Cancer Statistics, 2017

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Abstract: Each year, the American Cancer Society estimates the numbers of new cancer cases and deaths that will occur in the United States in the current year and compiles the most recent data on cancer incidence, mortality, and survival. Incidence data were collected by the Surveillance, Epidemiology, and End Results Program; the National Program of Cancer Registries; and the North American Association of Central Cancer Registries. Mortality data were collected by the National Center for Health Statistics. In 2017, 1,688,780 new cancer cases and 600,920 cancer deaths are projected to occur in the United States. For all sites combined, the cancer incidence rate is 20% higher in men than in women, while the cancer death rate is 40% higher. However, sex disparities vary by cancer type. For example, thyroid cancer incidence rates are 3-fold higher in women than in men (21 vs 7 per 100,000 population), despite equivalent death rates (0.5 per 100,000 population), largely reflecting sex differences in the "epidemic of diagnosis." Over the past decade of available data, the overall cancer incidence rate (2004-2013) was stable in women and declined by approximately 2% annually in men, while the cancer death rate (2005-2014) declined by about 1.5% annually in both men and women. From 1991 to 2014, the overall cancer death rate dropped 25%, translating to approximately 2,143,200 fewer cancer deaths than would have been expected if death rates had remained at their peak. Although the cancer death rate was 15% higher in blacks than in whites in 2014, increasing access to care as a result of the Patient Protection and Affordable Care Act may expedite the narrowing racial gap; from 2010 to 2015, the proportion of blacks who were uninsured halved, from 21% to 11%, as it did for Hispanics (31% to 16%). Gains in coverage for traditionally underserved Americans will facilitate the broader application of existing cancer control knowledge across every segment of the population. **CA Cancer J Clin 2017;67:7–30.** **© 2017 American Cancer Society.**

Keywords: cancer cases, cancer statistics, death rates, incidence, mortality

Introduction

Cancer is a major public health problem worldwide and is the second leading cause of death in the United States. In this article, we provide the expected numbers of new cancer cases and deaths in 2017 in the United States nationally and for each state, as well as a comprehensive overview of cancer incidence, mortality, and survival rates and trends using population-based data. The most current cancer data are available through 2013 for incidence and through 2014 for mortality. We also estimate the total number of deaths averted as a result of the continual decline in cancer death rates since the early 1990s. In addition, we present the actual number of deaths reported in 2014 by age for the 10 leading causes of death and for the 5 leading causes of cancer death.

Materials and Methods

Incidence and Mortality Data

Mortality data from 1930 to 2014 were provided by the National Center for Health Statistics (NCHS).[1-3] Forty-seven states and the District of Columbia met data quality requirements for reporting to the national vital statistics system in 1930. Texas, Alaska, and Hawaii began reporting mortality data in 1933, 1959, and 1960, respectively. The methods for abstraction and age adjustment of mortality data are described elsewhere.[3,4]

Population-based cancer incidence data in the United States have been collected by the National Cancer Institute's (NCI's) Surveillance, Epidemiology, and End

TABLE 1. Estimated New Cancer Cases and Deaths by Sex, United States, 2017*

	ESTIMATED NEW CASES			ESTIMATED DEATHS		
	BOTH SEXES	MALE	FEMALE	BOTH SEXES	MALE	FEMALE
All Sites	**1,688,780**	**836,150**	**852,630**	**600,920**	**318,420**	**282,500**
Oral cavity & pharynx	**49,670**	**35,720**	**13,950**	**9,700**	**7,000**	**2,700**
Tongue	16,400	11,880	4,520	2,400	1,670	730
Mouth	13,210	7,800	5,410	2,580	1,680	900
Pharynx	17,000	13,780	3,220	3,050	2,340	710
Other oral cavity	3,060	2,260	800	1,670	1,310	360
Digestive system	**310,440**	**175,650**	**134,790**	**157,700**	**92,350**	**65,350**
Esophagus	16,940	13,360	3,580	15,690	12,720	2,970
Stomach	28,000	17,750	10,250	10,960	6,720	4,240
Small intestine	10,190	5,380	4,810	1,390	770	620
Colon†	95,520	47,700	47,820	50,260	27,150	23,110
Rectum	39,910	23,720	16,190			
Anus, anal canal, & anorectum	8,200	2,950	5,250	1,100	450	650
Liver & intrahepatic bile duct	40,710	29,200	11,510	28,920	19,610	9,310
Gallbladder & other biliary	11,740	5,320	6,420	3,830	1,630	2,200
Pancreas	53,670	27,970	25,700	43,090	22,300	20,790
Other digestive organs	5,560	2,300	3,260	2,460	1,000	1,460
Respiratory system	**243,170**	**133,050**	**110,120**	**160,420**	**88,100**	**72,320**
Larynx	13,360	10,570	2,790	3,660	2,940	720
Lung & bronchus	222,500	116,990	105,510	155,870	84,590	71,280
Other respiratory organs	7,310	5,490	1,820	890	570	320
Bones & joints	**3,260**	**1,820**	**1,440**	**1,550**	**890**	**660**
Soft tissue (including heart)	**12,390**	**6,890**	**5,500**	**4,990**	**2,670**	**2,320**
Skin (excluding basal & squamous)	**95,360**	**57,140**	**38,220**	**13,590**	**9,250**	**4,340**
Melanoma of the skin	87,110	52,170	34,940	9,730	6,380	3,350
Other nonepithelial skin	8,250	4,970	3,280	3,860	2,870	990
Breast	**255,180**	**2,470**	**252,710**	**41,070**	**460**	**40,610**
Genital system	**279,800**	**172,330**	**107,470**	**59,100**	**27,500**	**31,600**
Uterine cervix	12,820		12,820	4,210		4,210
Uterine corpus	61,380		61,380	10,920		10,920
Ovary	22,440		22,440	14,080		14,080
Vulva	6,020		6,020	1,150		1,150
Vagina & other genital, female	4,810		4,810	1,240		1,240
Prostate	161,360	161,360		26,730	26,730	
Testis	8,850	8,850		410	410	
Penis & other genital, male	2,120	2,120		360	360	
Urinary system	**146,650**	**103,480**	**43,170**	**32,190**	**22,260**	**9,930**
Urinary bladder	79,030	60,490	18,540	16,870	12,240	4,630
Kidney & renal pelvis	63,990	40,610	23,380	14,400	9,470	4,930
Ureter & other urinary organs	3,630	2,380	1,250	920	550	370
Eye & orbit	**3,130**	**1,800**	**1,330**	**330**	**180**	**150**
Brain & other nervous system	**23,800**	**13,450**	**10,350**	**16,700**	**9,620**	**7,080**
Endocrine system	**59,250**	**15,610**	**43,640**	**3,010**	**1,440**	**1,570**
Thyroid	56,870	14,400	42,470	2,010	920	1,090
Other endocrine	2,380	1,210	1,170	1,000	520	480
Lymphoma	**80,500**	**44,730**	**35,770**	**21,210**	**12,080**	**9,130**
Hodgkin lymphoma	8,260	4,650	3,610	1,070	630	440
Non-Hodgkin lymphoma	72,240	40,080	32,160	20,140	11,450	8,690
Myeloma	**30,280**	**17,490**	**12,790**	**12,590**	6,660	**5,930**
Leukemia	**62,130**	**36,290**	**25,840**	**24,500**	**14,300**	**10,200**
Acute lymphocytic leukemia	5,970	3,350	2,620	1,440	800	640
Chronic lymphocytic leukemia	20,110	12,310	7,800	4,660	2,880	1,780
Acute myeloid leukemia	21,380	11,960	9,420	10,590	6,110	4,480
Chronic myeloid leukemia	8,950	5,230	3,720	1,080	610	470
Other leukemia‡	5,720	3,440	2,280	6,730	3,900	2,830
Other & unspecified primary sites‡	**33,770**	**18,230**	**15,540**	**42,270**	**23,660**	**18,610**

*Rounded to the nearest 10; cases exclude basal cell and squamous cell skin cancers and in situ carcinoma except urinary bladder.

About 63,410 cases of carcinoma in situ of the female breast and 74,680 cases of melanoma in situ will be newly diagnosed in 2017.

†Deaths for colon and rectum cancers are combined because a large number of deaths from rectal cancer are misclassified as colon.

‡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.

TABLE 2. Estimated New Cases for Selected Cancers by State, 2017*

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	26,160	3,960	210	2,210	720	770	3,880	1,320	960	2,410	1,090
Alaska	3,600	500	†	280	120	100	450	130	140	320	150
Arizona	35,810	4,870	240	2,630	1,110	1,170	3,940	2,050	1,410	2,990	1,670
Arkansas	16,040	2,100	150	1,390	480	580	2,620	610	660	1,440	710
California	176,140	27,980	1,490	13,890	6,280	6,740	18,270	9,180	7,880	14,520	7,500
Colorado	24,330	3,840	170	1,770	890	960	2,420	1,590	1,090	2,880	1,120
Connecticut	21,900	3,420	120	1,600	890	800	2,540	970	950	2,140	1,220
Delaware	5,660	840	†	440	200	180	850	340	250	590	270
Dist. of Columbia	3,070	520	†	210	110	90	310	120	110	380	90
Florida	124,740	18,170	1,040	9,930	4,230	5,070	19,000	7,610	5,410	12,830	6,430
Georgia	48,850	7,820	410	4,040	1,510	1,550	6,610	2,930	1,890	5,410	1,880
Hawaii	6,540	1,120	50	660	290	210	700	460	260	500	240
Idaho	7,310	1,080	50	610	290	310	980	550	370	870	480
Illinois	64,720	10,210	520	5,580	2,740	2,350	8,600	2,810	2,750	6,410	3,070
Indiana	36,440	5,140	290	3,080	1,370	1,280	5,540	1,730	1,560	3,410	1,710
Iowa	17,230	2,400	100	1,510	700	760	2,410	1,020	800	1,430	870
Kansas	14,400	2,180	110	1,170	540	560	1,880	830	630	1,320	640
Kentucky	26,220	3,590	210	2,250	830	1,050	4,830	1,410	1,070	2,050	1,190
Louisiana	24,220	3,320	230	2,150	630	770	3,510	960	990	2,620	980
Maine	8,750	1,350	†	710	380	310	1,380	450	380	720	570
Maryland	31,820	5,250	220	2,430	1,200	1,000	4,020	1,700	1,260	3,400	1,390
Massachusetts	37,130	5,940	200	2,760	1,600	1,220	4,890	1,890	1,630	3,930	2,050
Michigan	57,600	8,160	370	4,660	2,320	2,010	8,190	2,780	2,480	5,350	3,050
Minnesota	30,000	4,230	140	2,170	1,080	1,290	3,620	1,330	1,370	2,750	1,320
Mississippi	17,290	2,340	140	1,520	410	530	2,570	560	560	1,380	620
Missouri	34,400	4,930	240	2,860	1,250	1,210	5,620	1,690	1,420	2,990	1,610
Montana	6,140	900	†	500	220	260	750	400	280	750	350
Nebraska	9,520	1,450	60	840	380	380	1,220	490	440	840	450
Nevada	13,840	2,010	110	1,160	400	460	1,680	560	560	1,190	700
New Hampshire	8,670	1,260	†	620	350	290	1,150	470	340	770	520
New Jersey	51,680	7,890	360	4,000	2,100	1,990	5,540	2,790	2,380	5,180	2,560
New Mexico	10,040	1,410	80	800	350	370	1,010	490	400	960	390
New York	107,530	16,310	810	8,490	4,420	4,320	12,700	4,900	4,760	10,060	5,410
North Carolina	56,900	8,580	400	4,290	1,810	1,970	7,940	3,060	2,180	5,560	2,500
North Dakota	4,180	550	†	330	140	150	480	210	170	360	200
Ohio	68,180	9,430	460	5,510	2,670	2,270	10,660	3,140	2,860	5,840	3,360
Oklahoma	18,710	2,690	170	1,610	590	760	3,050	790	840	1,700	860
Oregon	21,780	3,450	140	1,620	870	730	2,900	1,580	970	2,060	1,070
Pennsylvania	77,710	11,300	520	6,300	3,270	2,800	9,930	4,140	3,310	7,320	4,190
Rhode Island	5,870	930	†	480	250	190	860	270	260	780	350
South Carolina	28,680	4,250	210	2,270	890	990	4,320	1,740	1,120	3,250	1,260
South Dakota	4,920	690	†	410	180	200	590	240	210	430	240
Tennessee	37,080	5,510	290	3,080	1,090	1,300	5,830	1,840	1,490	2,830	1,620
Texas	116,200	17,060	1,300	9,690	3,890	4,550	14,560	4,240	5,250	12,550	4,270
Utah	10,990	1,460	70	740	400	460	850	950	490	1,240	430
Vermont	4,000	580	†	280	160	110	510	220	170	380	240
Virginia	42,770	7,020	280	3,260	1,490	1,380	5,400	2,500	1,720	3,950	1,870
Washington	35,560	5,950	250	2,720	1,380	1,390	4,390	2,590	1,740	3,580	1,830
West Virginia	11,690	1,520	80	1,050	450	410	1,980	700	480	840	610
Wisconsin	32,990	4,850	180	2,650	1,360	1,460	4,280	1,590	1,380	3,570	1,670
Wyoming	2,780	410	†	220	100	100	320	190	120	320	150
United States	**1,688,780**	**252,710**	**12,820**	**135,430**	**61,380**	**62,130**	**222,500**	**87,110**	**72,240**	**161,360**	**79,030**

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

†Estimate is fewer than 50 cases.

Note: These are model-based estimates that 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.

Estimated New Cases

Males			Females		
Prostate	161,360	19%	Breast	252,710	30%
Lung & bronchus	116,990	14%	Lung & bronchus	105,510	12%
Colon & rectum	71,420	9%	Colon & rectum	64,010	8%
Urinary bladder	60,490	7%	Uterine corpus	61,380	7%
Melanoma of the skin	52,170	6%	Thyroid	42,470	5%
Kidney & renal pelvis	40,610	5%	Melanoma of the skin	34,940	4%
Non-Hodgkin lymphoma	40,080	5%	Non-Hodgkin lymphoma	32,160	4%
Leukemia	36,290	4%	Leukemia	25,840	3%
Oral cavity & pharynx	35,720	4%	Pancreas	25,700	3%
Liver & intrahepatic bile duct	29,200	3%	Kidney & renal pelvis	23,380	3%
All Sites	**836,150**	**100%**	**All Sites**	**852,630**	**100%**

Estimated Deaths

Males			Females		
Lung & bronchus	84,590	27%	Lung & bronchus	71,280	25%
Colon & rectum	27,150	9%	Breast	40,610	14%
Prostate	26,730	8%	Colon & rectum	23,110	8%
Pancreas	22,300	7%	Pancreas	20,790	7%
Liver & intrahepatic bile duct	19,610	6%	Ovary	14,080	5%
Leukemia	14,300	4%	Uterine corpus	10,920	4%
Esophagus	12,720	4%	Leukemia	10,200	4%
Urinary bladder	12,240	4%	Liver & intrahepatic bile duct	9,310	3%
Non-Hodgkin lymphoma	11,450	4%	Non-Hodgkin lymphoma	8,690	3%
Brain & other nervous system	9,620	3%	Brain & other nervous system	7,080	3%
All Sites	**318,420**	**100%**	**All Sites**	**282,500**	**100%**

FIGURE 1. Ten Leading Cancer Types for the Estimated New Cancer Cases and Deaths by Sex, United States, 2017.
Estimates are rounded to the nearest 10 and cases exclude basal cell and squamous cell skin cancers and in situ carcinoma except urinary bladder.

Results (SEER) Program since 1973 and by the Centers for Disease Control and Prevention's (CDC's) National Program of Cancer Registries (NPCR) since 1995. The SEER program is the only source for long-term population-based incidence data. Long-term incidence and survival trends (1975-2013) were based on data from the 9 oldest SEER areas (Connecticut, Hawaii, Iowa, New Mexico, Utah, and the metropolitan areas of Atlanta, Detroit, San Francisco-Oakland, and Seattle-Puget Sound), representing approximately 9% of the US population.[5,6] The lifetime probability of developing cancer, stage distribution, and survival by stage and for children and adolescents were based on data from all 18 SEER registries (the SEER 9 registries plus Alaska Natives, California, Georgia, Kentucky, Louisiana, and New Jersey), covering 28% of the US population.[7] The probability of developing cancer was calculated using NCI's DevCan software (version 6.7.4).[8] Some of the statistical information presented herein was adapted from data previously published in the *SEER Cancer Statistics Review 1975-2013*.[9]

NAACCR compiles and reports incidence data from 1995 onward for cancer registries that participate in the SEER program and/or the NPCR. These data approach 100% coverage of the US population in the most recent time period and were the source for the projected new cancer cases in 2017 and incidence rates by state and race/ethnicity.[10,11] Some of the incidence data presented herein were previously published in volumes 1 and 2 of *Cancer in North America: 2009-2013*.[12,13]

All cancer cases were classified according to the *International Classification of Diseases for Oncology* except childhood and adolescent cancers, which were classified according to the International Classification of Childhood Cancer (ICCC).[14,15] Causes of death were classified according to the *International Classification of Diseases*.[16] All incidence

TABLE 3. Estimated Deaths for Selected Cancers by State, 2017*

STATE	ALL SITES	BRAIN & OTHER NERVOUS SYSTEM	FEMALE BREAST	COLON & RECTUM	LEUKEMIA	LIVER & INTRAHEPATIC BILE DUCT	LUNG & BRONCHUS	NON-HODGKIN LYMPHOMA	OVARY	PANCREAS	PROSTATE
Alabama	10,530	320	650	940	420	470	3,200	320	250	710	450
Alaska	1,070	†	70	100	†	60	280	†	†	80	50
Arizona	12,050	380	810	1,020	550	660	2,820	430	310	930	600
Arkansas	6,800	180	420	600	250	280	2,160	210	150	430	260
California	59,400	1,830	4,440	5,240	2,610	3,750	12,000	2,140	1,530	4,510	3,130
Colorado	7,840	270	570	660	340	380	1,640	260	240	580	450
Connecticut	6,610	190	430	450	300	300	1,630	230	170	490	310
Delaware	2,050	50	130	150	70	110	590	70	50	150	90
Dist. of Columbia	1,060	†	100	90	†	90	220	†	†	100	70
Florida	43,870	1,250	2,910	3,620	1,800	2,020	11,790	1,510	970	3,170	2,050
Georgia	17,280	490	1,320	1,540	620	850	4,720	510	420	1,160	780
Hawaii	2,520	50	140	240	90	170	590	100	50	220	100
Idaho	2,900	100	190	250	110	120	680	110	70	230	170
Illinois	24,040	610	1,680	2,030	990	1,040	6,470	790	570	1,650	1,040
Indiana	13,590	350	860	1,110	550	520	4,030	450	300	900	550
Iowa	6,460	190	380	570	260	240	1,740	240	150	440	280
Kansas	5,440	170	330	470	260	230	1,500	180	120	400	230
Kentucky	10,400	250	590	830	390	400	3,560	330	200	640	340
Louisiana	9,240	220	620	830	320	520	2,610	300	170	700	370
Maine	3,260	100	170	220	130	120	960	110	60	220	140
Maryland	10,650	280	820	860	410	560	2,630	340	260	840	470
Massachusetts	12,620	350	760	910	540	670	3,270	410	320	950	550
Michigan	21,050	570	1,410	1,680	830	860	5,650	760	500	1,560	830
Minnesota	9,860	280	610	760	480	390	2,450	390	230	710	470
Mississippi	6,560	220	420	650	230	300	1,940	170	110	460	280
Missouri	14,380	330	860	1,070	550	580	4,030	390	250	910	500
Montana	2,030	60	130	170	80	80	510	70	50	140	120
Nebraska	3,520	110	230	330	150	130	900	120	70	250	180
Nevada	5,200	150	380	500	200	230	1,400	160	120	360	270
New Hampshire	2,710	80	170	200	110	90	760	80	60	200	120
New Jersey	15,880	420	1,250	1,420	640	700	3,760	510	410	1,270	700
New Mexico	3,630	90	250	340	150	220	760	110	100	250	200
New York	35,960	910	2,410	2,870	1,460	1,680	8,660	1,210	910	2,750	1,560
North Carolina	20,020	600	1,360	1,530	760	940	5,830	620	440	1,350	840
North Dakota	1,290	†	70	120	60	†	340	†	†	90	70
Ohio	25,430	640	1,690	2,130	990	990	7,300	860	570	1,810	1,020
Oklahoma	8,200	200	530	710	340	360	2,450	270	200	520	350
Oregon	8,140	260	520	660	320	440	2,030	290	230	580	410
Pennsylvania	28,510	700	1,900	2,390	1,210	1,220	7,420	1,010	690	2,110	1,200
Rhode Island	2,160	50	120	170	90	110	610	60	50	140	90
South Carolina	10,320	260	700	830	380	440	2,920	300	230	710	460
South Dakota	1,660	60	110	160	90	60	450	50	†	110	70
Tennessee	14,830	380	920	1,220	570	670	4,590	470	310	950	550
Texas	40,260	1,100	2,830	3,700	1,690	2,620	9,540	1,380	920	2,780	1,650
Utah	3,180	130	270	260	170	150	460	120	100	270	210
Vermont	1,400	50	70	100	50	50	400	†	†	110	70
Virginia	14,870	390	1,060	1,190	550	670	3,810	490	370	1,080	650
Washington	12,720	410	850	970	520	680	3,100	460	330	920	620
West Virginia	4,780	110	280	430	190	170	1,450	160	90	280	160
Wisconsin	11,710	360	740	880	540	440	3,070	420	220	870	570
Wyoming	960	†	60	80	60	†	220	†	†	70	†
United States	**600,920**	**16,700**	**40,610**	**50,260**	**24,500**	**28,920**	**155,870**	**20,140**	**14,080**	**43,090**	**26,730**

*Rounded to the nearest 10.

†Estimate is fewer than 50 deaths.

Note: These are model-based estimates that 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 deaths.

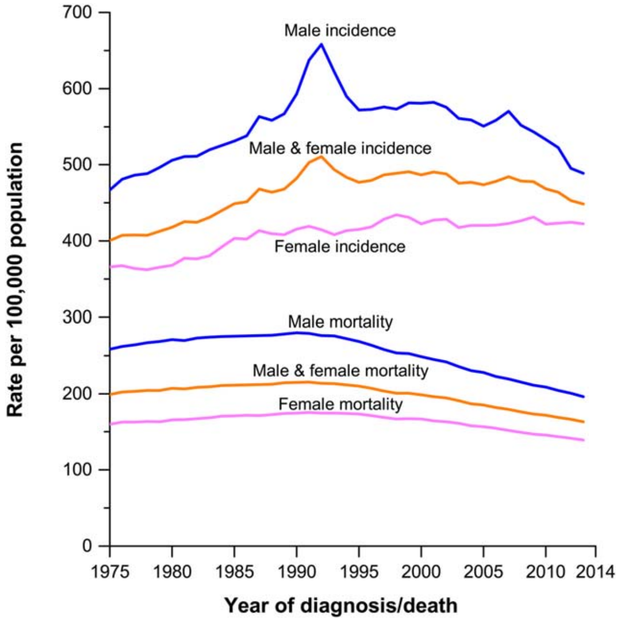

FIGURE 2. Trends in Cancer Incidence (1975 to 2013) and Death Rates (1975 to 2014) by Sex, United States.
Rates are age adjusted to the 2000 US standard population. Incidence rates also are adjusted for delays in reporting.

and death rates were age-standardized to the 2000 US standard population and expressed per 100,000 population, as calculated by NCI's SEER*Stat software (version 8.3.2).[17] The annual percent change in rates was quantified using NCI's Joinpoint Regression Program (version 4.3.1.0).[18]

Whenever possible, cancer incidence rates presented in this report were adjusted for delays in reporting, which occur because of a lag in case capture or data corrections. Delay adjustment has the largest effect on the most recent years of data for cancers that are frequently diagnosed in outpatient settings (eg, melanoma, leukemia, and prostate cancer) and provides a more accurate portrayal of the cancer burden in the most recent time period.[19] For example, the leukemia incidence rate for 2013 is 14% higher after adjusting for reporting delays.[20]

Projected Cancer Cases and Deaths in 2017

The most recent year for which incidence and mortality data are available lags 2 to 4 years behind the current year due to the time required for data collection, compilation, quality control, and dissemination. Therefore, we projected the numbers of new cancer cases and deaths in the United States in 2017 to provide an estimate of the contemporary cancer burden. The number of invasive cancer cases was estimated using a 3-step spatio-temporal model based on high-quality incidence data from 49 states and the District of Columbia representing approximately 95% population coverage (data were lacking for all years for Minnesota and for some years for other states). First, complete incidence counts were estimated for each county (or health service area for rare cancers) from 1999 through 2013 using geographic variations in sociodemographic and lifestyle factors, medical settings, and cancer screening behaviors as predictors of incidence.[21] Then these counts were adjusted for delays in cancer reporting using registry-specific or combined NAACCR delay ratios and aggregated to obtain national- and state-level counts for each year. Finally, a temporal projection method (the vector autoregressive model) was applied to all 15 years of data to estimate counts for 2017. This method cannot estimate numbers of basal cell or squamous cell skin cancers because data on the occurrence of these cancers are not required to be reported to cancer registries. For complete details of the case projection methodology, please refer to Zhu et al.[22]

New cases of female breast carcinoma in situ and melanoma in situ diagnosed in 2017 were estimated by first approximating the number of cases occurring annually from 2004 through 2013 based on age-specific NAACCR incidence rates (data from 46 states and the District of Columbia with high-quality data every year) and US population estimates provided in SEER*Stat. The average annual percent change in case counts from 2004 through 2013 generated by the joinpoint regression model was then used to project cases to 2017. The estimates for in situ cases were not adjusted for reporting delays.

The number of cancer deaths expected to occur in 2017 was estimated based on the most recent joinpoint-generated annual percent change in reported numbers of cancer deaths from 2000 through 2014 at the state and national levels as reported to the NCHS. For the complete details of this methodology, please refer to Chen et al.[23]

Other Statistics

The number of cancer deaths averted in men and women due to the reduction in overall cancer death rates was estimated by subtracting the number of recorded deaths from the number that would have been expected if cancer death rates had remained at their peak. The expected number of deaths was estimated 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 subsequent years through 2014. The difference between the number of expected and recorded cancer deaths in each age group and calendar year was then summed.

Selected Findings

Expected Numbers of New Cancer Cases

Table 1 presents the estimated numbers of new cases of invasive cancer expected in the United States in 2017 by sex. The overall estimate of 1,688,780 cases is the equivalent of more than 4,600 new cancer diagnoses each day.

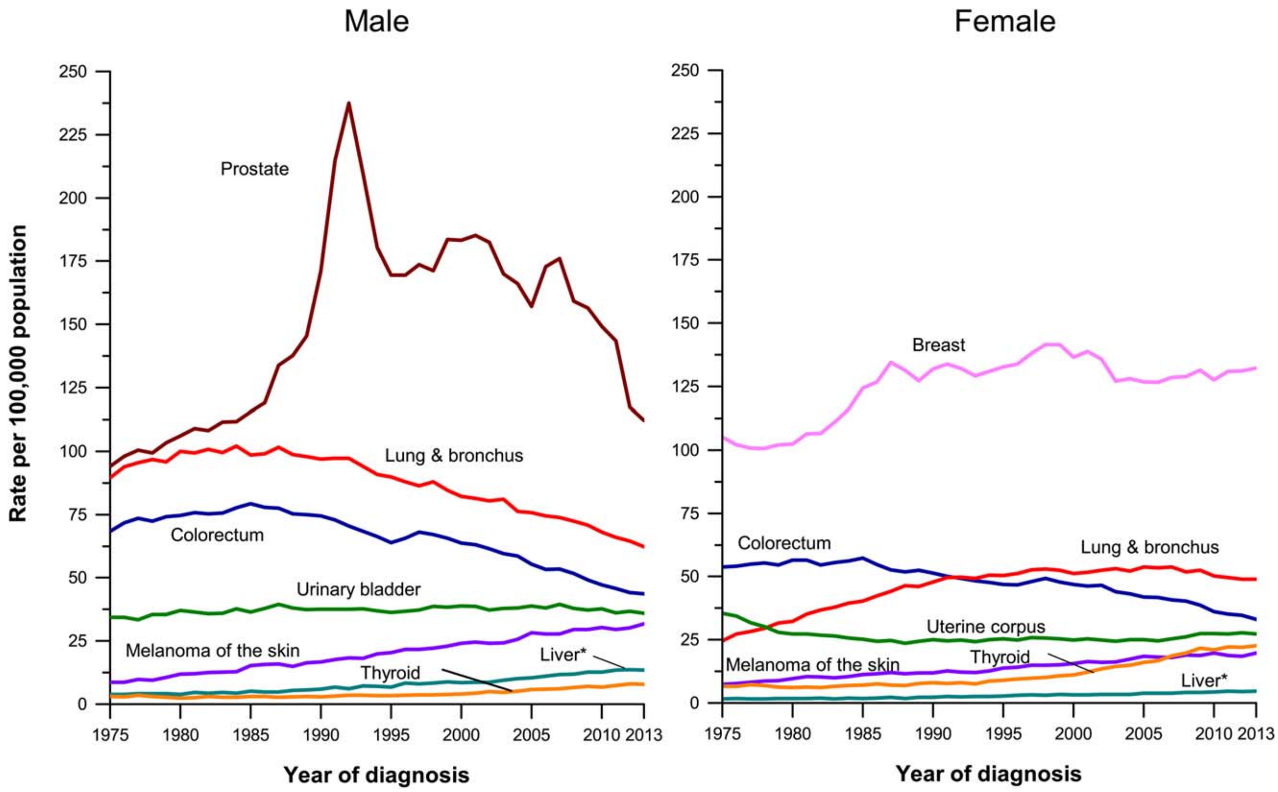

FIGURE 3. Trends in Incidence Rates for Selected Cancers by Sex, United States, 1975 to 2013.
Rates are age adjusted to the 2000 US standard population and adjusted for delays in reporting. *Includes intrahepatic bile duct.

In addition, about 63,410 cases of female breast carcinoma in situ and 74,680 cases of melanoma in situ are expected to be diagnosed in 2017. The estimated numbers of new cases by state for selected cancer sites are shown in Table 2.

Figure 1 depicts the most common cancers expected to occur in men and women in 2017. Prostate, lung and bronchus, and colorectal cancers account for 42% of all cases in men, with prostate cancer alone accounting for almost 1 in 5 new diagnoses. For women, the 3 most commonly diagnosed cancers are breast, lung and bronchus, and colorectum, which collectively represent one-half of all cases; breast cancer alone is expected to account for 30% of all new cancer diagnoses in women.

Expected Numbers of Cancer Deaths

An estimated 600,920 Americans will die from cancer in 2017, corresponding to about 1,650 deaths per day (Table 1). The most common causes of cancer death are cancers of the lung and bronchus, colorectum, and prostate in men and lung and bronchus, breast, and colorectum in women (Fig. 1). These 4 cancers account for 46% of all cancer deaths, with more than one-quarter (26%) due to lung cancer. Table 3 provides the estimated numbers of cancer deaths in 2017 by state for selected cancer sites.

Trends in Cancer Incidence

Figure 2 illustrates long-term trends in cancer incidence rates for all cancers combined by sex. Cancer incidence patterns reflect trends in behaviors associated with cancer risk and changes in medical practice, such as the introduction of screening. The volatility in incidence for males compared with females reflects rapid changes in prostate cancer incidence, which spiked in the late 1980s and early 1990s (Fig. 3) due to a surge in the detection of asymptomatic disease as a result of widespread prostate-specific antigen (PSA) testing.[24] Over the past decade of data, the overall cancer incidence rate in men declined by about 2% per year, with the pace accelerating in more recent years (Table 4). This trend reflects large continuing declines for cancers of the lung and colorectum, in addition to a sharp reduction in prostate cancer incidence of more than 10% annually from 2010 to 2013. This drop is attributed to decreased PSA testing in the wake of US Preventive Services Task Force recommendations against routine use of the test to screen for prostate cancer because of growing concerns about overdiagnosis and overtreatment.[25,26] The effect of reduced screening on the occurrence of advanced disease is being watched closely. Incidence rates for distant stage disease, which accounted for 4% of diagnoses during 2006 to 2012 (Fig. 4), have been stable since the mid-2000s following at least a decade of decline.[6]

TABLE 4. Trends in Delay-Adjusted Incidence Rates for Selected Cancers by Sex, United States, 1975 to 2013

	TREND 1		TREND 2		TREND 3		TREND 4		TREND 5		TREND 6		2004-2013	2009-2013
	YEARS	APC	YEARS	APC	YEARS	APC	YEARS	APC	YEARS	APC	YEARS	APC	AAPC	AAPC
All sites														
Overall	1975-1989	1.2*	1989-1992	2.8	1992-1995	−2.4	1995-1998	1.0	1998-2009	−0.3*	2009-2013	−1.5*	−0.8*	−1.5*
Male	1975-1989	1.3*	1989-1992	5.2*	1992-1995	−4.9*	1995-1999	0.6	1999-2009	−0.6*	2009-2013	−2.9*	−1.6*	−2.9*
Female	1975-1979	−0.3	1979-1987	1.6*	1987-1995	0.1	1995-1998	1.5	1998-2003	−0.6	2003-2013	0.1	0.1	0.1
Female breast	1975-1980	−0.5	1980-1987	4.0*	1987-1994	−0.2	1994-1999	1.8*	1999-2004	−2.3*	2004-2013	0.4*	0.4*	0.4*
Colorectum														
Male	1975-1985	1.1*	1985-1991	−1.2*	1991-1995	−3.2*	1995-1998	2.3	1998-2013	−3.0*			−3.0*	−3.0*
Female	1975-1985	0.3	1985-1995	−1.9*	1995-1998	1.8	1998-2008	−2.0*	2008-2013	−3.8*			−3.0*	−3.8*
Liver & intrahepatic bile duct														
Male	1975-1980	0.7	1980-2013	3.8*									3.8*	3.8*
Female	1975-1983	0.6	1983-1996	4.1*	1996-2013	2.8*							2.8*	2.8*
Lung & bronchus														
Male	1975-1982	1.5*	1982-1991	−0.5*	1991-2008	−1.7*	2008-2013	−2.9*					−2.4*	−2.9*
Female	1975-1982	5.6*	1982-1991	3.4*	1991-2006	0.5*	2006-2013	−1.4*					−1.0*	−1.4*
Melanoma of skin														
Male	1975-1985	5.6*	1985-2005	3.2*	2005-2013	1.7*							1.8*	1.7*
Female	1975-1980	5.5*	1980-2008	2.4*	2008-2013	0.4							1.3*	0.4
Pancreas														
Male	1975-1993	−0.8*	1993-2003	0.2	2003-2006	3.0	2006-2013	0.4					0.9	0.4
Female	1975-1984	1.3*	1984-1999	−0.3	1999-2013	1.3*							1.3*	1.3*
Prostate	1975-1988	2.6*	1988-1992	16.5*	1992-1995	−11.5*	1995-2000	2.3	2000-2010	−1.7*	2010-2013	−10.7*	−4.8*	−8.6*
Thyroid														
Male	1975-1980	−4.7	1980-1997	1.9*	1997-2013	5.4*							5.4*	5.4*
Female	1975-1977	6.5	1977-1980	−5.2	1980-1993	2.3*	1993-1999	4.5*	1999-2009	7.1*	2009-2013	1.5	4.6*	1.5
Uterine corpus	1975-1979	−6.0*	1979-1988	−1.7*	1988-1997	0.7*	1997-2006	−0.4*	2006-2009	3.7*	2009-2013	0.0	1.1	0.0

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 zero ($P < .05$).

Note: Trends analyzed by the Joinpoint Regression Program, version 4.3.0.0, allowing up to 5 joinpoints. Trends are based on Surveillance, Epidemiology, and End Results (SEER) 9 areas.

The overall incidence rate in women has remained generally stable since 1987 because declines in lung and colorectal cancers are being offset by increasing or stable rates for breast, uterine corpus, and thyroid cancers and for melanoma (Table 4). The slight increase in breast cancer incidence from 2004 to 2013 is driven wholly by nonwhite women; rates increased by about 2% per year among women other than white or black and by 0.5% per year among black women, while remaining stable among white women.[6]

Lung cancer incidence rates continue to decline about twice as fast in men as in women (Table 4). Sex differences in lung cancer trends reflect historical differences in tobacco use. Women took up smoking in large numbers later and at older ages than men, but were also slower to quit, including recent upturns in smoking prevalence in some birth cohorts.[27,28] In contrast, incidence patterns for colorectal cancer are very similar in men and women, with rates declining by 3% per year from 2004 through 2013 (Table 4). While declines in colorectal cancer incidence rates prior to 2000 are attributed equally to changes in risk factors and the introduction of screening,[29] recent rapid declines are thought to primarily reflect the increased uptake of colonoscopy and the removal of precancerous adenomatous polyps.[30,31] Colonoscopy use among adults aged 50 years and older has tripled, from 21% in 2000 to 60% in 2015.[32] In contrast to the rapid declines in colorectal cancer incidence among screening aged adults, rates increased by about 2% per year from 1993 to 2013 in individuals aged younger than 50 years.[6]

Incidence rates continue to increase rapidly for liver cancer, by about 3% per year in women and 4% per year in men, although rates have begun to decline in adults aged younger than 50 years.[25] Similarly, the long-term, rapid rise in melanoma incidence appears to be slowing, particularly among younger age groups. Incidence rates for thyroid cancer also appear to have begun stabilizing in recent years after changes in clinical practice guidelines were initiated in 2009, including more conservative indications for biopsy, following increased awareness of the "epidemic in diagnosis."[33] In an effort to further reduce overdiagnosis and overtreatment, an international panel of experts convened by the NCI recently proposed downgrading the terminology for a common subtype of thyroid cancer from encapsulated follicular variant of papillary thyroid carcinoma to noninvasive follicular thyroid neoplasm with papillary-like nuclear features.[34] These indolent tumors, which represent approximately 20% of thyroid cancer diagnoses in the United States, have a

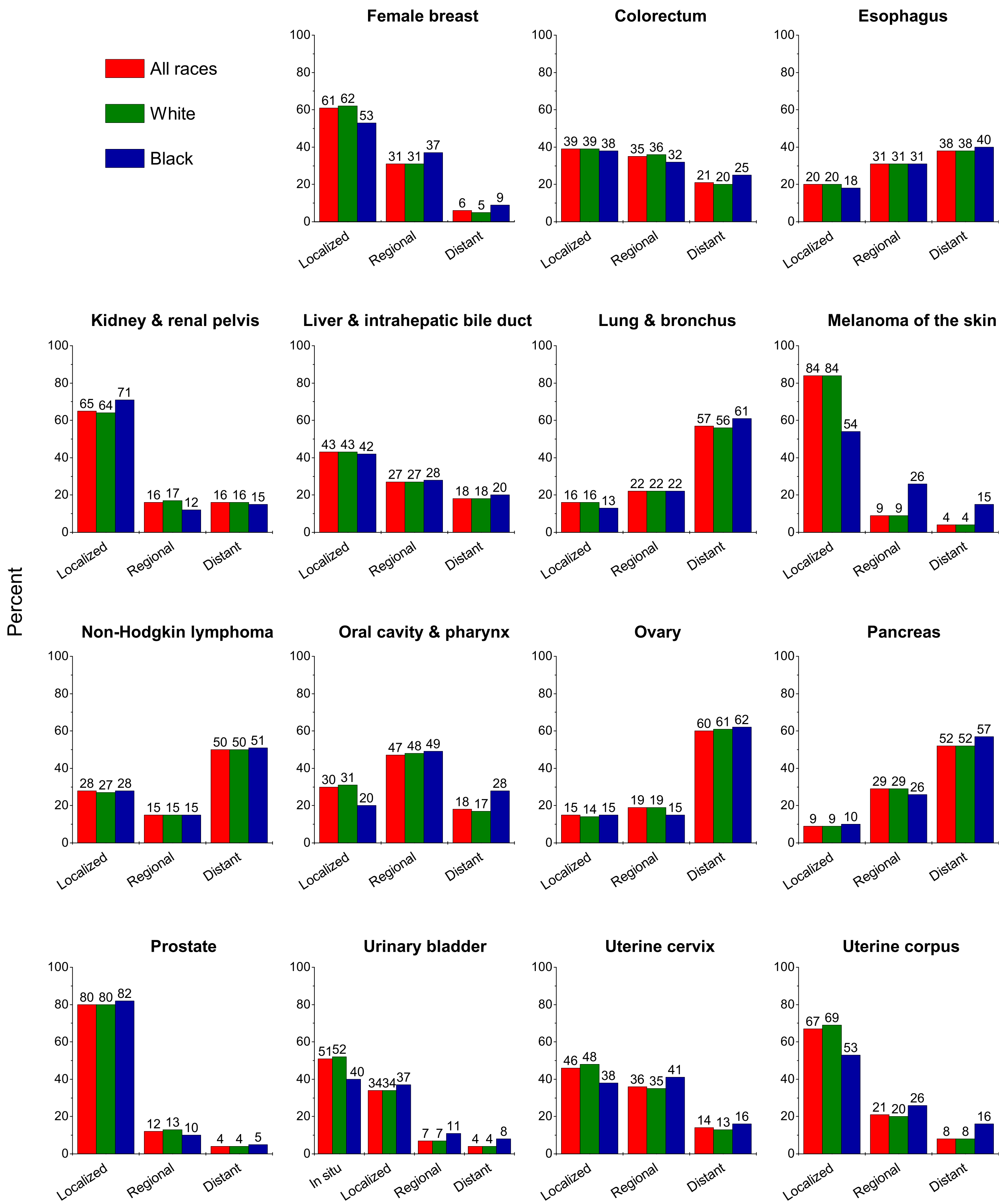

FIGURE 4. Stage Distribution by Race, United States, 2006 to 2012.
Stage categories do not sum to 100% because sufficient information is not available to stage all cases.

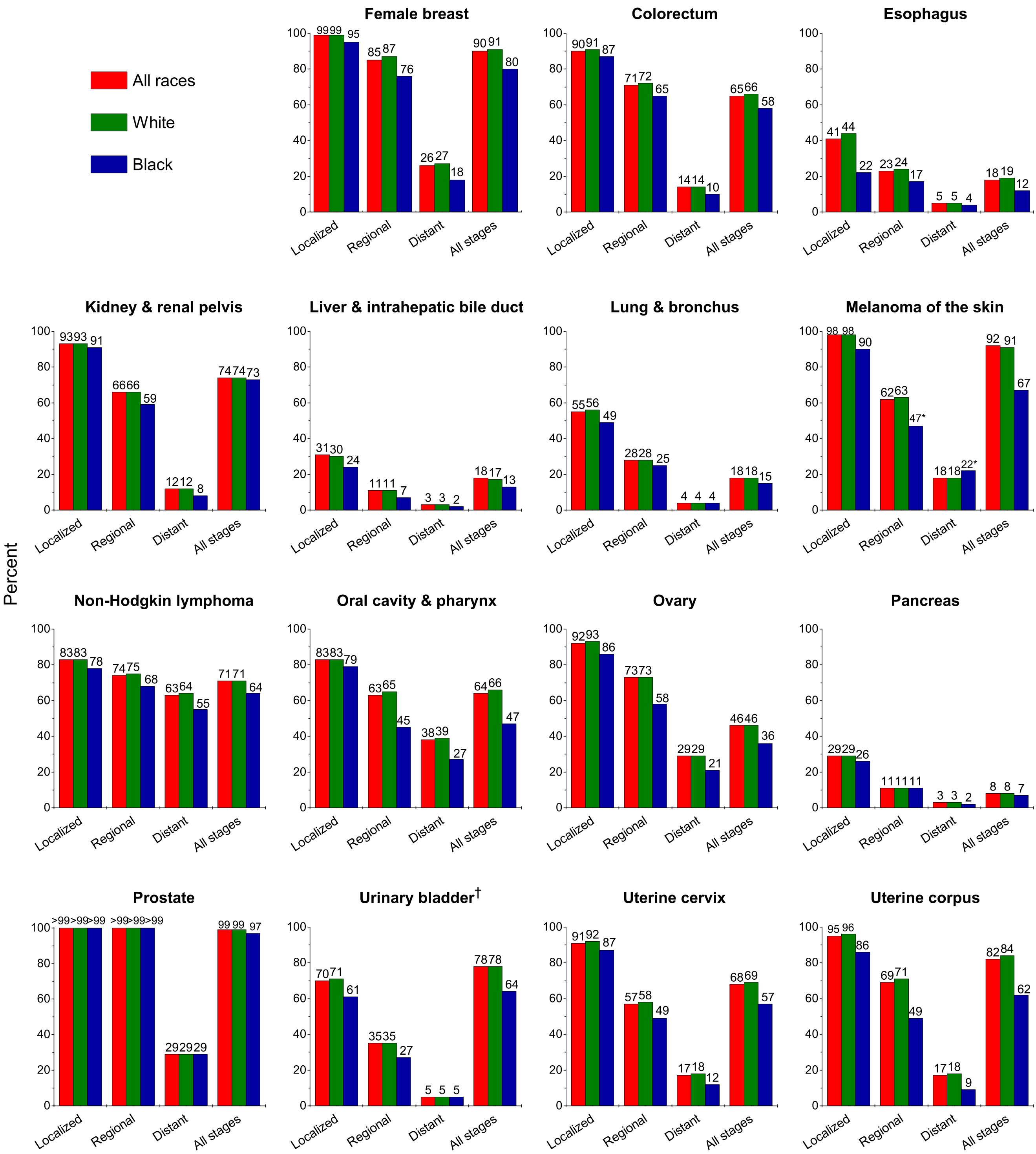

FIGURE 5. Five-Year Relative Survival Rates by Stage at Diagnosis and Race, United States, 2006 to 2012.
*The standard error of the survival rate is between 5 and 10 percentage points.
†The survival rate for carcinoma in situ of the urinary bladder is 96% in all races, 96% in whites, and 90% in blacks.

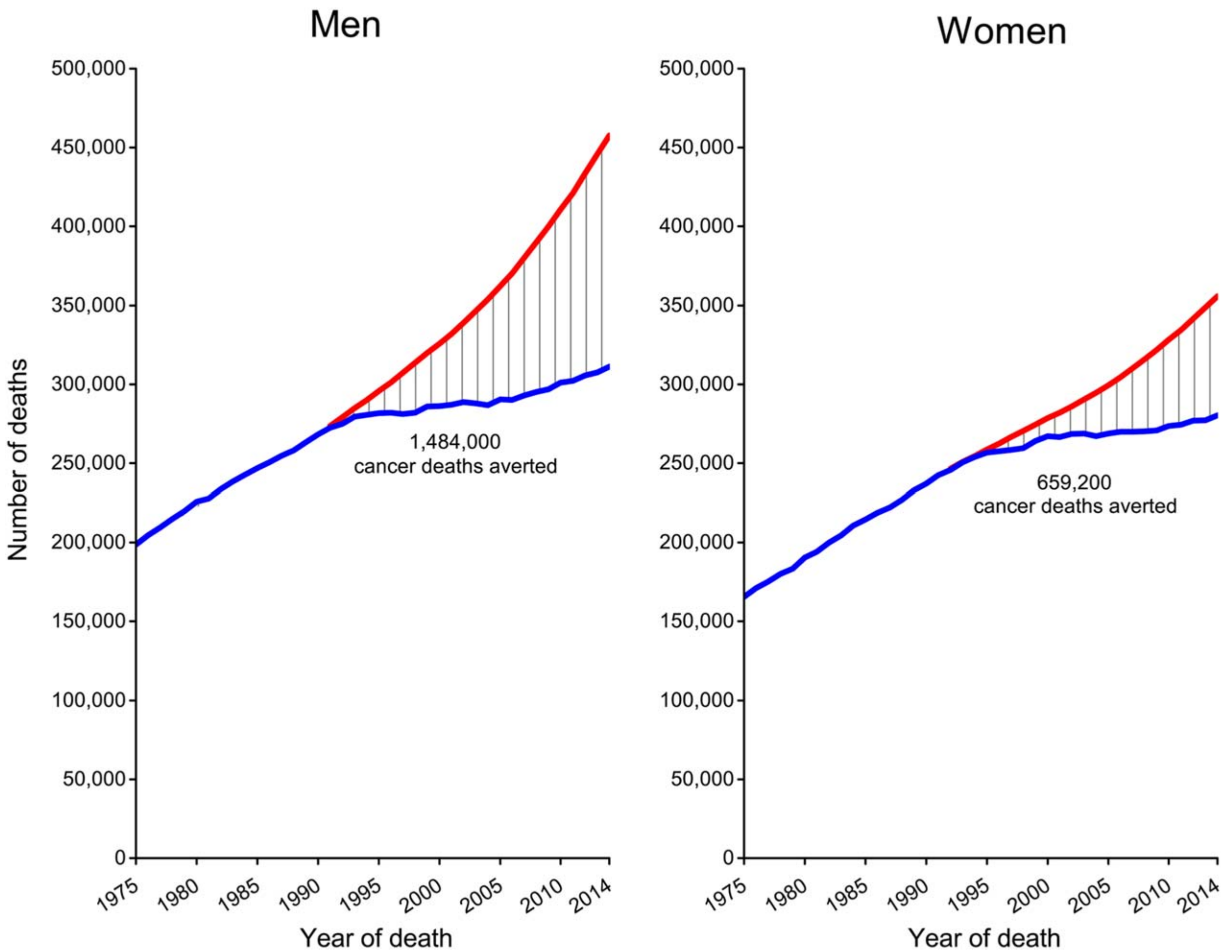

FIGURE 6. Total Number Of Cancer Deaths Averted From 1991 to 2014 in Men and From 1992 to 2014 in Women, United States. The blue line represents the actual number of cancer deaths recorded in each year, and the red line represents the number of cancer deaths that would have been expected if cancer death rates had remained at their peak.

recurrence rate of <1% at 15 years when removed with limited surgery (ie, thyroid lobectomy).

Trends in Cancer Survival

Over the past 3 decades, the 5-year relative survival rate for all cancers combined has increased 20 percentage points among whites and 24 percentage points among blacks. Improvements in survival for the most common cancers have been similar by sex, but are much more pronounced among patients aged 50 to 64 years than among those aged older than 65 years,[35] likely reflecting lower efficacy or use of new therapies in the elderly population. Progress has been most rapid for hematopoietic and lymphoid malignancies due to improvements in treatment protocols, including the discovery of targeted therapies. For example, comparing patients diagnosed in the mid-1970s with those diagnosed during 2006 to 2012, the 5-year relative survival rate has increased from 41% to 71% for acute lymphocytic leukemia and from 22% to 66% for chronic myeloid leukemia.[9] Most patients with chronic myeloid leukemia who are treated with tyrosine kinase inhibitors experience near normal life expectancy, particularly those diagnosed before age 65 years, based on a recent review of clinical trial data.[36] Although historical groupings of lymphoid malignancies are still used to track progress, they do not reflect the substantial biologic variation by subtype that is captured by the more contemporary World Health Organization classification system.[37]

In contrast to the steady increase in survival for most cancers, advances have been slow for lung and pancreatic cancers, for which the 5-year relative survival is currently 18% and 8%, respectively (Fig. 5). These low rates are partly because more than one-half of cases are diagnosed at a distant stage (Fig. 4), for which the 5-year survival is 4% and 3%, respectively. There is potential for lung cancer to be diagnosed at an earlier stage through the use of screening with low-dose computed tomography, which has been shown to reduce lung cancer mortality by up to 20% among current and former smokers with a smoking history of 30 or more pack-years.[38,39] However, only 2% to 4% of the 8.7 million Americans eligible for screening reported undergoing a computed tomography scan of the chest to check for lung cancer in 2010.[40]

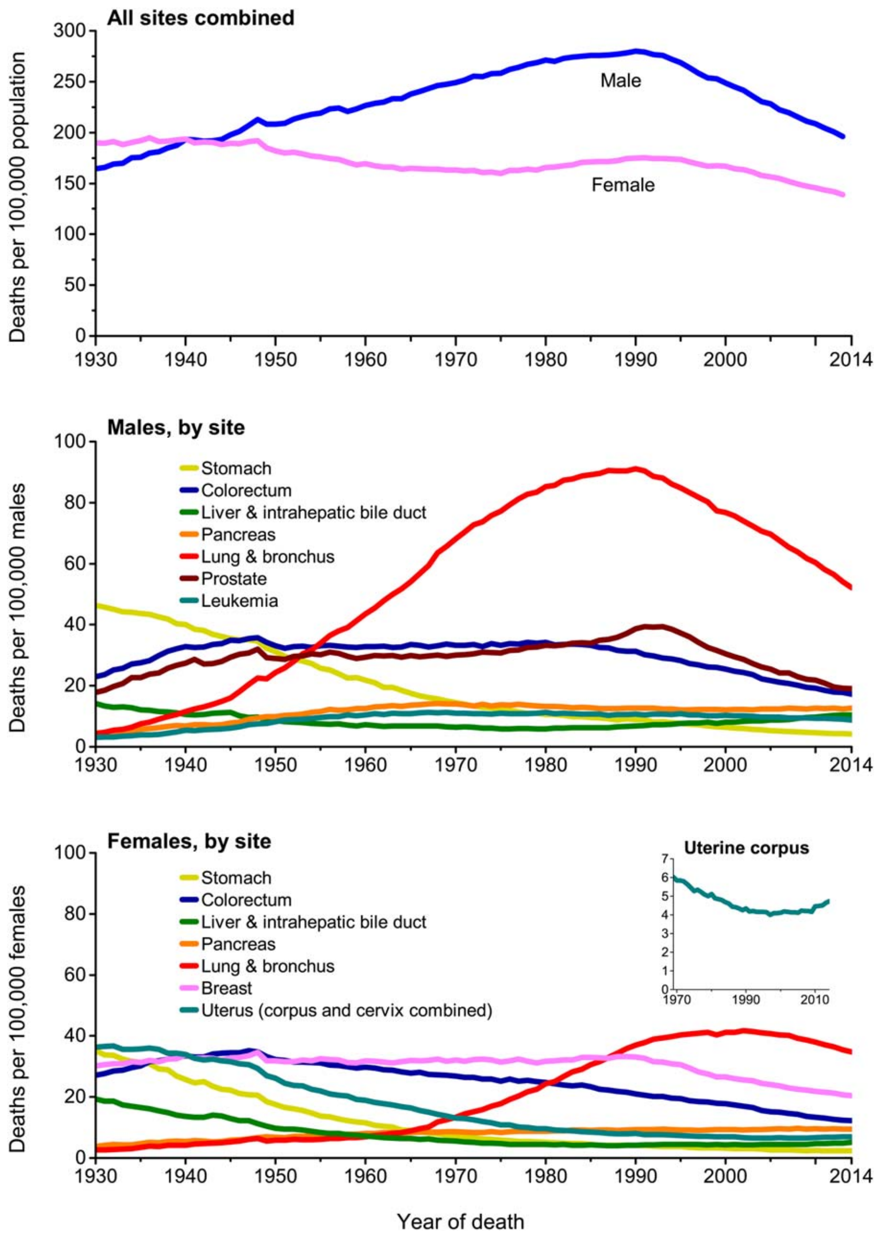

FIGURE 7. Trends in Death Rates by Sex Overall and for Select Cancers, United States, 1930 to 2014.
Rates are age adjusted to the 2000 US standard population. Due to improvements in International Classification of Diseases (ICD) coding over time, numerator data for cancers of the lung and bronchus, colon and rectum, liver, and uterus differ from the contemporary time period. For example, rates for lung and bronchus include pleura, trachea, mediastinum, and other respiratory organs.

Trends in Cancer Mortality

The overall cancer death rate rose during most of the 20th century, largely driven by rapid increases in lung cancer deaths among men as a consequence of the tobacco epidemic, but has declined by about 1.5% per year since the early 1990s. From its peak of 215.1 (per 100,000 population) in 1991, the cancer death rate dropped 25% to 161.2 in 2014. This decline, which is larger in men (31% since 1990) than in women (21% since 1991), translates into approximately 2,143,200 fewer cancer deaths (1,484,000 in men and 659,200 in women) than what would have occurred if peak rates had persisted (Fig. 6).

The decline in cancer mortality over the past 2 decades is the result of steady reductions in smoking and advances in early detection and treatment, reflected in considerable decreases for the 4 major cancers (lung, breast, prostate, and colorectum) (Fig. 7). Specifically, the death rate dropped 38% from 1989 to 2014 for female breast cancer, 51% from 1993 to 2014 for prostate cancer, and 51% from 1976 to 2014 for colorectal cancer. Lung cancer death rates declined 43% from 1990 to 2014 among males and 17% from 2002 to 2014 among females due to reduced tobacco use because of increased awareness of the health hazards of smoking and the implementation of comprehensive tobacco control.[41]

TABLE 5. Trends in Death Rates for Selected Cancers by Sex, United States, 1975 to 2014

	TREND 1		TREND 2		TREND 3		TREND 4		TREND 5		TREND 6		2005-2014	2010-2014
	YEARS	APC	YEARS	APC	YEARS	APC	YEARS	APC	YEARS	APC	YEARS	APC	AAPC	AAPC
All sites														
Overall	1975-1984	0.5*	1984-1991	0.3*	1991-1994	−0.5	1994-1998	−1.3*	1998-2001	−0.8	2001-2014	−1.5*	−1.5*	−1.5*
Male	1975-1979	1.0*	1979-1990	0.3*	1990-1993	−0.5	1993-2001	−1.5*	2001-2014	−1.8*			−1.8*	−1.8*
Female	1975-1990	0.6*	1990-1994	−0.2	1994-2002	−0.8*	2002-2014	−1.4*					−1.4*	−1.4*
Female breast	1975-1990	0.4*	1990-1995	−1.8*	1995-1998	−3.3*	1998-2014	−1.8*					−1.8*	−1.8*
Colorectum														
Male	1975-1978	0.8	1978-1984	−0.3	1984-1990	−1.3*	1990-2002	−2.0*	2002-2005	−3.9*	2005-2014	−2.5*	−2.5*	−2.5*
Female	1975-1984	−1.0*	1984-2001	−1.8*	2001-2014	−2.8*							−2.8*	−2.8*
Liver & intrahepatic bile duct														
Male	1975-1985	1.5*	1985-1996	3.8*	1996-1999	0.5	1999-2014	2.6*					2.6*	2.6*
Female	1975-1978	−1.5	1978-1988	1.4*	1988-1995	3.9*	1995-2000	0.4	2000-2008	1.5*	2008-2014	2.8*	2.4*	2.8*
Lung & bronchus														
Male	1975-1978	2.4*	1978-1984	1.2*	1984-1991	0.3*	1991-2005	−1.9*	2005-2012	−3.0*	2012-2014	−4.0*	−3.2*	−3.5*
Female	1975-1982	6.0*	1982-1990	4.2*	1990-1995	1.7*	1995-2003	0.3*	2003-2007	−0.8	2007-2014	−2.0*	−1.7*	−2.0*
Melanoma of skin														
Male	1975-1990	2.2*	1990-2002	0.0	2002-2009	0.9*	2009-2014	−1.3*					−0.3	−1.3*
Female	1975-1988	0.8*	1988-2014	−0.6*									−0.6*	−0.6*
Pancreas														
Male	1975-1986	−0.8*	1986-2000	−0.3*	2000-2014	0.3*							0.3*	0.3*
Female	1975-1984	0.8*	1984-2002	0.1	2002-2008	0.6*	2008-2014	−0.2					0.1	−0.2
Prostate	1975-1987	0.9*	1987-1991	3.0*	1991-1994	−0.5	1994-1999	−4.1*	1999-2014	−3.4*			−3.4*	−3.4*
Uterine corpus	1975-1993	−1.5*	1993-2008	0.2	2008-2014	2.1*							1.4*	2.1*

APC indicates annual percent change based mortality rates age adjusted to the 2000 US standard population; AAPC, average annual percent change.

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

Note: Trends analyzed by the Joinpoint Regression Program, version 4.3.1.0, allowing up to 5 joinpoints.

Tobacco control efforts adopted in the wake of the first Surgeon General's report on smoking and health in 1964 have resulted in an estimated 8 million fewer premature smoking-related deaths, one-third of which are due to cancer.[42,43] Despite this progress, in much of the Southern United States, 40% of cancer deaths in men in 2014 were caused by smoking.[44]

In contrast to declining trends for the 4 major cancers, death rates rose from 2010 to 2014 by almost 3% per year for liver cancer and by about 2% per year for uterine cancer (Table 5). Pancreatic cancer death rates continued to increase slightly (by 0.3% per year) in men but have leveled off in women.

Recorded Number of Deaths in 2014

A total of 2,626,418 deaths were recorded in the United States in 2014, 23% of which were from cancer (Table 6). Cancer is the second leading cause of death following heart disease. However, it is the leading cause of death in 22 states,[45] and in Hispanic and Asian Americans.[46,47] Cancer is also the leading cause of death among women aged 40 to 79 years and among men aged 45 to 79 years when data are analyzed by 5-year age group.[1]

Table 7 presents the number of deaths in 2014 for the 5 leading cancer types by age and sex. The leading causes of cancer death are brain cancer, leukemia, and female breast cancer before age 40 years and lung cancer in those aged 40 years or older. In 2013, lung cancer surpassed breast cancer as the leading cause of cancer death among women aged 40 to 59 years. Cervical cancer is the second leading cause of cancer death in women aged 20 to 39 years, underscoring the need to improve screening rates in this age group, as well as increase acceptance of and access to human papillomavirus vaccination. In 2014, only 40% of females aged 13 to 17 years had completed the 3-dose series, up slightly from 37% in 2013.[48]

Cancer Disparities by Sex

The lifetime probability of being diagnosed with invasive cancer is slightly higher for men (40.8%) than for women (37.5%) (Table 8). Reasons for the increased susceptibility in men are not well understood, but to some extent reflect differences in environmental exposures, endogenous hormones, and probably complex interactions between these influences. Adult height, which is determined by genetics and childhood nutrition, is positively associated with cancer incidence and death in both men and women,[49] and has been estimated to account for one-third of the gender disparity in cancer risk.[50]

Table 9 shows sex differences in cancer-specific incidence and mortality. Overall, incidence rates are about 20% higher in men while mortality rates are about 40% higher. The larger disparity for mortality reflects differences in the composition and distribution of cancers. For example, rates of liver cancer, which is highly fatal, are 3 times higher in men than in women. The largest sex disparities are for cancers of the esophagus, larynx, and bladder, for which

TABLE 6. Ten Leading Causes of Death by Age and Sex, United States, 2014

	ALL AGES		AGES 1 to 19		AGES 20 to 39		AGES 40 to 59		AGES 60 to 79		AGES ≥80	
	MALE All Causes 1,328,241	FEMALE All Causes 1,298,177	MALE All Causes 12,128	FEMALE All Causes 6,538	MALE All Causes 65,486	FEMALE All Causes 30,221	MALE All Causes 227,562	FEMALE All Causes 147,196	MALE All Causes 534,113	FEMALE All Causes 411,138	MALE All Causes 475,956	FEMALE All Causes 692,702
1	Heart diseases 325,077	Heart diseases 289,271	Accidents (unintentional injuries) 4,409	Accidents (unintentional injuries) 2,023	Accidents (unintentional injuries) 24,467	Accidents (unintentional injuries) 8,850	Cancer 52,478	Cancer 49,683	Cancer 167,075	Cancer 136,649	Heart diseases 137,360	Heart diseases 187,680
2	Cancer 311,296	Cancer 280,403	Intentional self-harm (suicide) 1,681	Cancer 757	Intentional self-harm (suicide) 10,353	Cancer 4,440	Heart diseases 52,140	Heart diseases 22,465	Heart diseases 129,926	Heart diseases 76,242	Cancer 86,662	Cancer 88,842
3	Accidents (unintentional injuries) 85,448	Chronic lower respiratory diseases 77,645	Assault (homicide) 1,563	Intentional self-harm (suicide) 581	Assault (homicide) 7,040	Intentional self-harm (suicide) 2,649	Accidents (unintentional injuries) 26,259	Accidents (unintentional injuries) 12,789	Chronic lower respiratory diseases 34,508	Chronic lower respiratory diseases 33,872	Chronic lower respiratory diseases 28,801	Alzheimer disease 56,533
4	Chronic lower respiratory diseases 69,456	Cerebro-vascular disease 77,632	Cancer 1,028	Assault (homicide) 477	Heart diseases 5,077	Heart diseases 2,459	Intentional self-harm (suicide) 12,196	Chronic lower respiratory diseases 5,960	Cerebro-vascular disease 21,645	Cerebro-vascular disease 19,932	Cerebro-vascular disease 26,324	Cerebro-vascular disease 52,068
5	Cerebro-vascular disease 55,471	Alzheimer disease 65,179	Congenital anomalies 498	Congenital anomalies 428	Cancer 4,020	Assault (homicide) 1,287	Chronic liver disease & cirrhosis 11,443	Chronic liver disease & cirrhosis 5,646	Diabetes mellitus 20,335	Diabetes mellitus 14,965	Alzheimer disease 22,353	Chronic lower respiratory diseases 37,397
6	Diabetes mellitus 41,111	Accidents (unintentional injuries) 50,605	Heart diseases 373	Heart diseases 266	Chronic liver disease & cirrhosis 971	Pregnancy, childbirth & puerperium 748	Diabetes mellitus 8,118	Cerebro-vascular disease 4,959	Accidents (unintentional injuries) 16,588	Accidents (unintentional injuries) 9,714	Influenza & pneumonia 13,482	Influenza & pneumonia 17,954
7	Intentional self-harm (suicide) 33,113	Diabetes mellitus 35,377	Chronic lower respiratory diseases 158	Influenza & pneumonia 126	Diabetes mellitus 970	Chronic liver disease & cirrhosis 628	Cerebro-vascular disease 6,585	Diabetes mellitus 4,947	Chronic liver disease & cirrhosis 10,620	Alzheimer disease 8,462	Accidents (unintentional injuries) 13,047	Accidents (unintentional injuries) 16,726
8	Alzheimer disease 28,362	Influenza & pneumonia 28,641	Influenza & pneumonia 145	Chronic lower respiratory diseases 89	HIV disease 784	Diabetes mellitus 624	Chronic lower respiratory diseases 5,550	Intentional self-harm (suicide) 4,389	Nephritis, nephrotic syndrome & nephrosis 9,698	Nephritis, nephrotic syndrome & nephrosis 8,352	Nephritis, nephrotic syndrome & nephrosis 11,665	Diabetes mellitus 14,817
9	Influenza & pneumonia 26,586	Nephritis, nephrotic syndrome & nephrosis 23,710	Cerebro-vascular disease 96	Cerebro-vascular disease 83	Cerebro-vascular disease 766	Cerebro-vascular disease 548	Influenza & pneumonia 3,236	Septicemia 2,664	Influenza & pneumonia 9,030	Septicemia 7,854	Diabetes mellitus 11,644	Nephritis, nephrotic syndrome & nephrosis 13,234
10	Chronic liver disease & cirrhosis 24,584	Septicemia 20,607	Septicemia 77	Septicemia 78	Influenza & pneumonia 602	Influenza & pneumonia 511	HIV disease 2,943	Influenza & pneumonia 2,592	Septicemia 8,227	Influenza & pneumonia 7,359	Parkinson disease 10,059	Hypertension & hypertensive renal disease* 11,724

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 Final Mortality Data, 2014, National Center for Health Statistics, Centers for Disease Control and Prevention, 2016.

TABLE 7. Five Leading Types of Cancer Death by Age and Sex, United States, 2014

ALL AGES	<20	20 TO 39	40 TO 59	60 TO 79	≥ 80
		MALE			
ALL SITES 311,296	**ALL SITES 1,050**	**ALL SITES 4,020**	**ALL SITES 52,478**	**ALL SITES 167,075**	**ALL SITES 86,662**
Lung & bronchus 84,861	Brain & ONS 314	Brain & ONS 529	Lung & bronchus 13,078	Lung & bronchus 51,714	Lung & bronchus 19,821
Prostate 28,344	Leukemia 272	Leukemia 507	Colorectum 5,947	Colorectum 13,317	Prostate 14,529
Colorectum 27,134	Bones & joints 100	Colorectum 446	Liver* 4,461	Prostate 12,489	Colorectum 7,422
Pancreas 20,755	Soft tissue (including heart) 78	Non-Hodgkin lymphoma 246	Pancreas 3,830	Pancreas 11,997	Urinary bladder 5,269
Liver* 16,623	Non-Hodgkin lymphoma 46	Lung & bronchus 236	Esophagus 2,581	Liver* 9,503	Pancreas 4,815
		FEMALE			
ALL SITES 280,403	**ALL SITES 787**	**ALL SITES 4,440**	**ALL SITES 49,683**	**ALL SITES 136,649**	**ALL SITES 88,842**
Lung & bronchus 70,667	Brain & ONS 245	Breast 1,051	Lung & bronchus 10,812	Lung & bronchus 40,256	Lung & bronchus 19,415
Breast 41,213	Leukemia 184	Uterine cervix 446	Breast 10,708	Breast 18,461	Breast 10,991
Colorectum 24,517	Bone & joints 81	Colorectum 376	Colorectum 4,214	Colorectum 10,060	Colorectum 9,864
Pancreas 19,664	Soft tissue (including heart) 65	Leukemia 363	Ovary 2,869	Pancreas 10,019	Pancreas 6,914
Ovary 14,195	Non-Hodgkin lymphoma 23	Brain & ONS 307	Pancreas 2,660	Ovary 7,419	Leukemia 4,190

ONS indicates other nervous system.

*Includes intrahepatic bile duct.

Note: Ranking order excludes category titles that begin with the word “Other.”

incidence and death rates are about 4-fold higher in men. However, incidence rates are higher in women for cancers of the anus, gallbladder, and thyroid. Notably, thyroid cancer incidence rates are 3 times higher in women than in men (21 vs 7 per 100,000 population), despite equivalent death rates (0.5 per 100,000 population). This pattern is indicative of a preponderance of nonfatal thyroid tumors in women, which is consistent with more prominent and prolonged overdiagnosis in women than in men.[51] However, consistency in the gender disparity for thyroid cancer globally and across racial/ethnic groups in the United States suggests a higher underlying disease burden in women,[52] despite unknown etiologic mechanisms.[53]

Melanoma incidence rates are about 60% higher in men than in women, while death rates are more than double. The larger disparity for mortality reflects an earlier stage at diagnosis and better stage-specific survival in women than in men. Sex disparities in melanoma survival, which have also been observed in Europe and Australia,[54,55] partly reflect more unfavorable prognostic indicators (eg, thick tumors, ulceration, and trunk loci) and an older age at diagnosis in men compared with women. However, sex is a predictor of survival independent of clinicopathologic factors for reasons that remain unclear.[56] While hormonal influences are thought to play a role, survival is higher and disease progression less likely in women, regardless of menopausal status, even for patients with advanced disease.[57] A recent study found a survival advantage for women when melanoma arose de novo (70%–80% of tumors), but no difference in survival for nevi-associated tumors, which are associated with better outcomes.[58]

Cancer Disparities by Race/Ethnicity and Socioeconomic Status

Cancer incidence and death rates vary considerably between racial and ethnic groups, with rates generally highest among blacks and lowest among Asian/Pacific Islanders (APIs)

TABLE 8. Probability (%) of Developing Invasive Cancer Within Selected Age Intervals by Sex, United States, 2011 to 2013*

		BIRTH TO 49	50 TO 59	60 TO 69	≥70	BIRTH TO DEATH
All sites†	Male	3.4 (1 in 30)	6.3 (1 in 16)	14.0 (1 in 7)	33.3 (1 in 3)	40.8 (1 in 2)
	Female	5.4 (1 in 18)	6.0 (1 in 17)	10.0 (1 in 10)	25.9 (1 in 4)	37.5 (1 in 3)
Breast	Female	1.9 (1 in 52)	2.3 (1 in 44)	3.5 (1 in 29)	6.8 (1 in 15)	12.4 (1 in 8)
Colorectum	Male	0.3 (1 in 294)	0.7 (1 in 149)	1.2 (1 in 84)	3.5 (1 in 28)	4.6 (1 in 22)
	Female	0.3 (1 in 318)	0.5 (1 in 198)	0.8 (1 in 120)	3.2 (1 in 31)	4.2 (1 in 24)
Kidney & renal pelvis	Male	0.2 (1 in 457)	0.3 (1 in 289)	0.6 (1 in 157)	1.3 (1 in 75)	2.1 (1 in 48)
	Female	0.1 (1 in 729)	0.2 (1 in 582)	0.3 (1 in 315)	0.7 (1 in 135)	1.2 (1 in 83)
Leukemia	Male	0.2 (1 in 410)	0.2 (1 in 574)	0.6 (1 in 259)	1.4 (1 in 72)	1.8 (1 in 57)
	Female	0.2 (1 in 509)	0.1 (1 in 901)	0.4 (1 in 447)	0.9 (1 in 113)	1.2 (1 in 81)
Lung & bronchus	Male	0.2 (1 in 643)	0.7 (1 in 149)	1.9 (1 in 53)	6.2 (1 in 16)	7.0 (1 in 14)
	Female	0.2 (1 in 598)	0.6 (1 in 178)	1.5 (1 in 68)	4.8 (1 in 21)	6.0 (1 in 17)
Melanoma of the skin‡	Male	0.5 (1 in 220)	0.5 (1 in 198)	0.9 (1 in 111)	2.5 (1 in 40)	3.5 (1 in 28)
	Female	0.6 (1 in 155)	0.4 (1 in 273)	0.5 (1 in 212)	1.0 (1 in 97)	2.3 (1 in 44)
Non-Hodgkin lymphoma	Male	0.3 (1 in 385)	0.3 (1 in 353)	0.4 (1 in 175)	1.8 (1 in 55)	2.4 (1 in 42)
	Female	0.2 (1 in 547)	0.2 (1 in 483)	0.2 (1 in 245)	1.3 (1 in 74)	1.9 (1 in 54)
Prostate	Male	0.3 (1 in 354)	1.9 (1 in 52)	5.4 (1 in 19)	9.1 (1 in 11)	12.9 (1 in 8)
Thyroid	Male	0.2 (1 in 533)	0.1 (1 in 799)	0.2 (1 in 620)	0.2 (1 in 429)	0.6 (1 in 163)
	Female	0.8 (1 in 127)	0.4 (1 in 275)	0.3 (1 in 292)	0.4 (1 in 258)	1.8 (1 in 57)
Uterine cervix	Female	0.3 (1 in 371)	0.1 (1 in 868)	0.1 (1 in 899)	0.2 (1 in 594)	0.6 (1 in 161)
Uterine corpus	Female	0.3 (1 in 352)	0.6 (1 in 169)	1.0 (1 in 105)	1.3 (1 in 76)	2.8 (1 in 36)

*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.

‡Probabilities for non-Hispanic whites only.

(Tables 10 and 11). Importantly, there are considerable differences within all of the broadly defined population groups described here, despite scant data. For example, while overall cancer incidence rates are 40% lower for API men than non-Hispanic white men based on aggregated data, rates in Hawaiians and Samoans are similar to those in non-Hispanic whites.[47] The same is true for Puerto Ricans within the lower risk Hispanic population.

In 2014, the cancer death rate was 15% higher in blacks than in whites. The racial disparity has been most striking for men, with the excess risk growing from 20% in 1970 to 47% in 1990. However, that gap had narrowed to 21% in 2014, due in part to more rapid declines in smoking-related cancers in blacks driven by sharper reductions in smoking initiation in the 1970s and early 1980s.[59,60] The racial disparity has declined similarly in women, from a peak of 20% in 1998 to 13% in 2014. Other than behavioral differences, racial disparities are caused by unequal access to and use of high-quality health care, including cancer prevention and early detection, timely diagnosis, and optimal treatment.[61,62] Blacks are more likely than whites to be diagnosed with cancer at an advanced stage (Fig. 4), but also have lower stage-specific survival for most cancer types (Fig. 5). Both stage at diagnosis and survival are closely aligned with health insurance coverage,[63] which is lower among minorities than non-Hispanic whites. However, this gap is also narrowing rapidly. As a result of the Patient Protection and Affordable Care Act and the Health Care and Education Reconciliation Act of 2010, together referred to as the Affordable Care Act or ACA, 11% of blacks and 7% of non-Hispanic whites were uninsured in 2015, down from 21% and 12%, respectively, in 2010.[64,65] Progress for Hispanics is similar, with the uninsured rate dropping from 31% in 2010 to 16% in 2015. If maintained, these shifts should help to expedite progress in reducing socioeconomic disparities in cancer, as well as other health conditions.

Cancer incidence and death rates among APIs, American Indians/Alaska Natives (AI/ANs), and Hispanics are lower than among non-Hispanic whites for the 4 most common cancers, but higher for cancers associated with infectious agents (eg, those of the stomach and liver). For example, liver cancer incidence rates in these populations are double those in non-Hispanic whites, reflecting a higher prevalence of risk factors such as chronic infection with hepatitis B and/or hepatitis C viruses, obesity, diabetes, and binge drinking.[66] AI/ANs have the highest rates of kidney cancer, although there is striking geographic variation, most likely reflecting differences in the prevalence of renal cancer risk factors such as obesity, smoking, and hypertension.[67]

Regional Variations in Cancer Rates

Tables 12 and 13 depict average annual cancer incidence and death rates for selected cancers by state. State variation in cancer occurrence reflects differences in medical practice and the prevalence of risk factors, such as smoking and obesity.

TABLE 9. Sex Differences in Cancer Incidence and Mortality Rates, 2009 to 2013

		INCIDENCE			MORTALITY		
		RATE	RATE RATIO (M/F)	(95% CI)	RATE	RATE RATIO (M/F)	(95% CI)
All sites	Female	418.5			143.4		
	Male	512.1	1.2	(1.22-1.23)	204.0	1.4	(1.42-1.43)
Oral cavity and pharynx	Female	6.3			1.3		
	Male	17.2	2.7	(2.69-2.75)	3.8	2.8	(2.77-2.89)
Esophagus	Female	1.8			1.5		
	Male	8.1	4.5	(4.44-4.60)	7.4	4.8	(4.75-4.93)
Stomach	Female	4.6			2.4		
	Male	9.2	2.0	(1.97-2.02)	4.5	1.9	(1.85-1.91)
Colon and rectum	Female	35.6			12.7		
	Male	46.9	1.3	(1.31-1.32)	18.1	1.4	(1.42-1.44)
Colon excluding rectum	Female	26.6					
	Male	32.4	1.2	(1.21-1.22)			
Rectum and rectosigmoid junction	Female	8.9					
	Male	14.5	1.6	(1.61-1.64)			
Anus, anal canal, and anorectum	Female	2.1			0.3		
	Male	1.5	0.7	(0.68-0.72)	0.2	0.8	(0.77-0.87)
Liver and intrahepatic bile duct	Female	4.0			3.6		
	Male	11.8	2.9	(2.89-2.96)	9.1	2.5	(2.45-2.52)
Gallbladder	Female	1.4			0.7		
	Male	0.8	0.6	(0.59-0.62)	0.5	0.7	(0.62-0.68)
Pancreas	Female	10.9			9.5		
	Male	14.1	1.3	(1.28-1.30)	12.5	1.3	(1.30-1.33)
Larynx	Female	1.4			0.4		
	Male	6.2	4.5	(4.39-4.57)	1.9	4.8	(4.62-4.97)
Lung and bronchus	Female	53.5			37.0		
	Male	75.0	1.4	(1.40-1.41)	57.8	1.6	(1.55-1.57)
Melanoma of the skin	Female	16.1			1.7		
	Male	25.9	1.6	(1.60-1.62)	4.1	2.4	(2.35-2.45)
Urinary bladder	Female	8.9			2.2		
	Male	36.2	4.1	(4.02-4.08)	7.7	3.5	(3.47-3.59)
Kidney and renal pelvis	Female	11.3			2.5		
	Male	21.7	1.9	(1.90-1.93)	5.7	2.3	(2.25-2.32)
Brain and ONS	Female	5.6			3.5		
	Male	7.8	1.4	(1.37-1.40)	5.3	1.5	(1.48-1.52)
Thyroid	Female	20.8			0.5		
	Male	7.0	0.3	(0.34-0.34)	0.5	1.0	(0.99-1.08)
Hodgkin lymphoma	Female	2.4			0.3		
	Male	3.1	1.3	(1.27-1.32)	0.5	1.6	(1.53-1.70)
Non-Hodgkin lymphoma	Female	15.9			4.7		
	Male	23.0	1.4	(1.44-1.46)	7.7	1.7	(1.63-1.67)
Myeloma	Female	5.2			2.7		
	Male	8.0	1.5	(1.51-1.54)	4.2	1.6	(1.54-1.59)
Leukemia	Female	10.6			5.2		
	Male	17.3	1.6	(1.62-1.65)	9.3	1.8	(1.78-1.82)
Acute lymphocytic leukemia	Female	1.4			0.4		
	Male	1.8	1.3	(1.27-1.33)	0.5	1.4	(1.36-1.50)
Chronic lymphocytic leukemia	Female	3.1			0.9		
	Male	6.1	1.9	(1.90-1.95)	2.0	2.2	(2.15-2.27)
Acute myeloid leukemia	Female	3.4			2.2		
	Male	5.0	1.5	(1.44-1.49)	3.7	1.7	(1.65-1.72)
Chronic myeloid leukemia	Female	1.4			0.2		
	Male	2.2	1.6	(1.57-1.65)	0.4	1.7	(1.64-1.83)

95% CI indicates 95% confidence interval; F, female, M, male, ONS, other nervous system.

TABLE 10. **Incidence Rates by Site, Race, and Ethnicity, United States, 2009 to 2013**

	ALL RACES COMBINED	NON-HISPANIC WHITE	NON-HISPANIC BLACK	ASIAN/PACIFIC ISLANDER	AMERICAN INDIAN/ ALASKA NATIVE*	HISPANIC
All sites						
Male	512.1	519.3	577.3	310.2	426.7	398.1
Female	418.5	436.0	408.5	287.1	387.3	329.6
Breast (female)	123.3	128.3	125.1	89.3	98.1	91.7
Colorectum						
Male	46.9	46.1	58.3	37.8	51.4	42.8
Female	35.6	35.2	42.7	27.8	41.2	29.8
Kidney & renal pelvis						
Male	21.7	21.9	24.4	10.8	29.9	20.7
Female	11.3	11.3	13.0	4.8	17.6	11.9
Liver & intrahepatic bile duct						
Male	11.8	9.7	16.9	20.4	18.5	19.4
Female	4.0	3.3	5.0	7.6	8.9	7.5
Lung & bronchus						
Male	75.0	77.7	90.8	46.6	71.3	42.2
Female	53.5	58.2	51.0	28.3	56.2	25.6
Prostate	123.2	114.8	198.4	63.5	85.1	104.9
Stomach						
Male	9.2	7.8	14.7	14.4	11.2	13.1
Female	4.6	3.5	7.9	8.4	6.5	7.8
Uterine cervix	7.6	7.0	9.8	6.1	9.7	9.9

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

*Data based on Indian Health Service Contract Health Service Delivery Areas (CHSDA) counties and exclude data from Kansas.

Geographic disparities often reflect the national distribution of poverty and access to health care, which have increased over time and may continue to exacerbate because of differential state expansion of Medicaid facilitated by the ACA.[68-70] The largest geographic variation by far is for lung cancer, reflecting the large historical and continuing differences in smoking prevalence among states.[41] For example, lung cancer incidence rates in Kentucky (118 per 100,000 population in men and 80 per 100,000 population in women), which has historically had the highest smoking prevalence, are about 3.5 times higher than those in Utah (34 per 100,000 population in men and 24 per 100,000 population in women), which

TABLE 11. **Death Rates by Site, Race, and Ethnicity, United States, 2010 to 2014**

	ALL RACES COMBINED	NON-HISPANIC WHITE	NON-HISPANIC BLACK	ASIAN/PACIFIC ISLANDER	AMERICAN INDIAN/ ALASKA NATIVE*	HISPANIC
All sites						
Male	200.4	204.0	253.4	122.7	183.6	142.5
Female	141.5	145.5	165.9	88.8	129.1	97.7
Breast (female)	21.2	21.1	30.0	11.3	14.1	14.4
Colorectum						
Male	17.7	17.3	25.9	12.4	19.5	15.0
Female	12.4	12.3	16.9	8.8	14.0	9.2
Kidney & renal pelvis						
Male	5.6	5.8	5.7	2.7	8.9	4.9
Female	2.4	2.5	2.5	1.1	4.2	2.3
Liver & intrahepatic bile duct						
Male	9.2	8.0	13.3	14.3	14.9	13.1
Female	3.7	3.3	4.6	6.1	6.8	5.8
Lung & bronchus						
Male	55.9	58.3	69.8	31.7	46.2	27.3
Female	36.3	39.8	35.5	18.0	30.8	13.4
Prostate	20.0	18.7	42.8	8.8	19.4	16.5
Stomach						
Male	4.4	3.4	8.7	7.1	7.5	6.9
Female	2.3	1.7	4.2	4.3	3.8	4.1
Uterine cervix	2.3	2.1	3.9	1.7	2.8	2.6

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

*Data based on Indian Health Service Contract Health Service Delivery Areas (CHSDA) counties.

TABLE 12. Incidence Rates for Selected Cancers by State, United States, 2009 to 2013

	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	548.1	395.6	119.3	52.8	37.3	95.3	53.4	19.8	13.9	139.1	34.0	7.7
Alaska	459.7	411.9	123.5	49.2	40.4	71.6	55.6	21.4	14.3	100.3	34.7	10.8
Arizona	418.1	375.1	111.0	39.6	30.5	58.0	46.4	18.6	13.5	84.1	32.1	8.0
Arkansas	531.2	390.7	111.5	50.1	37.0	99.6	59.4	20.8	14.8	128.4	35.7	7.2
California	473.0	390.9	121.4	43.8	33.7	53.6	41.2	22.8	15.3	118.7	32.0	7.6
Colorado	458.0	393.8	124.8	38.7	31.0	49.8	42.4	21.5	14.9	122.1	32.7	8.3
Connecticut	541.8	459.1	137.8	46.5	35.1	70.9	57.7	25.3	17.7	130.3	47.4	12.5
Delaware	581.7	451.2	130.0	44.3	33.3	83.4	62.3	25.0	17.3	151.1	41.8	11.1
Dist. of Columbia	543.1	444.8	143.0	47.9	41.1	72.0	49.7	22.1	13.9	169.1	24.4	9.3
Florida	490.1	398.5	115.3	43.4	33.1	73.6	54.4	21.3	14.8	111.2	34.1	8.3
Georgia	542.5	409.6	123.4	48.8	36.2	86.7	53.2	21.7	14.6	139.8	33.6	7.7
Hawaii	454.0	408.7	134.4	53.1	36.4	58.0	38.7	21.8	14.9	96.5	23.3	6.1
Idaho	496.0	408.7	119.4	42.2	32.2	56.4	46.9	20.7	16.1	131.8	39.0	8.7
Illinois	531.6	437.6	128.5	53.4	38.9	81.0	58.5	23.5	16.2	128.8	38.2	9.5
Indiana	503.2	425.9	120.0	49.5	39.4	91.1	61.7	23.3	16.4	102.0	36.4	8.9
Iowa	536.5	438.8	122.6	52.2	39.7	80.2	52.7	26.7	18.5	119.2	39.7	8.8
Kansas	529.0	426.8	122.0	48.8	36.0	73.6	53.5	23.6	16.6	133.5	38.8	9.2
Kentucky	593.8	470.2	122.0	59.6	43.7	118.3	80.2	25.4	17.1	118.1	40.0	9.7
Louisiana	585.0	420.0	123.4	57.3	41.8	92.1	55.5	24.0	16.6	154.4	34.2	8.0
Maine	529.7	450.8	124.5	44.8	35.6	86.0	66.1	24.0	17.6	106.5	46.6	12.5
Maryland	506.0	421.0	130.2	42.5	33.8	67.9	52.9	21.2	15.1	135.0	36.0	9.2
Massachusetts	522.5	454.4	136.0	43.8	35.0	72.7	61.9	23.8	16.7	124.9	41.5	11.4
Michigan	530.2	428.3	123.0	45.2	34.9	78.9	59.1	24.5	17.2	137.0	39.5	10.2
Minnesota*	518.7	431.8	130.1	44.6	35.3	62.9	50.1	27.2	18.5	130.3	38.3	9.5
Mississippi	567.0	405.4	116.1	58.9	42.6	103.1	56.5	20.8	14.4	142.7	30.9	7.3
Missouri	504.9	427.6	124.8	50.5	37.3	90.8	64.7	22.3	15.3	106.3	33.6	8.5
Montana	500.4	425.5	122.7	45.7	34.5	62.6	54.9	23.3	15.8	127.3	37.0	10.5
Nebraska	493.8	414.0	120.7	49.5	38.9	70.4	49.9	24.0	17.8	119.2	34.8	8.4
Nevada*,†	496.9	397.1	113.9	50.7	35.1	67.9	58.6	20.5	14.2	135.4	38.0	11.1
New Hampshire	544.2	460.9	138.1	41.4	34.7	73.5	64.4	26.2	17.9	133.5	50.1	12.8
New Jersey	555.2	452.9	131.4	49.5	38.8	67.7	53.1	25.4	17.8	148.7	41.6	11.0
New Mexico*,‡	424.2	365.8	112.9	41.1	30.6	49.6	36.8	17.8	13.8	106.1	25.5	6.0
New York	557.3	450.6	128.4	47.9	36.6	72.0	54.7	26.3	18.0	145.2	41.4	10.6
North Carolina	534.8	419.5	128.4	44.8	33.4	90.5	55.9	21.7	15.0	130.2	36.1	8.8
North Dakota	515.5	415.5	124.6	54.5	40.2	69.8	47.5	22.7	18.3	130.9	38.5	8.7
Ohio	513.8	423.8	122.0	48.9	36.2	85.6	59.7	22.9	15.7	119.7	38.8	9.3
Oklahoma	511.4	409.8	117.7	49.9	38.1	87.7	58.5	21.7	14.9	120.6	33.8	8.1
Oregon	478.5	424.0	128.1	42.2	32.5	65.3	54.9	22.5	15.4	110.6	37.5	9.2
Pennsylvania	550.8	460.4	129.0	51.3	38.6	80.0	56.5	26.1	17.8	125.4	44.1	11.0
Rhode Island	528.3	459.2	130.4	42.7	35.3	78.3	64.0	25.0	17.8	117.4	46.3	13.3
South Carolina	530.6	409.6	125.6	45.5	34.4	87.8	54.3	20.4	13.4	129.0	34.2	8.7
South Dakota	487.0	428.6	130.6	50.9	39.8	67.4	50.9	23.6	16.3	119.6	33.8	9.4
Tennessee	540.5	420.6	121.7	47.6	36.6	97.6	61.2	22.0	15.1	126.3	35.1	8.1
Texas	474.1	381.1	112.3	47.0	32.8	70.1	45.5	21.5	15.2	106.4	27.9	6.5
Utah	468.6	369.8	112.7	36.1	28.2	34.4	24.2	23.4	15.1	144.4	30.2	5.8
Vermont	505.6	439.3	128.3	41.2	33.4	74.2	61.2	25.4	18.2	109.8	40.0	9.8
Virginia	473.3	399.3	125.5	42.2	33.5	75.2	52.2	21.1	14.4	116.5	31.7	8.3
Washington	513.3	442.2	135.6	41.7	34.0	67.1	54.7	25.6	17.0	125.7	37.8	9.5
West Virginia	533.4	440.0	114.4	54.3	40.8	101.0	65.9	22.1	16.1	106.6	39.9	10.9
Wisconsin	517.9	433.5	127.2	44.6	34.3	70.3	54.5	25.0	17.3	122.0	40.0	10.0
Wyoming	458.1	380.7	109.6	44.0	31.6	52.6	43.1	18.4	14.4	116.0	36.7	10.5
United States	**512.1**	**418.5**	**123.3**	**46.9**	**35.6**	**75.0**	**53.5**	**23.0**	**15.9**	**123.2**	**36.2**	**8.9**

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

*This state's data are not included in the US combined rates because they did not meet high-quality standards for one or more years during 2009 to 2013 according to the North American Association of Central Cancer Registries (NAACCR).

†Rates are based on incidence data for 2009 to 2010.

‡Rates are based on incidence data for 2009 to 2012.

TABLE 13. Death Rates for Selected Cancers by State, United States, 2010 to 2014

	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	235.7	148.2	22.0	20.6	13.3	77.1	39.5	7.5	4.8	13.2	9.7	23.8
Alaska	203.5	146.7	20.4	18.5	13.5	54.7	41.7	7.1	3.7	11.9	9.9	20.5
Arizona	174.2	126.2	19.5	15.6	11.2	42.9	30.4	6.8	4.3	11.5	9.0	18.2
Arkansas	237.0	153.8	22.1	21.8	14.6	81.0	43.9	7.6	5.2	12.7	9.4	20.8
California	176.7	130.4	20.4	15.9	11.5	39.8	28.5	7.1	4.4	11.8	9.2	20.0
Colorado	166.4	125.1	19.2	14.5	11.1	36.4	28.1	6.6	4.0	10.9	8.6	21.7
Connecticut	182.5	133.5	19.1	13.8	10.4	46.3	34.4	7.1	4.3	12.5	9.8	18.6
Delaware	208.3	150.5	21.9	17.1	10.8	62.3	42.6	7.8	4.6	14.1	9.6	19.2
Dist. of Columbia	210.0	160.0	29.3	18.6	15.5	49.6	33.5	6.1	3.3	15.5	12.1	33.6
Florida	189.4	132.7	20.2	16.3	11.3	54.1	35.5	7.2	4.2	12.0	8.9	17.6
Georgia	212.3	140.5	22.5	19.4	12.6	64.1	35.6	7.1	4.1	12.3	9.1	23.4
Hawaii	167.3	114.9	15.0	17.5	10.7	40.8	25.1	6.7	4.0	12.4	9.8	13.7
Idaho	185.4	132.6	20.4	15.9	11.1	43.7	31.4	7.9	5.1	12.8	9.7	23.3
Illinois	208.3	150.3	22.5	19.1	13.2	59.0	39.4	7.8	4.6	12.8	9.8	20.9
Indiana	224.8	153.7	21.8	19.3	13.4	71.2	42.9	8.6	5.1	13.1	9.6	21.0
Iowa	206.5	142.2	19.4	19.2	13.9	59.1	36.0	8.7	5.1	12.7	9.3	19.8
Kansas	200.9	143.0	20.1	18.4	12.6	57.3	38.4	7.7	4.9	13.0	9.9	19.1
Kentucky	249.4	167.1	21.9	20.9	14.2	89.6	54.7	9.0	5.1	13.3	9.6	19.8
Louisiana	237.7	157.1	24.2	21.7	14.9	72.9	41.5	8.6	5.0	15.1	11.3	22.4
Maine	215.7	150.4	18.0	16.5	11.8	64.4	43.3	7.6	5.3	11.8	10.6	19.8
Maryland	198.1	143.3	22.8	17.6	12.1	52.2	36.6	7.1	4.2	13.9	9.9	20.3
Massachusetts	196.6	140.2	18.8	15.9	11.3	51.8	38.0	7.1	4.4	12.6	9.9	19.4
Michigan	209.2	151.6	22.4	17.7	12.7	60.8	41.5	8.8	5.2	13.3	10.1	19.5
Minnesota	188.7	135.8	18.8	15.2	11.5	47.6	33.9	8.6	5.2	12.4	8.8	20.6
Mississippi	252.2	158.5	23.9	23.7	16.1	82.7	41.0	7.2	4.2	14.3	11.0	26.2
Missouri	216.6	154.5	22.5	19.1	13.2	69.3	44.7	7.5	4.7	13.0	9.9	18.2
Montana	182.5	138.2	20.2	16.2	11.1	46.2	37.2	7.5	4.1	10.5	9.0	21.4
Nebraska	197.1	138.3	20.1	18.5	14.2	54.3	34.6	7.2	5.1	12.5	8.9	20.8
Nevada	194.1	145.4	22.7	20.2	13.8	52.8	41.4	6.9	4.0	12.2	9.0	21.1
New Hampshire	197.7	143.4	20.3	14.0	13.3	53.9	40.7	6.8	4.1	12.9	9.5	19.9
New Jersey	191.3	141.6	22.9	18.2	12.8	48.4	33.7	7.3	4.4	13.2	10.2	19.4
New Mexico	176.2	123.8	19.3	17.3	11.3	38.1	26.4	6.0	4.1	10.9	8.1	20.7
New York	187.1	138.0	20.6	16.9	12.1	49.0	33.8	7.3	4.4	13.0	9.9	19.5
North Carolina	215.1	142.1	21.6	17.3	11.6	67.9	37.9	7.4	4.5	12.6	9.2	21.6
North Dakota	189.6	128.0	17.8	17.9	13.1	52.0	31.4	6.9	4.5	12.1	7.9	19.8
Ohio	219.6	155.0	23.1	19.8	13.6	66.5	42.7	8.5	5.1	13.3	10.0	19.9
Oklahoma	227.2	157.4	23.4	20.6	13.8	71.5	44.9	8.3	5.0	12.4	9.9	20.8
Oregon	196.2	145.9	20.8	16.6	12.2	50.5	39.1	8.2	4.9	12.5	9.5	21.2
Pennsylvania	210.5	149.4	22.2	18.9	13.5	59.0	37.1	8.3	4.9	13.6	10.0	19.7
Rhode Island	209.2	143.5	18.8	16.4	12.9	59.1	41.8	6.8	4.7	12.6	9.1	19.8
South Carolina	223.0	145.7	22.7	18.7	12.9	67.0	37.8	7.2	4.4	13.1	9.7	23.4
South Dakota	196.9	138.5	20.2	19.8	12.8	55.5	35.2	7.5	4.3	11.6	9.1	19.5
Tennessee	236.2	153.9	22.1	20.1	14.0	78.4	43.7	8.3	4.8	12.6	10.0	20.7
Texas	195.1	133.2	20.4	18.3	11.9	52.2	31.7	7.4	4.4	11.7	9.0	18.7
Utah	151.0	111.2	20.8	13.0	9.7	24.6	16.2	6.8	4.7	11.4	8.6	22.1
Vermont	202.5	147.0	18.6	15.8	12.7	54.3	41.5	8.0	4.4	12.7	10.0	21.1
Virginia	201.9	141.3	21.9	17.0	12.0	57.4	36.5	7.5	4.4	12.9	9.4	21.0
Washington	191.4	140.1	20.1	15.2	11.2	49.9	36.3	7.9	4.8	12.3	9.8	20.4
West Virginia	236.7	163.3	22.1	22.1	15.0	77.2	47.2	8.1	5.3	12.2	8.7	18.2
Wisconsin	202.0	144.0	20.5	16.4	12.1	53.4	37.5	8.1	4.9	13.2	10.0	21.8
Wyoming	177.9	134.9	18.9	17.1	10.6	41.9	32.5	6.6	4.6	10.8	8.4	18.5
United States	**200.4**	**141.5**	**21.2**	**17.7**	**12.4**	**55.9**	**36.3**	**7.6**	**4.6**	**12.6**	**9.5**	**20.0**

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

TABLE 14. **Five-Year Relative Survival Rate (%) by Age and ICCC Type, Ages Birth to 19 Years, United States, 2006 to 2012**

	BIRTH TO 14	15 TO 19
All ICCC groups combined	83.0	83.9
Lymphoid leukemia	90.2	74.7
Acute myeloid leukemia	64.2	59.7
Hodgkin lymphoma	97.7	96.4
Non-Hodgkin lymphoma	90.7	86.0
Central nervous system neoplasms	72.6	79.1
Neuroblastoma & other peripheral nervous cell tumors	79.7	74.2*
Retinoblasoma	95.3	†
Renal tumors	90.6	68.1*
Hepatic tumors	77.1	47.4*
Osteosarcoma	69.5	63.4
Ewing tumor & related bone sarcomas	78.7	59.2
Soft tissue and other extraosseous sarcomas	74.0	69.1
Rhabdomyosarcoma	69.6	48.9
Germ cell and gonadal tumors	93.3	91.9
Thyroid carcinoma	99.7	99.7
Malignant melanoma	93.7	94.0

ICCC indicates International Classification of Childhood Cancer.

Survival rates are adjusted for normal life expectancy and are based on follow-up of patients through 2013.

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

†Statistic could not be calculated due to fewer than 25 cases during 2006 to 2012.

continues to have the lowest smoking prevalence. Smoking history similarly predicts state disparities in smoking-attributable mortality; the proportion of total cancer deaths caused by smoking is 38% in men and 29% in women in Kentucky, compared with 22% and 11%, respectively, in Utah.[44] The 2-fold difference for prostate cancer incidence rates, which range from 84 (per 100,000 population) in Arizona to 169 in the District of Columbia, reflect state differences in PSA testing prevalence and racial composition.[24] State variations are smaller for cancers without particularly strong risk factors or early detection tests (eg, pancreas).

Cancer in Children and Adolescents

Cancer is the second most common cause of death among children aged 1 to 14 years in the United States, surpassed only by accidents. In 2017, an estimated 10,270 children (birth to 14 years) will be diagnosed with cancer (excluding benign/borderline malignant brain tumors) and 1,190 will die from the disease. Benign and borderline malignant brain tumors are not included in the 2017 case estimates because the calculation method requires historical data and these tumors were not required to be reported to cancer registries until 2004.

Leukemias (76% of which are lymphoid leukemias) account for 29% of all childhood cancers (including benign and borderline malignant brain tumors). Cancers of the brain and other nervous system are the second most common cancer type (26%). The third most common category is lymphomas and reticuloendothelial neoplasms (11%), almost one-half of which are non-Hodgkin lymphoma (including Burkitt lymphoma) and more than one-quarter of which are Hodgkin lymphoma. Soft tissue sarcomas (almost one-half of which are rhabdomyosarcoma) and neuroblastoma each account for 6% of childhood cancers, followed by renal (Wilms) tumors (5%).[10]

Cancers in adolescents (aged 15 to 19 years) differ somewhat from those in children in terms of type and distribution. For example, the most common cancer type in adolescents is lymphoma (21%), almost two-thirds of which is Hodgkin lymphoma. Cancers of the brain and other nervous system account for 17% of cases, followed by leukemia (14%), germ cell and gonadal tumors (12%), and thyroid carcinoma (11%). Melanoma accounts for 5% of the cancers diagnosed in this age group.

Although overall cancer incidence in children and adolescents has been increasing slightly (by 0.6% per year) since 1975, rates appear to have stabilized during the most recent data years. In contrast, death rates among those aged birth to 19 years have declined continuously, from 6.5 (per 100,000 population) in 1970 to 2.2 in 2014, an overall reduction of 66% (68% in children and 60% in adolescents). The 5-year relative survival rate for all cancers combined improved from 58% during the mid-1970s to 83% during 2006-2012 for children and from 68% to 84% for adolescents. However, survival varies substantially by cancer type and age at diagnosis (Table 14).

Limitations

Although the estimated numbers of new cancer cases and deaths expected to occur in 2017 provide a reasonably accurate portrayal of the contemporary cancer burden, they are model-based, 3-year- or 4-year-ahead projections that should be interpreted with caution and not be used to track trends over time. First, the estimates may be affected by changes in methodology as we take advantage of improvements in modeling techniques and cancer surveillance coverage. Second, although the model is robust, it can only account for trends through the most recent year of data (currently 2013 for incidence and 2014 for mortality) and cannot anticipate abrupt fluctuations for cancers affected by changes in detection practice, such as prostate cancer. Third, the model can be oversensitive to sudden or large changes in observed data. The most informative metrics for tracking cancer trends are age-standardized or age-specific cancer death rates from the

NCHS and cancer incidence rates from SEER, NPCR, and/or NAACCR.

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 nonblack populations. This is particularly relevant for AI/AN populations. It is also important to note that cancer data in the United States are primarily reported for broad, heterogeneous racial and ethnic groups, masking substantial and important differences in the cancer burden within these subpopulations. For example, among API men, lung cancer incidence rates in Hawaiian men are just as high as those in non-Hispanic white men and 3-fold higher than those in Asian Indian/Pakistani men based on limited data available by population subgroups. Thus, the high burden of lung and other cancers among Hawaiians is completely concealed with the presentation of aggregated API data.

Conclusions

The continuous decline in cancer death rates over 2 decades has resulted in an overall drop of 25%, resulting in 2.1 million fewer cancer deaths during this time period. Moreover, racial disparities in cancer death rates are continuing to decline and the proportion of blacks who are uninsured has halved since 2010, potentially expediting further progress. Despite these successes, death rates are increasing rapidly for cancers of the liver (one of the most fatal cancers) and uterine corpus, both of which are strongly associated with obesity. Advancing the fight against cancer requires continued clinical and basic research to improve detection practices, as well as treatment. In addition, creative new strategies are also needed to increase healthy behaviors nationwide and to more broadly apply existing cancer control knowledge across all segments of the population, with an emphasis on disadvantaged groups. ■

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