10. Incidence and Death Rates by Site, Race, and Ethnicity, United States, 2005 to 2009

	WHITE	AFRICAN AMERICAN	ASIAN AMERICAN AND PACIFIC ISLANDER	AMERICAN INDIAN AND ALASKA NATIVE*	HISPANIC/LATINO
Incidence					
All sites					
Male	543.1	619.7	327.5	423.2	418.7
Female	424.0	396.8	286.2	360.3	333.2
Breast (female)	123.3	118.0	85.9	89.1	93.0
Colorectum					
Male	52.8	65.1	41.4	50.7	46.9
Female	39.2	48.0	32.1	41.1	33.3
Kidney & renal pelvis					
Male	21.2	23.3	10.1	29.0	19.8
Female	11.2	12.1	5.1	16.6	11.4
Liver & intrahepatic bile duct					
Male	9.1	15.0	21.6	16.4	17.5
Female	3.1	4.2	8.1	7.6	6.6
Lung & bronchus					
Male	82.3	99.3	49.4	67.4	45.4
Female	57.5	51.3	28.1	49.5	26.6
Prostate	141.0	228.7	77.2	98.8	124.9
Stomach					
Male	8.4	16.3	16.1	13.0	13.5
Female	4.0	8.2	9.3	6.4	8.1
Uterine cervix	7.8	10.4	7.2	10.1	11.8
Mortality					
All sites					
Male	216.7	288.3	132.6	184.9	146.4
Female	150.8	174.6	93.2	135.9	100.6
Breast (female)	22.4	31.6	11.9	16.6	14.9
Colorectum					
Male	19.5	29.8	13.1	18.8	15.3
Female	13.6	19.8	9.6	14.6	10.2
Kidney & renal pelvis					
Male	5.9	6.0	2.9	8.8	5.0
Female	2.7	2.6	1.3	4.1	2.3
Liver & intrahepatic bile duct					
Male	7.4	11.9	14.5	11.9	11.8
Female	3.1	4.0	6.1	5.9	5.3
Lung & bronchus					
Male	65.3	82.6	35.9	48.3	30.8
Female	40.8	38.0	18.5	33.2	14.1
Prostate	21.7	53.1	10.0	19.7	17.8
Stomach					
Male	4.3	10.3	9.0	8.3	7.4
Female	2.2	4.8	5.3	3.8	4.3
Uterine cervix	2.2	4.3	2.0	3.5	3.0

Rates are per 100,000 population and age adjusted to the 2000 US standard population. Race and ethnicity categories are not mutually exclusive of Hispanic origin.

*Data based on Indian Health Service Contract Health Service Delivery Areas.

TABLE 11. Ten-Year Trends in Cancer Incidence and Mortality Rates by Race/Ethnicity, United States, 2000 to 2009

	2000-2009 AAPC			
	INCIDENCE		MORTALITY	
	MALE	FEMALE	MALE	FEMALE
All races/ethnicities	−1.1*	−0.3*	−1.8*	−1.4*
Non-Hispanic white	−1.0*	−0.2*	−1.5*	−1.3*
African American	−1.4*	0.0	−2.4*	−1.5*
Asian American/Pacific Islander	−1.8*	0.2	−1.5*	−1.1*
American Indian/Alaska Native†	−0.7	0.0	−0.8	−0.8
Hispanic‡	−1.7*	−0.3*	−2.3*	−1.4*

AAPC indicates average annual percent change.

*AAPC is statistically significant ($P < .05$).

†Data based on Indian Health Service Contract Health Service Delivery Areas.

‡Excludes deaths from the District of Columbia, Minnesota, New Hampshire, and North Dakota due to unreliable Hispanic origin data for some years.

Notes: Trends analyzed by the Joinpoint Regression Program, version 3.5.0, allowing up to 2 joinpoints. Incidence trends based on the North American Association of Central Cancer Registries (NAACCR) data. Race and ethnicity categories are not mutually exclusive of Hispanic origin.

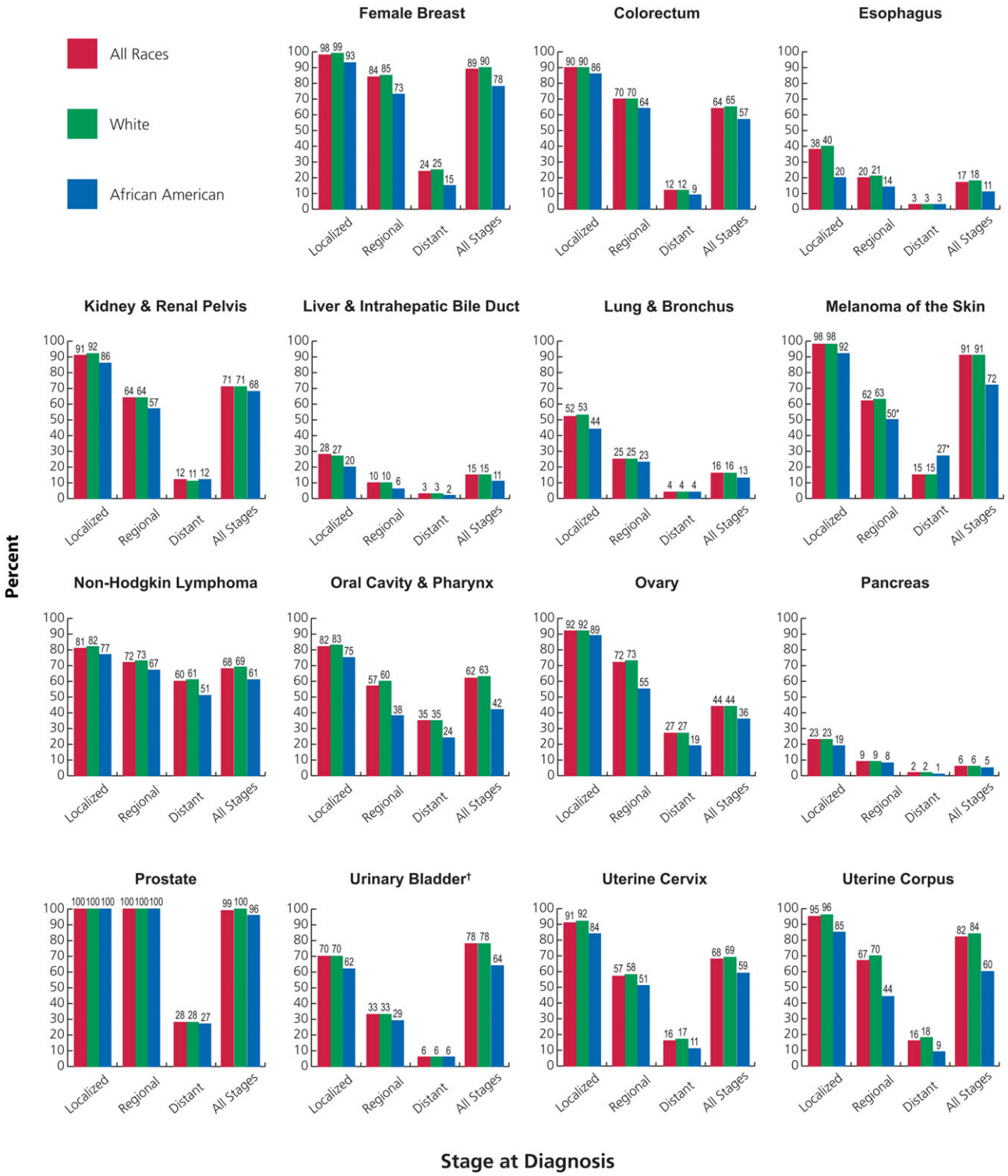

FIGURE 7. Five-Year Relative Survival Rates for Selected Cancers by Race and Stage at Diagnosis, United States, 2002 to 2008.
*The standard error of the survival rate is between 5 and 10 percentage points.
†The survival rate for carcinoma in situ of the urinary bladder is 96% for All Races, 97% for Whites, and 91% for African Americans.

showed that African Americans remain less likely than whites to receive standard cancer therapies for lung, breast, colorectal, and prostate cancers.[29] Some studies suggest that African Americans who receive cancer treatment and medical care similar to that of whites experience similar outcomes.[30]

There have been notable improvements in survival over the past 3 decades for most cancers for both whites and African Americans (Table 12). Between 1975 to 1977 and 2002 to 2008, overall 5-year relative survival rates increased 19% among whites and 21% among African Americans.

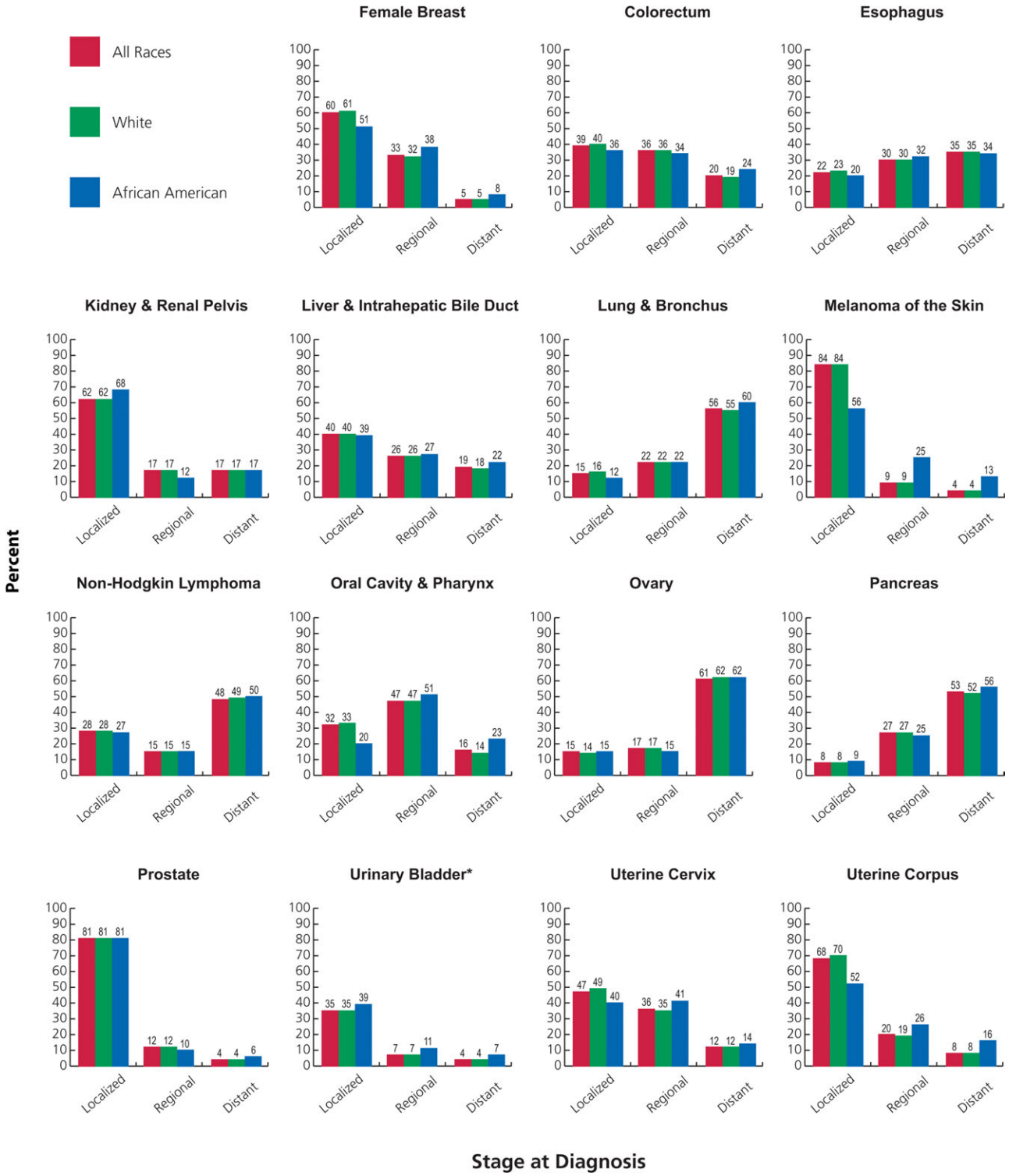

FIGURE 8. Distribution of Selected Cancers by Race and Stage at Diagnosis, United States, 2002 to 2008.
*The proportions of carcinoma in situ of the urinary bladder are 51% for All Races, 52% for Whites, and 37% for African Americans.
Stage categories do not sum to 100% because sufficient information is not available to assign a stage to all cancer cases.

The largest improvements in survival have been for leukemia and non-Hodgkin lymphoma, while cancers of the lung and pancreas have shown the least improvement.

Relative survival rates cannot be calculated for some minority populations because accurate life expectancies are not available. Comparison of cause-specific survival rates of cancer patients diagnosed from 2002 to 2008 in SEER registry areas of the United States indicate that all minority male populations have a greater probability than whites of dying from cancer within 5 years of diagnosis, although the difference is small for Hispanic men.[6] In contrast, among women, Asian Americans/Pacific Islanders (69.1%) and

TABLE 12. Trends in 5-Year Relative Survival Rates* (%) by Race and Year of Diagnosis, United States, 1975 to 2008

	ALL RACES			WHITE			AFRICAN AMERICAN		
	1975 TO 1977	1987 TO 1989	2002 TO 2008	1975 TO 1977	1987 TO 1989	2002 TO 2008	1975 TO 1977	1987 TO 1989	2002 TO 2008
All sites	49	56	68†	50	57	69†	39	43	60†
Brain & other nervous system	22	29	35†	22	28	34†	25	32	41†
Breast (female)	75	84	90†	76	85	92†	62	71	78†
Colon	51	61	65†	51	61	66†	45	53	55†
Esophagus	5	10	19†	6	11	21†	3	7	14†
Hodgkin lymphoma	72	79	87†	72	80	88†	70	72	83†
Kidney & renal pelvis	50	57	72†	50	57	72†	49	55	70†
Larynx	66	66	63†	67	67	65	59	56	51
Leukemia	34	43	58†	35	44	59†	33	35	51†
Liver & intrahepatic bile duct	3	5	16†	3	6	16†	2	3	11†
Lung & bronchus	12	13	17†	12	13	17†	11	11	14†
Melanoma of the skin	82	88	93†	82	88	93†	57‡	79‡	70‡
Myeloma	25	28	43†	25	27	43†	30	30	43†
Non-Hodgkin lymphoma	47	51	71†	47	52	72†	48	46	63†
Oral cavity & pharynx	53	54	65†	54	56	67†	36	34	45†
Ovary	36	38	43†	35	38	43†	42	34	36
Pancreas	2	4	6†	3	3	6†	2	6	5†
Prostate	68	83	100†	69	85	100†	61	72	98†
Rectum	48	58	68†	48	59	69†	45	52	61†
Stomach	15	20	28†	14	19	27†	16	19	28†
Testis	83	95	96†	83	96	97†	73‡,§	88‡	89
Thyroid	92	95	98†	92	94	98†	90	92	96†
Urinary bladder	73	79	80†	74	80	81†	50	63	62†
Uterine cervix	69	70	69	70	73	70	65	57	61
Uterine corpus	87	83	83†	88	84	85†	60	57	63

*Survival rates are adjusted for normal life expectancy and are based on cases diagnosed in the Surveillance, Epidemiology, and End Results (SEER) 9 areas from 1975 to 1977, 1987 to 1989, and 2002 to 2008 and followed through 2009.

†The difference in rates between 1975 to 1977 and 2002 to 2008 is statistically significant ($P < .05$).

‡The standard error of the survival rate is between 5 and 10 percentage points.

§Survival rate is for 1978 to 1980.

Hispanics (67.2%) have the highest 5-year cause-specific survival, followed by whites (66.2%), American Indians/Alaska Natives (60.6%), and African Americans (57.6%). Minority populations are generally more likely than non-Hispanic whites to be diagnosed at a distant stage of disease for all 4 major cancer sites.[31]

Cancer in Children

Cancer is the second most common cause of death among children ages 1 to 14 years in the United States, surpassed only by accidents; 1,320 children died from cancer in 2009.[1] Leukemia accounts for almost one-third of all cancers (including benign brain tumors) diagnosed in

TABLE 13. Trends in 5-Year Relative Survival Rates* (%) for Children (0 to 14 Years) by Year of Diagnosis, United States, 1975 to 2008

	1975 TO 1977	1978 TO 1980	1981 TO 1983	1984 TO 1986	1987 TO 1989	1990 TO 1992	1993 TO 1995	1996 TO 1998	1999 TO 2001	2002 TO 2008
All sites	58	63	67	68	72	76	77	79	81	83†
Acute lymphocytic leukemia	58	66	71	73	78	83	84	87	88	91†
Acute myeloid leukemia	19	26	27‡	31‡	37‡	42	42‡	49	58	64†
Bone & joint	50‡	48	57‡	57‡	67‡	67	74	70	70	79†
Brain & other nervous system	57	58	56	62	64	65	71	75	74	75
Hodgkin lymphoma	81	87	88	91	87	97	95	96	94	97†
Neuroblastoma	53	57	55	52	63	76	67	66	73	74†
Non-Hodgkin lymphoma	43	53	67	70	71	77	81	84	89	85†
Soft tissue	61	75	69	73	66	80	77	70	77	82†
Wilms tumor	73	79	87	91	92	92	92	92	94	90†

*Survival rates are adjusted for normal life expectancy and are based on follow-up of patients through 2009.

†The difference in rates between 1975 to 1977 and 2002 to 2008 is statistically significant ($P < .05$).

‡The standard error of the survival rate is between 5 and 10 percentage points.

children aged 0 to 14 years, 77% of which are acute lymphocytic leukemias. Cancers of the brain and other nervous system are the second most common cancer type (25%), followed by soft tissue sarcomas (7%, half of which are rhabdomyosarcoma), neuroblastoma (6%), renal (Wilms) tumors (5%), and Hodgkin and non-Hodgkin lymphomas (4% each).[6] From 2005 to 2009, the overall incidence rate for cancer in children aged 14 years and younger increased slightly by 0.5% per year, a trend that has been consistent since 1975. The death rate for childhood cancer has decreased by more than half over the past 3 decades, from 4.9 (per 100,000) in 1975 to 2.1 in 2009. Table 13 provides trends in survival rates for the most common childhood cancers. The 5-year relative survival rate for all cancer sites combined improved from 58% for children diagnosed between 1975 and 1977 to 83% for those diagnosed between 2002 and 2008. The substantial progress for all of the major childhood cancers reflects both improvements in treatment and high levels of participation in clinical trials.

Limitations

The projected numbers of new cancer cases and cancer deaths should be interpreted cautiously because these estimates are model-based and may vary considerably from year to year for reasons other than changes in cancer occurrence. For instance, estimates are affected by changes in method, which occur regularly as modeling techniques improve over time and cancer registration becomes more complete. In addition, not all changes in cancer trends can be captured by modeling techniques. For these reasons, we discourage the use of these estimates to track year-to-year changes in cancer occurrence and death. The data used for tracking cancer trends are age-standardized or age-specific cancer death rates from the NCHS and cancer incidence rates from SEER and/or NPCR. Nevertheless, the American Cancer Society projections of the numbers of new cancer cases and deaths provide a reasonably accurate estimate of the current cancer burden in the United States.

Errors in reporting race/ethnicity in medical records and on death certificates may result in underestimates of cancer incidence and mortality rates in nonwhite and non-African American populations. It is also important to note that cancer data in the United States are primarily reported for broad racial and ethnic minority groups that are not homogenous, and thus important differences in the cancer burden within racial/ethnic subgroups are masked.

Conclusions

In 2009, Americans had a 20% lower risk of death from cancer than in 1991, when cancer death rates peaked. Despite this substantial progress, all demographic groups have not benefitted equally, particularly for cancers such as colorectal and breast, for which mortality declines have been attributed to earlier detection and improvements in treatment. Further progress can be accelerated by applying existing cancer control knowledge across all segments of the population, with an emphasis on those groups in the lowest socioeconomic bracket as well as other disadvantaged populations. ■

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