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Cancer statistics, 2023

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Abstract

Each year, the American Cancer Society estimates the numbers of new cancer cases and deaths in the United States and compiles the most recent data on population-based cancer occurrence and outcomes using incidence data collected by central cancer registries and mortality data collected by the National Center for Health Statistics. In 2023, 1,958,310 new cancer cases and 609,820 cancer deaths are projected to occur in the United States. Cancer incidence increased for prostate cancer by 3% annually from 2014 through 2019 after two decades of decline, translating to an additional 99,000 new cases; otherwise, however, incidence trends were more favorable in men compared to women. For example, lung cancer in women decreased at one half the pace of men (1.1% vs. 2.6% annually) from 2015 through 2019, and breast and uterine corpus cancers continued to increase, as did liver cancer and melanoma, both of which stabilized in men aged 50 years and older and declined in younger men. However, a 65% drop in cervical cancer incidence during 2012 through 2019 among women in their early 20s, the first cohort to receive the human papillomavirus vaccine, foreshadows steep reductions in the burden of human papillomavirus-associated cancers, the majority of which occur in women. Despite the pandemic, and in contrast with other leading causes of death, the cancer death rate continued to decline from 2019 to 2020 (by 1.5%), contributing to a 33% overall reduction since 1991 and an estimated 3.8 million deaths averted. This progress increasingly reflects advances in treatment, which are particularly evident in the rapid declines in mortality (approximately 2% annually during 2016 through 2020) for leukemia, melanoma, and kidney cancer, despite stable/increasing incidence, and accelerated declines for lung cancer. In summary, although cancer mortality rates continue to decline, future progress may be attenuated by rising incidence for breast, prostate, and uterine corpus cancers, which also happen to have the largest racial disparities in mortality.

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. The coronavirus disease 2019 (COVID-19) pandemic caused delays in the diagnosis and treatment of cancer because of health care setting closures, disruptions in employment and health insurance, and fear of COVID-19 exposure. Although the impact was largest during the COVID-19 peak in mid-2020, the provision of health care has not fully rebounded. For example, surgical oncology procedures at Massachusetts General Hospital were 72% of 2019 levels during the last one half of 2020 and were only 84% in 2021, the lowest recovery of any surgical specialty.[1] Delays in diagnosis and treatment may lead to an uptick in advanced-stage disease and mortality.[2] These and other secondary consequences of the pandemic will occur gradually over time and will require many years to quantify at the population level because of the 2-year to 3-year lag in population-based cancer incidence and mortality data. However, what is already well established is the disproportionate direct and indirect impact of the pandemic on communities of color.[3,4]

In this article, we provide the estimated numbers of new cancer cases and deaths in 2023 in the United States nationally and for each state, as well as a comprehensive overview of cancer occurrence based on up-to-date population-based data for cancer incidence and mortality. We also estimate the total number of cancer deaths averted through 2020 because of the continuous decline in cancer death rates since the early 1990s.

MATERIALS AND METHODS

Data sources

Population-based cancer incidence data in the United States have been collected by the National Cancer Institute's (NCI) Surveillance, Epidemiology, and End Results (SEER) program since 1973 and by the Centers for Disease Control and Prevention's National Program of Cancer Registries (NPCR) since 1995. The SEER program is the only source for historic, population-based cancer incidence (1975–2019), which is currently based on data from the eight oldest SEER areas (Connecticut, Hawaii, Iowa, New Mexico, Utah, and the metropolitan areas of Atlanta, San Francisco–Oakland, and Seattle–Puget Sound) and represent approximately 8% of the US population.[5] Historic survival data (1975–1977 and 1995–1997) are based on the SEER 8 areas plus the Detroit metropolitan area,[6] as published previously. Contemporary survival statistics (2012–2018) were based on data from the 17 SEER registries (SEER 8 plus the Alaska Native Tumor Registry and the California, Georgia, Kentucky, Louisiana, and New Jersey registries), representing 27% of the US population.[7,8] All 22 SEER registries (SEER 17 plus Idaho, Illinois, Massachusetts, New York, and Texas), covering 48% of the United States, were the source for the probability of developing cancer, which was obtained using the NCI's DevCan software, version 6.8.0.[9]

The North American Association of Central Cancer Registries (NAACCR) compiles and reports incidence data from 1995 forward for registries that participate in the SEER program and/or the NPCR and achieve high-quality data standards. These data approach 100% coverage of the US population for the most recent years and were the source for the projected new cancer cases in 2023, contemporary incidence trends (1998–2019) and cross-sectional incidence rates (2015–2019), and stage distribution (2015–2019).[10] The incidence rates presented herein differ slightly from those published in *Cancer in North America: 2015–2019* because of the use of 19 versus 20 age groups, respectively, for age adjustment.[11,12]

Mortality data from 1930 to 2020 were provided by the National Center for Health Statistics (NCHS).[13,14] Forty-seven states and the District of Columbia met data quality requirements for reporting to the national vital statistics system in 1930, and Texas, Alaska, and Hawaii began reporting in 1933, 1959, and 1960, respectively. The methods for abstraction and age adjustment of historic mortality data are described elsewhere.[14,15] Contemporary 5-year mortality rates for Puerto Rico were obtained from the NCI and the Centers for Disease Control and Prevention joint website, State Cancer Profiles (statecancerprofiles.cancer.gov).

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*.[16–18] Causes of death were classified according to the *International Classification of Diseases*.[19]

Statistical analysis

All incidence and death rates were age standardized to the 2000 US standard population (19 age groups) and expressed per 100,000 persons (or per million for childhood cancer incidence), as calculated using the NCI's SEER*Stat software, version 8.4.0.[20] The annual percent change in rates was quantified using the NCI's Joinpoint Regression software program (version 4.9.1.0).[21] Trends were described as increasing or decreasing when the annual percent change was statistically significant based on a 2-sided p value < .05 and otherwise were described as stable. All statistics presented herein by race, including those for Asian American/Pacific Islander (AAPI) and American Indian/Alaska Native (AIAN) individuals, are exclusive of Hispanic ethnicity for improved accuracy of classification. Racial misclassification for AIAN individuals has been further reduced by restricting incidence rates to Purchased/Referred Care Delivery Area counties and adjusting mortality rates (for the entire United States) using classification ratios previously published by the NCHS.[22] Life tables by Hispanic ethnicity were published in 2018 and were used for relative survival comparisons between White and Black individuals.[23]

Whenever possible, cancer incidence rates were adjusted for delays in reporting, which occur because of lags in case capture and data corrections. Delay adjustment provides the most accurate portrayal of contemporary cancer rates and thus is particularly important in trend analysis.[24] It has the largest effect on the most recent data years for cancers that are frequently diagnosed in outpatient settings (e.g., melanoma, leukemia, and prostate cancer). For example, the leukemia incidence rate for 2019 was 13% higher after adjusting for reporting delays (14.9 vs. 13.2 per 100,000 persons).[25]

Projected cancer cases and deaths in 2023

The most recent year for which incidence and mortality data are available lags 2–4 years behind the current year because of the time required for data collection, compilation, quality control, and dissemination. Therefore, we project the numbers of new cancer cases and deaths in the United States in 2023 to estimate the contemporary cancer burden using two-step statistical modeling, as described in detail elsewhere.[26,27] Briefly, complete cancer diagnoses were estimated for every state from 2005 through 2019 based on delay-adjusted, high-quality incidence data from 50 states and the District of Columbia (99.7% population coverage; recent data were unavailable for Nevada) and state-level variations in sociodemographic and lifestyle factors, medical settings, and cancer screening behaviors.[28] Modeled state and national counts were then projected forward to 2023 using a novel, data-driven joinpoint algorithm.[27] Ductal carcinoma in situ of the female breast and in situ melanoma of the skin were estimated by approximating annual case counts from 2010 through 2019 based on NAACCR age-specific incidence rates, delay factors for invasive disease (delay factors are unavailable for in situ cases),[29] and US population estimates obtained using SEER*Stat software.[10,30] Counts were then projected four years ahead based on the average annual percent change generated by the joinpoint regression model.

The number of cancer deaths expected to occur in 2023 was estimated by applying the previously described data-driven joinpoint algorithm to reported cancer deaths from 2006 through 2020 at the state and national levels as reported by the NCHS.[27] Please note that the estimated cases for 2023 reported herein are based on currently available incidence data through 2019 and do not account for the impact of the COVID-19 pandemic on cancer diagnoses, whereas the projected cancer deaths in 2023 are based on data through 2020 and only account for the first year. In addition, basal cell and squamous cell skin cancers cannot be estimated because diagnoses are not recorded by most cancer registries.

Other statistics

The number of cancer deaths averted in men and women because of the reduction in cancer death rates since the early 1990s was estimated by summing the annual difference between the number of cancer deaths recorded and 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 and sex-specific cancer death rates in the peak year for age-standardized cancer death rates (1990 in men, 1991 in women) to the corresponding age-specific and sex-specific populations in subsequent years through 2020.

SELECTED FINDINGS

Expected number of new cancer cases

Table 1 presents the estimated numbers of new invasive cancer cases in the United States in 2023 by sex and cancer type. In total, there will be approximately 1,958,310 new cancer cases, the equivalent of about 5370 cases each day. In addition, there will be about 55,720 new cases of ductal carcinoma in situ in women and 89,070 new cases of melanoma in situ of the skin. The estimated numbers of new cases for selected cancers by state are shown in Table 2.

The lifetime probability of being diagnosed with invasive cancer is slightly higher for men (40.9%) than for women (39.1%; Table 3). Higher risk in men for most cancer types is thought to largely reflect greater exposure to carcinogenic environmental and behavioral factors, such as smoking, although a recent study suggests that other differences also play a large role.[31] These may include height,[32,33] endogenous hormone exposure, and immune function and response.[34]

Figure 1 depicts the most common cancers diagnosed in men and women in 2023. Prostate, lung and bronchus (hereinafter lung), and colorectal cancers (CRCs) account for almost one half (48%) of all incident cases in men, with prostate cancer alone accounting for 29% of diagnoses. For women, breast cancer, lung cancer, and CRC account for 52% of all new diagnoses, with breast cancer alone accounting for 31% of female cancers.

Expected number of cancer deaths

An estimated 609,820 people in the United States will die from cancer in 2023, corresponding to 1670 deaths per day (Table 1). The greatest number of deaths are from cancers of the lung, prostate, and colorectum in men and cancers of the lung, breast, and colorectum in women (Figure 1). Table 4 provides the estimated number of deaths for these and other common cancers by state.

Approximately 350 people die each day from lung cancer—nearly 2.5 times more than the number of people who die from CRC, which is the second leading cause of cancer death overall. Approximately 103,000 of the 127,070 lung cancer deaths (81%) in 2023 will be caused by cigarette smoking directly, with an additional 3560 caused by second-hand smoke.[35] The remaining balance of approximately 20,500 nonsmoking-related lung cancer deaths would rank as the eighth leading cause of cancer death among the sexes combined if it was classified separately.

TABLE 1 Estimated new cancer cases and deaths by sex, United States, 2023[a]

	Estimated new cases			Estimated deaths		
Cancer site	**Both sexes**	**Male**	**Female**	**Both sexes**	**Male**	**Female**
All sites	1,958,310	1,010,310	948,000	609,820	322,080	287,740
Oral cavity & pharynx	54,540	39,290	15,250	11,580	8140	3440
Tongue	18,040	13,180	4860	2940	1950	990
Mouth	14,820	8680	6140	3090	1870	1220
Pharynx	20,070	16,340	3730	4140	3260	880
Other oral cavity	1610	1090	520	1410	1060	350
Digestive system	348,840	194,980	153,860	172,010	99,350	72,660
Esophagus	21,560	17,030	4530	16,120	12,920	3200
Stomach	26,500	15,930	10,570	11,130	6690	4440
Small intestine	12,070	6580	5490	2070	1170	900
Colon & rectum[b]	153,020	81,860	71,160	52,550	28,470	24,080
Colon	106,970	54,420	52,550			
Rectum	46,050	27,440	18,610			
Anus, anal canal, & anorectum	9760	3180	6580	1870	860	1010
Liver & intrahepatic bile duct	41,210	27,980	13,230	29,380	19,000	10,380
Gallbladder & other biliary	12,220	5750	6470	4510	1900	2610
Pancreas	64,050	33,130	30,920	50,550	26,620	23,930
Other digestive organs	8450	3540	4910	3830	1720	2110
Respiratory system	256,290	131,150	125,140	132,330	71,170	61,160
Larynx	12,380	9900	2480	3820	3070	750
Lung & bronchus	238,340	117,550	120,790	127,070	67,160	59,910
Other respiratory organs	5570	3700	1870	1440	940	500
Bones & joints	3970	2160	1810	2140	1200	940
Soft tissue (including heart)	13,400	7400	6000	5140	2720	2420
Skin (excluding basal & squamous)	104,930	62,810	42,120	12,470	8480	3990
Melanoma of the skin	97,610	58,120	39,490	7990	5420	2570
Other nonepithelial skin	7320	4690	2630	4480	3060	1420
Breast	300,590	2800	297,790	43,700	530	43,170
Genital system	414,350	299,540	114,810	69,660	35,640	34,020
Uterine cervix	13,960		13,960	4310		4310
Uterine corpus	66,200		66,200	13,030		13,030
Ovary	19,710		19,710	13,270		13,270
Vulva	6470		6470	1670		1670
Vagina & other female genital	8470		8470	1740		1740
Prostate	288,300	288,300		34,700	34,700	
Testis	9190	9190		470	470	
Penis & other male genital	2050	2050		470	470	
Urinary system	168,560	117,590	50,970	32,590	22,680	9910
Urinary bladder	82,290	62,420	19,870	16,710	12,160	4550
Kidney & renal pelvis	81,800	52,360	29,440	14,890	9920	4970
Ureter & other urinary organs	4470	2810	1660	990	600	390
Eye & orbit	3490	1900	1590	430	240	190

TABLE 1 (Continued)

Cancer site	Estimated new cases			Estimated deaths		
	Both sexes	Male	Female	Both sexes	Male	Female
Brain & other nervous system	24,810	14,280	10,530	18,990	11,020	7970
Endocrine system	47,230	14,340	32,890	3240	1560	1680
Thyroid	43,720	12,540	31,180	2120	970	1150
Other endocrine	3510	1800	1710	1120	590	530
Lymphoma	89,380	49,730	39,650	21,080	12,320	8760
Hodgkin lymphoma	8830	4850	3980	900	540	360
Non-Hodgkin lymphoma	80,550	44,880	35,670	20,180	11,780	8400
Myeloma	35,730	19,860	15,870	12,590	7000	5590
Leukemia	59,610	35,670	23,940	23,710	13,900	9810
Acute lymphocytic leukemia	6540	3660	2880	1390	700	690
Chronic lymphocytic leukemia	18,740	12,130	6610	4490	2830	1660
Acute myeloid leukemia	20,380	11,410	8970	11,310	6440	4870
Chronic myeloid leukemia	8930	5190	3740	1310	780	530
Other leukemia[c]	5020	3280	1740	5210	3150	2060
Other & unspecified primary sites[c]	32,590	16,810	15,780	48,160	26,130	22,030

Note: These are model-based estimates that should be interpreted with caution and not compared with those for previous years.

Source: Estimated new cases are based on 2005–2019 incidence data reported by the North American Association of Central Cancer Registries. Estimated deaths are based on 2006–2020 US mortality data reported by the National Center for Health Statistics, Centers for Disease Control and Prevention.

[a]Rounded to the nearest 10; cases exclude basal cell and squamous cell skin cancer and in situ carcinoma except urinary bladder. Approximately 55,720 cases of female breast ductal carcinoma in situ and 89,070 cases of melanoma in situ will be diagnosed in 2023.

[b]Includes appendiceal cancer; deaths for colon and rectal cancers are combined because a large number of deaths from rectal cancer are misclassified as colon cancer.

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

Trends in cancer incidence

Figure 2 illustrates long-term trends in overall cancer incidence rates, which reflect both patterns in behaviors associated with cancer risk and changes in medical practice, such as the use of cancer screening tests. For example, the spike in incidence for males during the early 1990s reflects a surge in the detection of asymptomatic prostate cancer as a result of widespread rapid uptake of prostate-specific antigen (PSA) testing among previously unscreened men.[36] Thereafter, cancer incidence in men generally decreased until around 2013, then stabilized through 2019. In women, the rate was fairly stable until the mid-1980s but has since increased slowly by <0.5% per year.[5,37] Consequently, the sex gap is slowly narrowing, with the male-to-female incidence rate ratio declining from 1.59 (95% confidence interval [CI], 1.57–1.61) in 1992[6] to 1.14 (95% CI, 1.14–1.15) in 2019.[25] However, differences in risk vary widely by age. For example, rates among individuals aged 20–49 years are about 80% higher in females than in males, whereas, among those aged 75 years and older, they are nearly 50% higher in men.

The incidence rate for prostate cancer dropped by about 40% from 2007 to 2014 (Figure 3) because of declines in the diagnosis of localized tumors through PSA testing, the prevalence of which decreased after the United States Preventive Services Task Force (USPSTF) recommended against screening for men aged 75 years and older in 2008 and for all men in 2012.[38,39] However, the prostate cancer incidence rate has risen by 3% per year from 2014 through 2019, translating to 99,000 more cases than would have occurred if rates had remained stable, approximately half of which were advanced. This uptick is driven by increases of about 4.5% annually for regional-stage and distant-stage diagnoses that began as early as 2011 and are being watched closely.[37] Localized-stage disease has also begun to tick up, although the trend is not yet statistically significant. These patterns are consistent with continued reports of a shift toward higher grade and stage at prostate cancer diagnosis since circa 2010.[40] Efforts to recoup the benefit of early prostate cancer detection while mitigating overdiagnosis and overtreatment include a USPSTF upgrade to informed decision making in men aged 55–69 in 2018[41,42] and more targeted screening for clinically significant tumors using molecular markers and magnetic resonance imaging-targeted biopsy.[43,44] Black men benefit more from screening in general[45,46] and from the integration of personalized biomarkers because they are more likely to harbor genomically aggressive cancer, even with clinically low-risk disease.[47] Prostate cancer mortality rates in

TABLE 2 Estimated new cases for selected cancers by state, 2023[a]

State	All sites	Female breast	Colon & rectum	Leukemia	Lung & bronchus	Melanoma of the skin	Non-Hodgkin lymphoma	Prostate	Urinary bladder	Uterine cervix	Uterine corpus
Alabama	30,730	4500	2570	780	4280	1510	1030	5320	1180	240	830
Alaska	3390	520	330	90	450	100	140	470	160	—[b]	110
Arizona	41,120	6240	3220	1190	4450	2800	1710	5060	1960	280	1260
Arkansas	18,670	2510	1630	520	2950	1080	720	2500	750	160	520
California	192,770	32,020	16,420	5510	17,040	10,950	8280	26,970	7250	1610	7050
Colorado	28,920	4910	2120	870	2600	2000	1150	4220	1220	200	920
Connecticut	23,480	3620	1560	810	2750	830	1020	3990	1160	120	800
Delaware	7240	1050	500	200	920	350	310	1330	350	50	250
District of Columbia	3520	570	240	60	350	80	120	540	110	—[b]	130
Florida	162,410	22,670	11,750	6080	19,340	9640	8200	24,000	7210	1200	5050
Georgia	61,170	9440	4880	1700	7610	3310	2090	9140	2160	470	1760
Hawaii	8460	1480	770	210	930	520	330	1190	300	50	340
Idaho	10,810	1560	810	380	1080	760	440	1700	540	70	350
Illinois	74,580	11,530	6200	2090	9670	3380	2990	10,580	3160	520	2770
Indiana	40,270	5810	3430	1230	6020	2180	1580	5580	1780	280	1340
Iowa	20,460	2810	1630	740	2680	1310	860	2970	940	120	690
Kansas	16,840	2470	1430	500	2240	640	680	2680	720	120	550
Kentucky	30,270	4030	2640	850	5170	1490	1120	3520	1240	230	830
Louisiana	28,580	4050	2560	820	3850	1260	1040	4970	1060	230	820
Maine	10,490	1450	690	340	1550	490	450	1210	580	—[b]	390
Maryland	35,200	5760	2560	1050	4290	1840	1380	5980	1340	230	1320
Massachusetts	42,880	6770	2880	1280	5790	1540	1750	6430	1890	210	1470
Michigan	61,910	8980	4630	1820	8690	2680	2580	8360	2980	380	2420
Minnesota	34,380	5220	2430	1200	3970	1140	1510	4880	1530	150	1190
Mississippi	18,210	2610	1750	460	2830	720	600	2790	620	150	530
Missouri	37,910	5700	3030	1190	5760	1610	1500	5000	1570	280	1320
Montana	7100	1030	540	220	720	550	290	1370	350	—[b]	220
Nebraska	11,530	1670	950	380	1340	640	470	2180	470	60	370
Nevada	17,370	2620	1490	540	2030	800	720	2180	820	150	550
New Hampshire	9580	1390	650	290	1280	560	410	1410	520	—[b]	360
New Jersey	56,150	8580	4220	1790	5920	2250	2420	9460	2540	350	2120
New Mexico	11,280	1730	940	350	960	610	470	1680	410	100	360
New York	123,810	18,780	8970	3560	14,150	4000	5150	20,390	5440	850	4620
North Carolina	67,690	10,730	4,740	2100	8810	3950	2560	10,040	2760	420	2180
North Dakota	4370	610	370	160	530	290	170	740	200	—[b]	120
Ohio	74,140	11,200	5910	1980	10,680	3880	2900	10,980	3400	510	2570
Oklahoma	23,420	3330	1950	710	3390	1220	890	3100	920	200	700
Oregon	26,030	4220	1840	680	3030	1540	1090	3400	1210	140	830
Pennsylvania	88,450	12,830	6610	2600	11,320	3630	3690	13,210	4270	510	3330
Rhode Island	7030	1050	470	220	940	290	310	1030	340	—[b]	260
South Carolina	33,890	5430	2550	890	4650	1800	1230	5770	1390	240	1040

TABLE 2 (Continued)

State	All sites	Female breast	Colon & rectum	Leukemia	Lung & bronchus	Melanoma of the skin	Non-Hodgkin lymphoma	Prostate	Urinary bladder	Uterine cervix	Uterine corpus
South Dakota	5340	760	440	190	690	310	220	1040	240	—[b]	170
Tennessee	43,790	6210	3450	1200	6580	1990	1600	6280	1730	320	1320
Texas	139,100	22,280	12,220	4780	14,510	5530	5540	17,230	4490	1510	4460
Utah	13,840	2030	940	440	800	1550	510	2500	500	90	470
Vermont	4370	630	300	130	590	230	210	630	200	—[b]	150
Virginia	47,100	7810	3630	1230	6010	2360	1910	7580	1830	310	1590
Washington	44,630	7050	3160	1360	5030	2680	1900	6450	1940	270	1430
West Virginia	12,840	1620	1120	390	2170	560	550	1780	620	90	450
Wisconsin	37,640	5460	2650	1320	4630	1970	1630	5800	1780	180	1390
Wyoming	3170	460	260	90	330	210	110	690	170	—[b]	110
United States	1,958,310	297,790	153,020	59,610	238,340	97,610	80,550	288,300	82,290	13,960	66,200

Note: These are model-based estimates that should be interpreted with caution. State estimates may not add to US totals because of rounding and the exclusion of states with fewer than 50 cases.

[a]Rounded to the nearest 10; excludes basal cell and squamous cell skin cancers and in situ carcinomas except urinary bladder. Estimates for Puerto Rico are unavailable.

[b]The estimate is fewer than 50 cases.

TABLE 3 Probability (%) of developing invasive cancer within selected age intervals by sex, United States, 2017–2019[a]

		Probability, %				
Cancer site	Sex	Birth to 49 years	50–59 years	60–69 years	70 years and older	Birth to death
All sites[b]	Male	3.5 (1 in 29)	6.2 (1 in 16)	13.8 (1 in 7)	34.0 (1 in 3)	40.9 (1 in 2)
	Female	5.8 (1 in 17)	6.4 (1 in 16)	10.4 (1 in 10)	27.2 (1 in 4)	39.1 (1 in 3)
Breast	Female	2.1 (1 in 48)	2.4 (1 in 41)	3.5 (1 in 28)	7.0 (1 in 14)	12.9 (1 in 8)
Colon & rectum	Male	0.4 (1 in 241)	0.7 (1 in 138)	1.1 (1 in 90)	3.1 (1 in 33)	4.3 (1 in 23)
	Female	0.4 (1 in 267)	0.5 (1 in 191)	0.8 (1 in 130)	2.8 (1 in 36)	3.9 (1 in 26)
Kidney & renal pelvis	Male	0.3 (1 in 389)	0.4 (1 in 250)	0.7 (1 in 144)	1.4 (1 in 69)	2.3 (1 in 44)
	Female	0.2 (1 in 609)	0.2 (1 in 504)	0.3 (1 in 292)	0.8 (1 in 124)	1.3 (1 in 75)
Leukemia	Male	0.3 (1 in 380)	0.2 (1 in 538)	0.4 (1 in 263)	1.4 (1 in 69)	1.8 (1 in 55)
	Female	0.2 (1 in 495)	0.1 (1 in 820)	0.2 (1 in 425)	0.9 (1 in 111)	1.3 (1 in 78)
Lung & bronchus	Male	0.1 (1 in 848)	0.6 (1 in 178)	1.7 (1 in 59)	5.6 (1 in 18)	6.2 (1 in 16)
	Female	0.1 (1 in 746)	0.5 (1 in 183)	1.4 (1 in 72)	4.7 (1 in 21)	5.8 (1 in 17)
Melanoma of the skin[c]	Male	0.4 (1 in 246)	0.5 (1 in 205)	0.9 (1 in 114)	2.6 (1 in 38)	3.5 (1 in 28)
	Female	0.6 (1 in 162)	0.4 (1 in 247)	0.5 (1 in 191)	1.1 (1 in 88)	2.4 (1 in 41)
Non-Hodgkin lymphoma	Male	0.3 (1 in 400)	0.3 (1 in 354)	0.6 (1 in 181)	1.8 (1 in 55)	2.3 (1 in 43)
	Female	0.2 (1 in 535)	0.2 (1 in 473)	0.4 (1 in 250)	1.3 (1 in 74)	1.9 (1 in 53)
Prostate	Male	0.2 (1 in 457)	1.8 (1 in 55)	5.2 (1 in 19)	9.2 (1 in 11)	12.6 (1 in 8)
Thyroid	Male	0.2 (1 in 487)	0.1 (1 in 767)	0.2 (1 in 599)	0.2 (1 in 416)	0.6 (1 in 155)
	Female	0.8 (1 in 125)	0.3 (1 in 290)	0.3 (1 in 318)	0.4 (1 in 276)	1.7 (1 in 59)
Uterine cervix	Female	0.3 (1 in 340)	0.1 (1 in 803)	0.1 (1 in 934)	0.2 (1 in 593)	0.7 (1 in 153)
Uterine corpus	Female	0.3 (1 in 305)	0.6 (1 in 161)	1.0 (1 in 97)	1.5 (1 in 68)	3.1 (1 in 33)

[a]For people free of cancer at beginning of age interval.

[b]All sites exclude basal cell and squamous cell skin cancers and in situ cancers except urinary bladder.

[c]Probability for non-Hispanic White individuals.

Estimated New Cases

Males			Females		
Prostate	288,300	29%	Breast	297,790	31%
Lung & bronchus	117,550	12%	Lung & bronchus	120,790	13%
Colon & rectum	81,860	8%	Colon & rectum	71,160	8%
Urinary bladder	62,420	6%	Uterine corpus	66,200	7%
Melanoma of the skin	58,120	6%	Melanoma of the skin	39,490	4%
Kidney & renal pelvis	52,360	5%	Non-Hodgkin lymphoma	35,670	4%
Non-Hodgkin lymphoma	44,880	4%	Thyroid	31,180	3%
Oral cavity & pharynx	39,290	4%	Pancreas	30,920	3%
Leukemia	35,670	4%	Kidney & renal pelvis	29,440	3%
Pancreas	33,130	3%	Leukemia	23,940	3%
All Sites	**1,010,310**	**100%**	**All Sites**	**948,000**	**100%**

Estimated Deaths

Males			Females		
Lung & bronchus	67,160	21%	Lung & bronchus	59,910	21%
Prostate	34,700	11%	Breast	43,170	15%
Colon & rectum	28,470	9%	Colon & rectum	24,080	8%
Pancreas	26,620	8%	Pancreas	23,930	8%
Liver & intrahepatic bile duct	19,000	6%	Ovary	13,270	5%
Leukemia	13,900	4%	Uterine corpus	13,030	5%
Esophagus	12,920	4%	Liver & intrahepatic bile duct	10,380	4%
Urinary bladder	12,160	4%	Leukemia	9,810	3%
Non-Hodgkin lymphoma	11,780	4%	Non-Hodgkin lymphoma	8,400	3%
Brain & other nervous system	11,020	3%	Brain & other nervous system	7,970	3%
All Sites	**322,080**	**100%**	**All Sites**	**287,740**	**100%**

FIGURE 1 Ten leading cancer types for the estimated new cancer cases and deaths by sex, United States, 2023. Estimates are rounded to the nearest 10, and cases exclude basal cell and squamous cell skin cancers and in situ carcinoma except urinary bladder. Ranking is based on modeled projections and may differ from the most recent observed data.

Black men are approximately two to four times higher than those in every other racial and ethnic group (Table 5).

Female breast cancer incidence rates have been slowly increasing by about 0.5% per year since the mid-2000s, largely driven by diagnoses of localized-stage and hormone receptor-positive disease.[48] This trend has been attributed at least in part to continued declines in the fertility rate and increases in excess body weight,[49] which may also contribute to increased uterine corpus cancer incidence of about 1% per year since the mid-2000s among women aged 50 years and older and nearly 2% per year since at least the mid-1990s in younger women.[37,50] After decades of increase, thyroid cancer incidence rates have declined since 2014 by about 2% per year because of changes in clinical practice designed to mitigate over detection, including recommendations against thyroid cancer screening by the USPSTF, and for more restrictive criteria for performing and interpreting biopsies by professional societies.[51,52] Data from autopsy studies indicate that the occurrence of clinically relevant thyroid tumors has remained stable since 1970 and is generally similar in men and women, despite three-fold higher overall incidence rates in women.[53,54]

Lung cancer incidence has declined at a steady pace since 2006–2007 by 2.6% annually in men and by 1.1% annually in women.[37] Declines in lung cancer incidence began later and have been slower in women than in men because women took up cigarette smoking in large numbers later and were also slower to quit, including upturns in smoking prevalence in some birth cohorts.[55,56] In contrast, CRC incidence patterns have been similar by sex since at least the mid-1970s, with rates declining by 1.4%–1.5% per year since 2012 in both men and women.[37] However, these rates are driven by cancer occurrence in older age groups, for whom screening has been recommended, and mask increasing trends in young adults. Compared with declines of 2% per year in people aged 50 years and older during that time period, rates increased by almost 2% per year in adults younger than 50 years. Rising incidence in the United States and several other high-income countries since the mid-1990s[57] remains unexplained but likely reflects changes in lifestyle exposures that began with generations born circa 1950.[58]

After a long history of increase, incidence of non-Hodgkin lymphoma decreased by about 1% per year during 2015 through 2019, and melanoma and liver cancer have stabilized. However, progress

TABLE 4 Estimated deaths for selected cancers by state, 2023[a]

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	10,640	330	720	900	370	520	2610	290	200	840	540
Alaska	1,150	—[b]	60	110	—[b]	70	220	—[b]	—[b]	90	60
Arizona	13,460	420	920	1300	530	690	2290	430	320	1140	850
Arkansas	6340	190	390	550	200	310	1680	190	120	460	340
California	59,830	2180	4680	5530	2290	3450	9380	2180	1450	4970	4090
Colorado	8650	310	690	740	340	430	1450	280	210	790	740
Connecticut	6440	230	480	550	290	320	1320	230	160	540	400
Delaware	2230	60	160	170	90	90	500	80	50	210	100
District of Columbia	990	—[b]	60	90	—[b]	80	160	—[b]	—[b]	100	70
Florida	47,410	1450	3170	3810	1970	2230	10,230	1580	1060	3910	2650
Georgia	18,510	590	1400	1640	660	820	4060	500	430	1520	1020
Hawaii	2620	60	180	240	90	170	480	90	50	240	150
Idaho	3120	100	160	270	140	170	580	120	80	280	200
Illinois	23,380	680	1720	2110	910	1080	5000	780	550	2080	1270
Indiana	13,660	330	930	1170	510	650	3250	460	260	1170	760
Iowa	6310	190	380	540	260	230	1410	200	140	460	370
Kansas	5690	190	370	500	240	250	1330	190	120	410	280
Kentucky	10,090	280	790	890	400	380	2710	320	160	740	410
Louisiana	9420	250	690	870	390	530	2240	290	170	730	470
Maine	3500	110	190	270	120	120	870	120	70	270	170
Maryland	11,090	320	850	980	420	510	1950	350	260	910	680
Massachusetts	12,420	450	760	880	490	530	2570	350	300	1120	680
Michigan	21,380	620	1370	1740	800	920	4930	760	460	1810	1210
Minnesota	10,280	320	640	830	450	380	2090	400	210	870	630
Mississippi	6690	190	470	640	230	300	1740	170	110	440	370
Missouri	13,090	370	810	940	470	590	3210	420	250	1010	650
Montana	2200	80	150	170	80	160	380	70	—[b]	170	140
Nebraska	3540	130	270	320	160	100	630	110	70	300	170
Nevada	5850	190	440	470	200	300	1260	220	120	450	440
New Hampshire	2910	100	180	190	100	140	560	100	—[b]	320	170
New Jersey	15,230	520	1200	1360	640	600	2800	530	350	1410	730
New Mexico	3840	120	300	290	130	300	560	130	70	310	280
New York	31,320	950	2440	2770	1200	1210	6330	1000	850	2940	1650
North Carolina	20,400	560	1450	1640	760	1010	4660	640	370	1630	1150
North Dakota	1320	—[b]	70	110	70	50	290	50	—[b]	110	70
Ohio	24,770	720	1670	2120	1060	1010	5730	830	470	2080	1310
Oklahoma	8660	250	580	800	340	460	2090	290	190	590	400
Oregon	8430	270	570	640	330	470	1650	310	150	710	500
Pennsylvania	27,460	740	1870	2280	1140	1260	5720	950	610	2340	1440

(Continues)

TABLE 4 (Continued)

State	All sites	Brain & other nervous system	Female breast	Colon & rectum	Leukemia	Liver & intrahepatic bile duct	Lung & bronchus	Non-Hodgkin lymphoma	Ovary	Pancreas	Prostate
Rhode Island	2150	80	130	160	80	130	470	70	–[b]	190	110
South Carolina	11,250	360	800	910	410	500	2630	310	190	900	640
South Dakota	1760	60	110	170	130	90	380	60	–[b]	150	80
Tennessee	14,590	420	1030	1240	520	620	3700	460	330	1090	740
Texas	44,140	1330	3340	4350	1590	2750	8330	1440	950	3510	2290
Utah	3710	200	320	310	160	180	460	140	110	310	340
Vermont	1460	60	80	120	50	80	280	50	–[b]	110	90
Virginia	15,800	500	1150	1410	590	680	3320	510	350	1320	960
Washington	13,350	490	960	1050	510	680	2630	480	320	1100	840
West Virginia	4610	120	230	440	180	220	1290	150	90	330	190
Wisconsin	11,670	380	720	880	480	510	2460	410	220	1020	730
Wyoming	1020	50	70	110	–[b]	60	200	–[b]	–[b]	90	80
United States	609,820	18,990	43,170	52,550	23,710	29,380	127,070	20,180	13,270	50,550	34,700

Note: These are model-based estimates that should be interpreted with caution. State estimates may not add to US totals because of rounding and the exclusion of states with fewer than 50 deaths.

[a]Rounded to the nearest 10; estimates for Puerto Rico are not available.

[b]The estimate is <50 deaths.

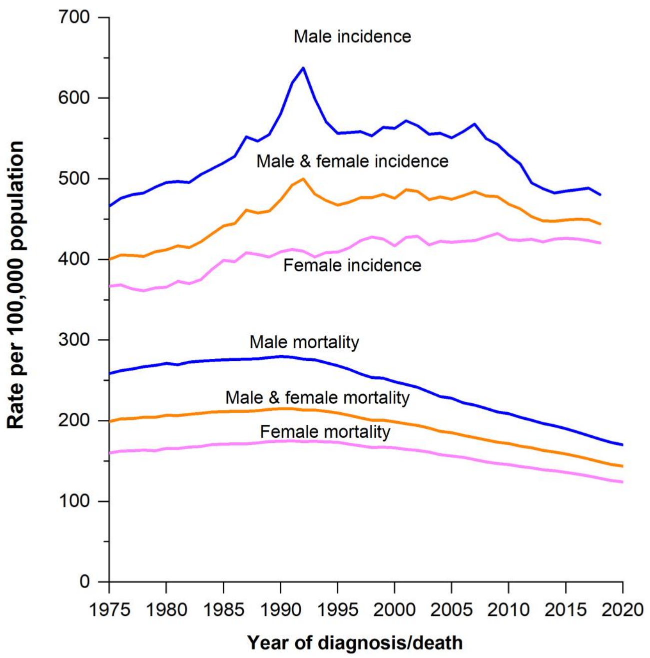

FIGURE 2 Trends in cancer incidence (1975–2019) and mortality (1975–2020) rates by sex, United States. Rates are age adjusted to the 2000 US standard population. Incidence rates are also adjusted for delays in reporting.

for the latter two cancers is mostly confined to men, among whom rates declined by about 1% per year for melanoma and by 2.6% per year for liver cancer in those younger than 50 years and were stable in older men. In women, melanoma was stable in those younger than 50 years but continued to increase by about 1% per year in older women, whereas liver cancer increased by 1.6%–1.7% per year in both age groups.[37] The decline in urinary bladder cancer since the mid-2000s accelerated from 0.6% per year to 1.8% per year during 2015 through 2019 overall; however, trends vary widely by race and ethnicity, and incidence continues to increase by 1.3% per year in AIAN individuals. Incidence also continued to increase by about 1% annually in both men and women for cancers of the kidney and pancreas and by 2.8% and 1.3% per year, respectively, for human papillomavirus (HPV)-associated oral cavity cancers.

Cervical cancer incidence has decreased by more than one half since the mid-1970s because of the widespread uptake of screening. Although rates were stable during 2015 through 2019 overall, trends vary by age, race, and ethnicity. For example, rates continued to decline by about 2% annually in Black, Hispanic, and Asian American/Pacific Islander (AAPI) women 50 years and older and by 1% annually in younger Black and AAPI women; however, rates among younger Hispanic women increased by 2% per year from 2012 through 2019. This may at least in part reflect a change in the composition of the young Hispanic population in the United States through immigration and/or migration. For example, cervical cancer incidence rates among women in Puerto Rico are 30% higher than those among mainland Hispanic women[59] and were recently reported to be increasing in women younger than 65 years, perhaps due to increased HPV prevalence and suboptimal screening.[60]

The first vaccine against the two strains of HPV that cause 70% of cervical cancers (HPV-16 and HPV-18) was approved in 2006 by

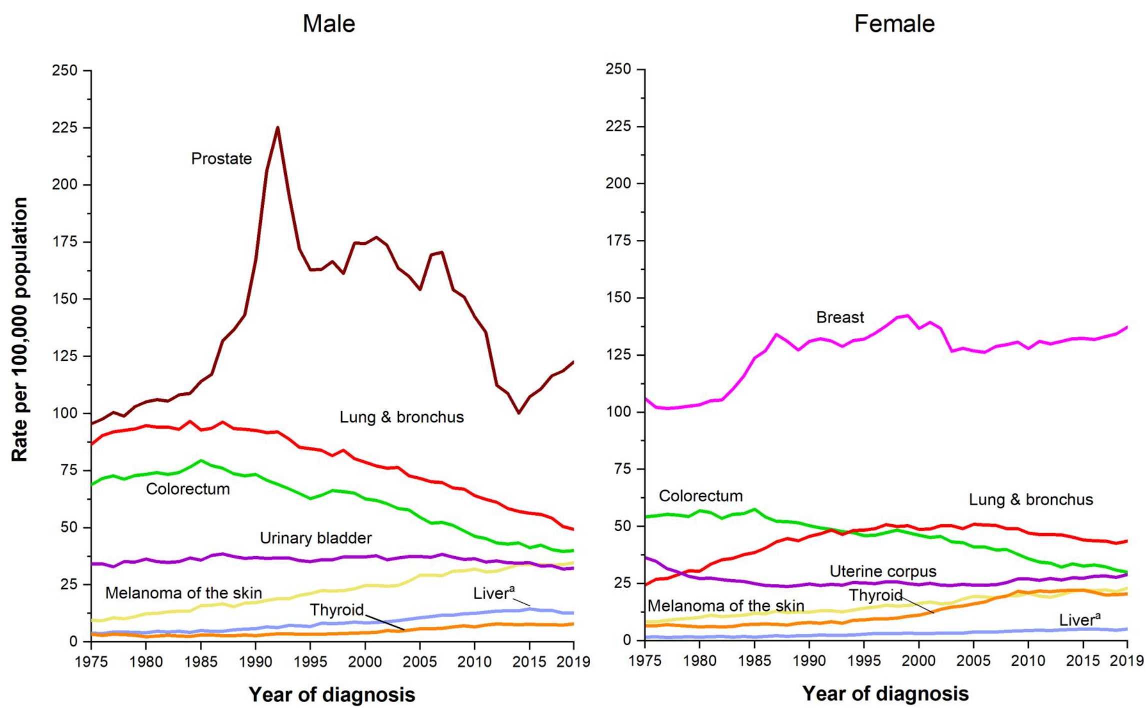

FIGURE 3 Trends in incidence rates for selected cancers by sex, United States, 1975–2019. Rates are age adjusted to the 2000 US standard population and adjusted for delays in reporting. [a]Liver includes intrahepatic bile duct.

the US Food and Drug Administration for use in females aged 9–26 years.[61,62] Thus, the first cohort of vaccinated adolescents is now in their 20s. Among women aged 20–24 years, invasive cervical cancer incidence rates declined by 3% annually from 1998 (2.1 per 100,000 persons) through 2012 (1.3 per 100,000 persons), then by 11.4% annually from 2012 through 2019 (0.5 per 100,000 persons; Figure 4). The overall reduction during 2012 through 2019 was 65%, compared with 33% during the previous 7-year period (2005–2012). Although a new joinpoint is not yet evident among women of color because of sparse data, the decrease in rates during 2012 through 2019 was similar across race and ethnicity (White, 64%; Black, 69%; Hispanic, 70%). Data for AAPI and AIAN women were too sparse to analyze.

These findings are consistent with those of Mix et al., who reported declines in cervical squamous cell carcinoma of 22.5% per year from 2010 through 2017 among women aged 15–20 years.[63] Surprisingly large herd immunity has also been shown in the United States based on data from the National Health Examination Survey during 2003 through 2018, with reductions in HPV-16 and HPV-18 infection among sexually active females aged 14–24 years of 90% among those who were vaccinated and 74% among those who were unvaccinated.[64] Sweden was first to report a population-level reduction in invasive cervical cancer incidence of 78% among women who were vaccinated before age 17 years in 2020.[65] Shortly thereafter, an 87% reduction in cervical cancer and a 97% reduction in grade 3 cervical intraepithelial neoplasia was demonstrated among women aged 20–29 years who were vaccinated at ages 12 to 13 years in England.[66] Although up-to-date (three-dose) HPV vaccination coverage in the United States has lagged behind other countries, accumulating evidence suggests that a single dose offers substantial protection[67,68] and may even be preferable in low-income, high-burden populations.[69] In April, 2022, the World Health Organization's Strategic Advisory Group of Experts on Immunization endorsed single-dose vaccination among girls aged 9–14 years to address the global shortfall and optimize cancer prevention.[70] In 2021, 79% of adolescent girls in the United States had received at least one dose, and 64% were up to date.[71]

Cancer survival

The 5-year relative survival rate for all cancers combined has increased from 49% for diagnoses during the mid-1970s to 68% for diagnoses during 2012 through 2018 (Table 6).[6,7] Current survival is highest for cancers of the thyroid (98%), prostate (97%), testis (95%) and for melanoma (94%), and lowest for cancers of the pancreas (12%), liver and esophagus (21%). Screening influences the interpretation of survival improvements for breast and prostate cancers because of lead-time bias and the detection of indolent cancers,[72] which is likely also a factor for thyroid and other cancers that can be detected incidentally through imaging.[73]

Gains in survival have been especially rapid for hematopoietic and lymphoid malignancies because of improvements in treatment protocols, including the development of targeted therapies. For example, the 5-year relative survival rate for chronic myeloid leukemia has increased from 22% in the mid-1970s to 70% for those diagnosed during 2012 through 2018, and most patients who were treated with tyrosine-kinase inhibitors are experiencing near normal life expectancy.[74] More recently, a cascade of new therapies has

TABLE 5 Incidence and mortality rates for selected cancers by race and ethnicity, United States, 2015–2020

	All races and ethnicities	White	Black	American Indian/ Alaska Native[b]	Asian American/ Pacific Islander	Hispanic/Latino
Incidence, 2015–2019						
All sites	449.4	466.6	453.7	456.8	295.5	352.2
Male	488.2	502.1	527.5	481.2	294.9	372.1
Female	423.3	442.8	404.2	443.6	300.1	344.8
Breast (female)	128.1	133.7	127.8	111.3	101.3	99.2
Colon & rectum[a]	35.9	35.7	41.7	48.6	28.6	32.5
Male	41.5	41.0	49.6	56.2	33.9	38.8
Female	31.2	30.9	35.9	42.5	24.3	27.4
Kidney & renal pelvis	17.3	17.5	19.1	31.0	8.1	17.5
Male	23.5	23.8	26.2	41.2	11.4	22.8
Female	12.0	11.9	13.6	22.5	5.5	13.1
Liver & intrahepatic bile duct	8.6	7.3	10.7	18.4	12.2	13.8
Male	13.1	11.0	17.4	26.8	18.9	20.3
Female	4.8	4.0	5.5	11.5	6.8	8.2
Lung & bronchus	56.3	60.6	58.2	61.6	34.2	29.1
Male	64.1	67.3	74.8	66.9	42.1	35.6
Female	50.3	55.5	46.9	57.9	28.3	24.4
Prostate	109.9	103.5	176.2	82.6	57.2	87.2
Stomach	6.4	5.2	9.7	9.6	9.4	9.4
Male	8.5	7.2	13.0	12.5	12.2	11.6
Female	4.6	3.4	7.4	7.5	7.2	7.8
Uterine cervix	7.7	7.2	8.8	10.9	6.1	9.7
Uterine corpus	27.7	27.9	28.4	29.4	21.2	25.5
Mortality, 2016–2020						
All sites	149.4	154.4	174.7	179.3	94.5	108.2
Male	177.5	182.5	216.0	216.5	110.4	129.6
Female	128.7	133.0	149.2	153.7	82.9	93.2
Breast (female)	19.6	19.7	27.6	20.5	11.7	13.7
Colon & rectum	13.1	13.1	17.6	18.6	9.1	10.7
Male	15.7	15.5	22.3	22.6	10.9	13.5
Female	11.0	11.1	14.3	15.6	7.7	8.5
Kidney & renal pelvis	3.5	3.6	3.4	6.5	1.6	3.3
Male	5.1	5.3	5.2	9.7	2.4	4.8
Female	2.2	2.3	2.1	4.1	1.0	2.1
Liver & intrahepatic bile duct	6.6	5.9	8.3	13.3	8.4	9.2
Male	9.6	8.4	12.9	19.5	12.5	13.1
Female	4.1	3.6	4.8	8.5	5.1	6.0
Lung & bronchus	35.0	38.0	37.2	42.3	19.8	15.4
Male	42.2	44.7	51.0	51.1	25.6	20.9
Female	29.3	32.8	27.8	36.0	15.4	11.4

TABLE 5 (Continued)

	All races and ethnicities	White	Black	American Indian/ Alaska Native[b]	Asian American/ Pacific Islander	Hispanic/Latino
Prostate	18.8	17.8	37.5	21.9	8.6	15.3
Stomach	2.8	2.1	5.0	5.5	4.6	4.8
Male	3.8	2.9	7.2	7.5	5.9	5.9
Female	2.1	1.5	3.5	4.0	3.7	3.9
Uterine cervix	2.2	2.0	3.3	3.2	1.6	2.5
Uterine corpus	5.1	4.6	9.1	4.9	3.5	4.3

Note: Rates are per 100,000 population and age adjusted to the 2000 US standard population. All race groups are exclusive of Hispanic origin.
[a]Colorectal cancer incidence rates exclude appendix.
[b]To reduce racial misclassification, incidence rates are limited to Purchased/Referred Care Delivery Area counties and mortality rates (for the entire United States) are adjusted using factors published by the National Center for Health Statistics.[22]

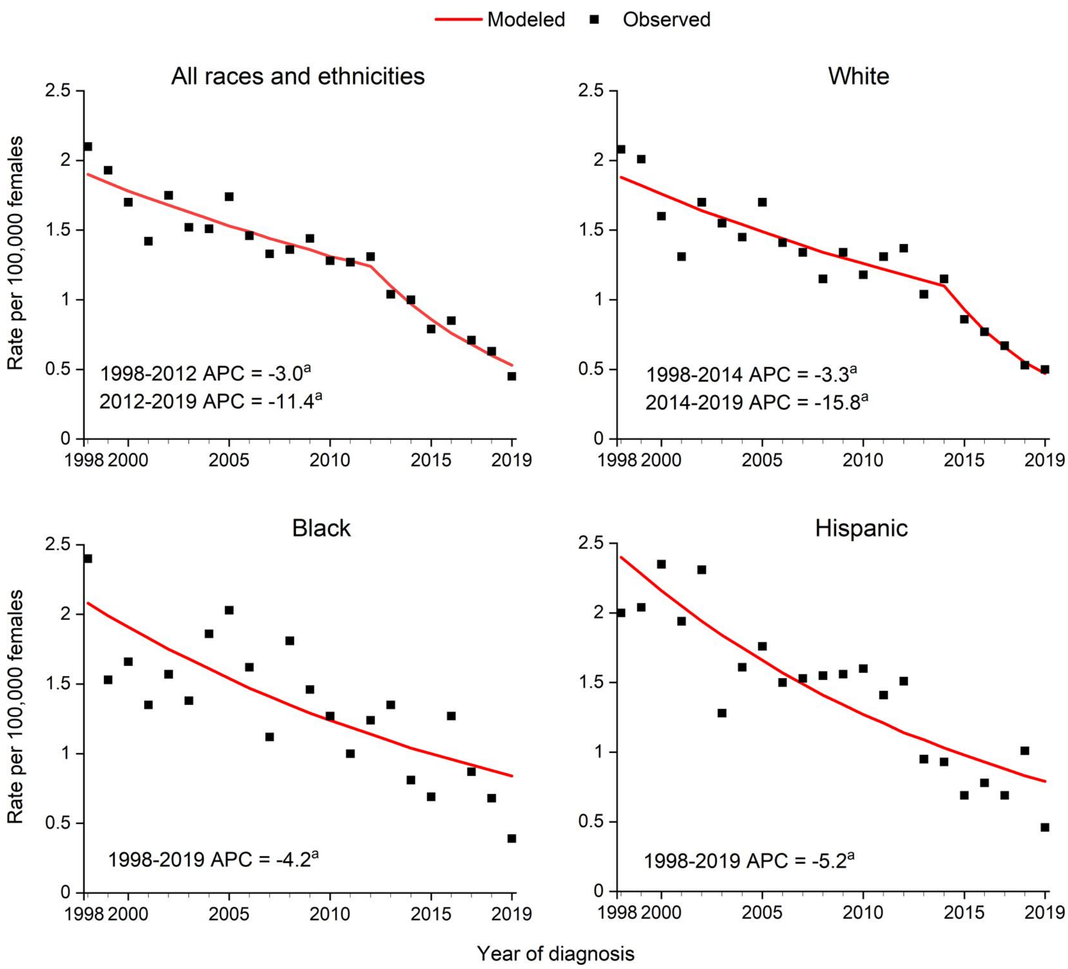

FIGURE 4 Trends in cervical cancer incidence rates among women aged 20–24 years by race and ethnicity, United States, 1998–2019. Rates are age adjusted to the 2000 US standard population and adjusted for reporting delays. White and Black race are exclusive of Hispanic ethnicity. [a]The APC is statistically significant ($p < .05$). APC indicates annual percent change.

been game-changing in the treatment of metastatic melanoma, including first-generation and second-generation immunotherapies (anti-CTLA4 and anti-PD-1 checkpoint inhibition) and BRAF and MEK inhibitors.[75,76] As a result, 3-year relative survival for distant-stage melanoma has doubled over the past decade, from 20.6% for patients diagnosed during 2004 through 2006 to 39.3% during 2016

TABLE 6 Trends in 5-year relative survival rates (%) by race, United States, 1975–2019[a]

	All races & ethnicities			White			Black		
Cancer site	**1975–1977**	**1995–1997**	**2012–2018**	**1975–1977**	**1995–1997**	**2012–2018**	**1975–1977**	**1995–1997**	**2012–2018**
All sites	49	63	68	50	64	69	39	54	64
Brain & other nervous system	23	32	33	22	31	29	25	39	40
Breast (female)	75	87	91	76	89	92	62	75	83
Colon & rectum	50	61	65	50	62	65	45	54	60
Colon	51	61	63	51	62	64	45	54	58
Rectum	48	62	68	48	62	67	44	55	65
Esophagus	5	13	21	6	14	22	4	9	15
Hodgkin lymphoma	72	84	89	72	85	90	70	82	87
Kidney & renal pelvis	50	62	77	50	62	76	49	62	77
Larynx	66	66	61	67	68	62	58	52	53
Leukemia	34	48	66	35	50	67	33	42	62
Liver & intrahepatic bile duct	3	7	21	3	7	20	2	4	19
Lung & bronchus	12	15	23	12	15	23	11	13	21
Melanoma of the skin	82	91	94	82	91	94	57[b]	76[b]	70
Myeloma	25	32	58	24	32	57	29	32	60
Non-Hodgkin lymphoma	47	56	74	47	57	75	49	49	70
Oral cavity & pharynx	53	58	68	54	60	70	36	38	52
Ovary	36	43	50	35	43	49	42	36	41
Pancreas	3	4	12	3	4	11	2	4	11
Prostate	68	97	97	69	97	97	61	94	97
Stomach	15	22	33	14	20	33	16	22	34
Testis	83	96	95	83	96	96	73[b,c]	86[b]	92
Thyroid	92	95	98	92	96	99	90	95	97
Urinary bladder	72	80	77	73	81	78	50	63	65
Uterine cervix	69	73	67	70	74	67	65	66	56
Uterine corpus	87	84	81	88	86	84	60	62	64

[a]Rates are age adjusted for normal life expectancy and are based on cases diagnosed in the Surveillance, Epidemiology, and End Results (SEER) 9 areas for 1975–1977 and 1995–1997 and in the SEER 17 areas for 2012–2018; all cases were followed through 2019. Rates for White and Black patients diagnosed during 2012 through 2018 are exclusive of Hispanic ethnicity.

[b]The standard error is between 5 and 10 percentage points.

[c]The survival rate is for cases diagnosed from 1978 to 1980.

through 2018.[7] Investigators at the NCI recently reported that the number of individuals living with metastatic melanoma increased by 258% from 1990 to 2018, by far the largest increase among the six common cancers studied.[77]

Immunotherapy has also shown promise in the neoadjuvant setting for resectable stage II–IV cutaneous squamous cell carcinoma[78] and nonsmall cell lung cancer. A phase 3 trial among patients with stage I–III nonsmall cell lung cancer reported a median progression-free survival of 20.8 months with standard chemotherapy versus 31.6 months with the addition of nivolumab, including a pathologic complete response in one of four patients.[79] At the population level, 3-year relative survival for all stages of lung cancer combined increased from 22% for diagnoses during 2004 through 2006 to 33% for diagnoses during 2016 through 2018, with progress against nonsmall cell lung cancer (from 25% to 38%) far exceeding that for small cell lung cancer (from 9% to 12%). Gains not only reflect improved therapies[80,81] but also earlier lung cancer detection[82,83] and advances in staging[84] and surgical procedures.[85] Checkpoint inhibitors and targeted therapies are also showing promise in difficult-to-treat advanced renal cell carcinoma.[86]

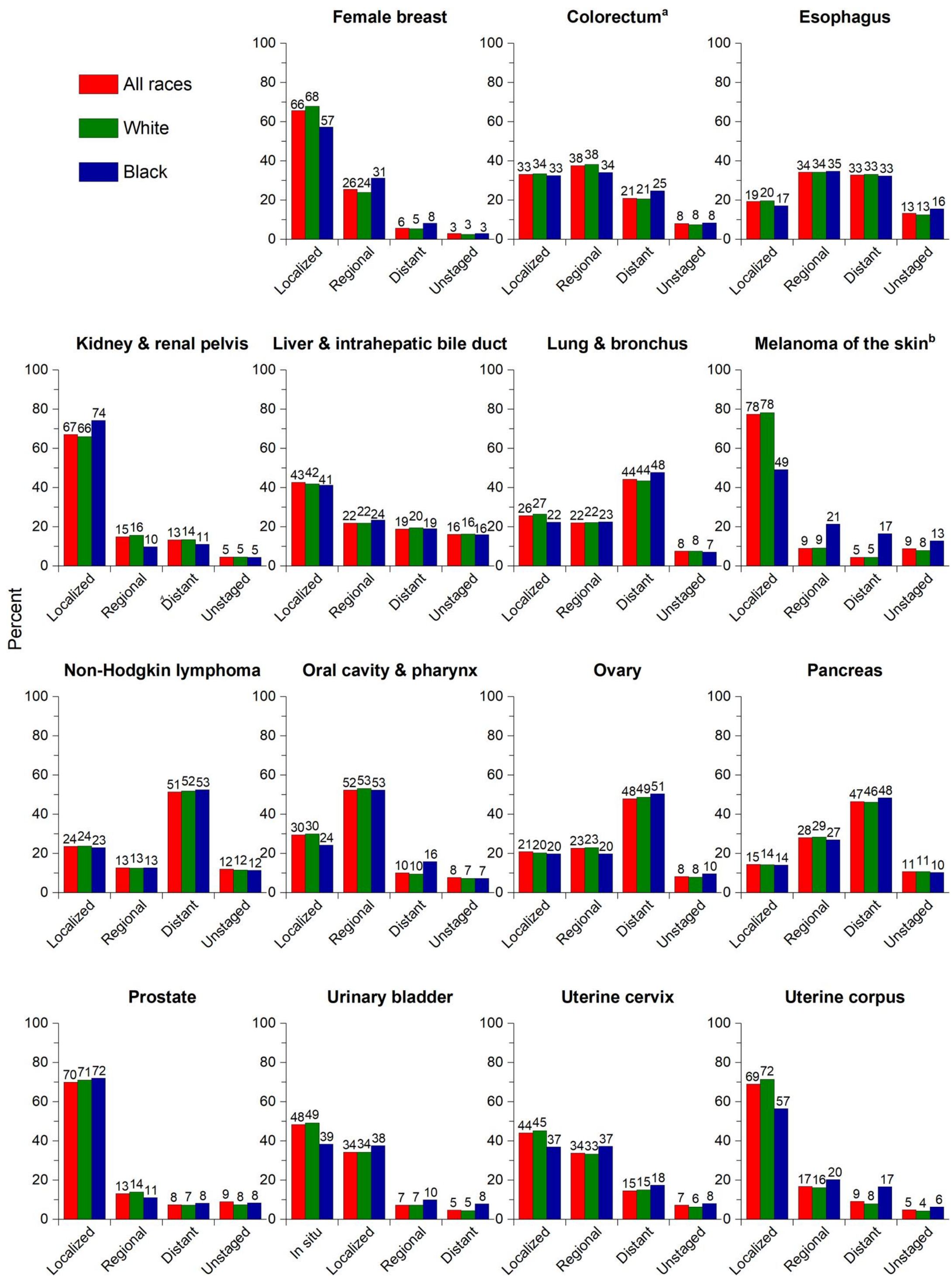

FIGURE 5 Stage distribution for selected cancers by race, United States, 2015 to 2019. White and Black race categories are exclusive of Hispanic ethnicity. [a]Colorectum excludes appendiceal cancer. [b]The proportion of melanoma patients with unknown stage increased after 2015 when collaborative staging rules were no longer in effect.

Unlike most common cancers, survival has not improved over the past 4 decades for women with uterine malignancies (Table 6), largely reflecting a lack of major treatment advances.[87,88] Uterine corpus cancer is the fourth most commonly diagnosed cancer in women, yet there is a dearth of research activity[89] and it ranked 24th in NCI research funding in 2018.[90] The lack of progress has disproportionately affected Black women, who are substantially less likely to be diagnosed with localized-stage disease (57% versus 72% of White women; Figure 5) and have lower survival for every stage (Figure 6). Black women have the highest mortality rate of all racial and ethnic

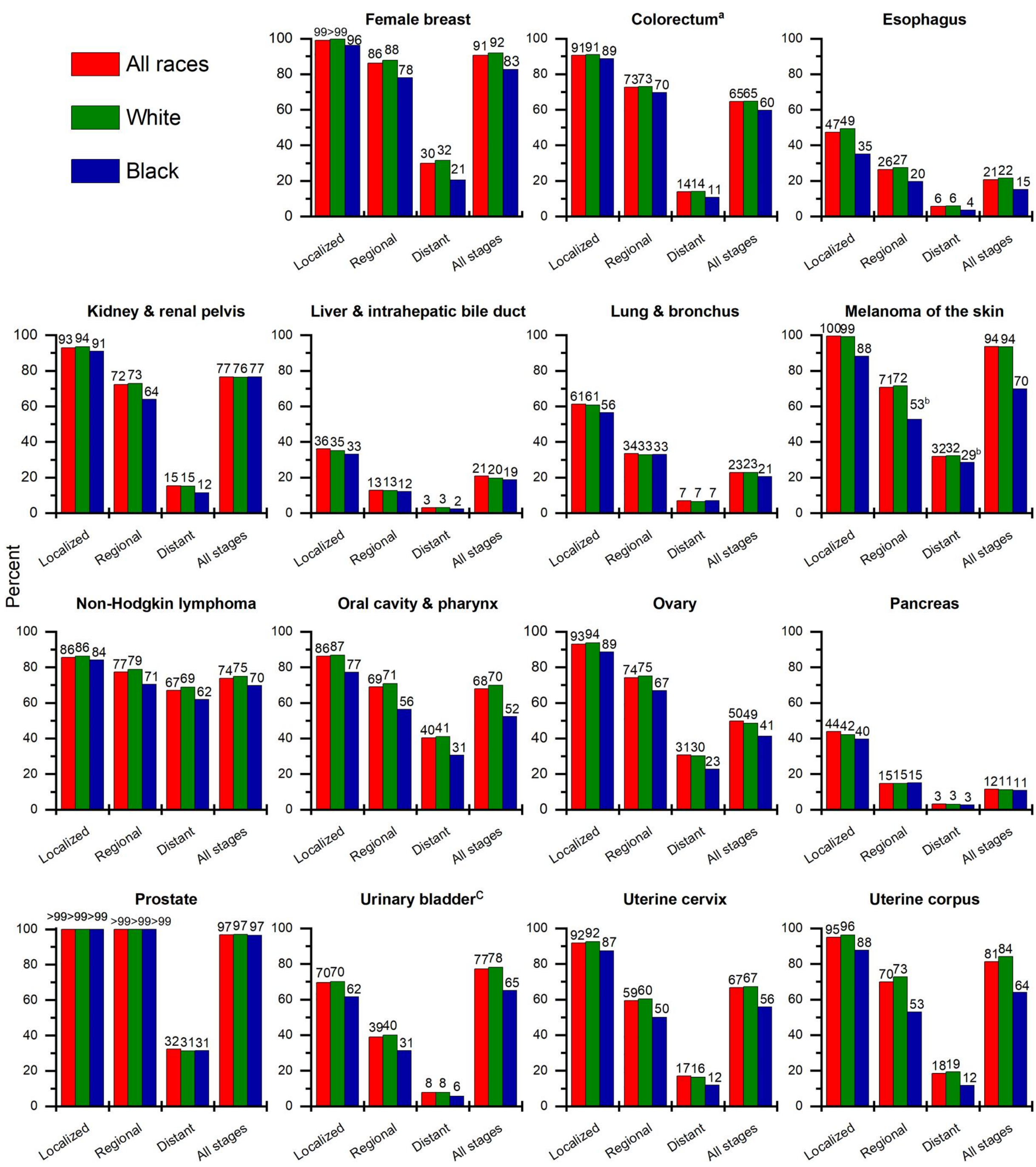

FIGURE 6 Five-year relative survival for selected cancers by race and stage at diagnosis, United States, 2012 to 2018. White and Black race categories are exclusive of Hispanic ethnicity. [a]Colorectum excludes appendiceal cancer. [b]The standard error of the survival rate is between 5 and 10 percentage points. [c]The survival rate for carcinoma in situ of the urinary bladder is 96% in all races, 96% in White patients, and 94% in Black patients.

groups for every histologic subtype of uterine corpus cancer.[91] The recent identification of distinct molecular subtypes offers opportunities for the development of targeted therapies, which could have a large impact because almost one half of early stage, recurrent endometrial cancers have targetable molecular alterations.[92,93] However, equitable dissemination of future advances will be critical to avoid exacerbating the current disparity, which is already one of the largest of all cancers. Stagnant survival trends for cervical cancer likely reflect in part an increased proportion of adenocarcinoma, which has poorer survival than squamous cell carcinoma,[94] because of the disproportionate detection of cervical intraepithelial neoplasia and early invasive squamous cell carcinoma during cytology screening.[95]

Survival rates are lower for Black individuals than for White individuals for every cancer type shown in Figure 6 except pancreas and kidney cancers, for which they are similar. However, kidney cancer survival is lower in Black patients for every histologic subtype of the disease and is only similar overall because of a higher proportion than Whites of papillary and chromophobe renal cell carcinoma (RCC), which have a better prognosis than other types of RCC.[96] The largest Black–White survival differences in absolute terms are for melanoma (24%) and cancers of the uterine corpus (20%), the oral cavity and pharynx (18%), and the urinary bladder (13%). Although these disparities partly reflect a later stage at diagnosis (Figure 5), Black individuals have lower stage-specific survival for most cancer types (Figure 6). After adjusting for stage, sex, and age, the risk of cancer death is 33% higher in Black people and 51% higher in AIAN people compared with White people.[97]

Trends in cancer mortality

Mortality rates are a better indicator of progress against cancer than incidence or survival rates because they are less affected by biases that result from changes in detection practice.[98] The cancer death rate rose during most of the 20th century (Figure 7), largely because of a rapid increase in lung cancer deaths among men as a consequence of the tobacco epidemic. However, reductions in smoking as well as improvements in early detection and treatment for some cancers have resulted in a continuous decline in the cancer death rate since its peak in 1991 at 215.1 per 100,000 persons. The overall drop

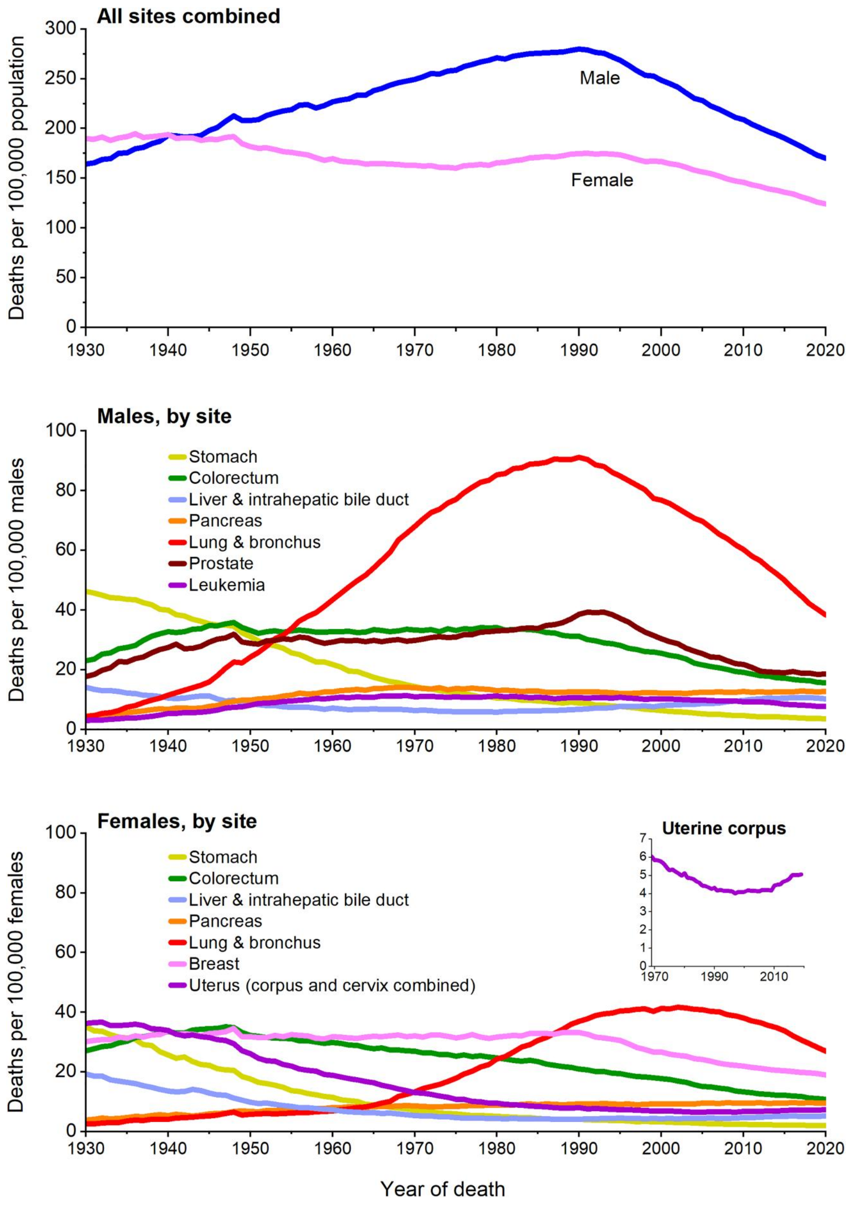

FIGURE 7 Trends in cancer mortality rates by sex overall and for selected cancers, United States, 1930–2020. Rates are age adjusted to the 2000 US standard population. Because of improvements in International Classification of Diseases coding over time, numerator data for cancers of the lung and bronchus, 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.

of 33% through 2020 (143.8 per 100,000 persons) translates to an estimated 3,820,800 fewer cancer deaths (2,582,800 in men and 1,238,000 in women) than if mortality had remained at its peak (Figure 8). The number of averted deaths is twice as large for men than for women because the death rate in men peaked higher and declined faster (Figure 7).

The pace of decline in cancer mortality has slowly accelerated from about 1% per year during the 1990s, to 1.5% per year during the 2000s, and to 2% per year from 2015 through 2020 (Table 7). Overall mortality trends are largely driven by lung cancer, for which declines steepened similarly in men and women in recent years because of treatment advances that have extended survival, as mentioned earlier, as well as earlier detection.[83] For example, the annual decrease in lung cancer mortality accelerated from 3.1% during 2005 through 2014 to 5.3% during 2014 through 2020 in men and from 1.8% to 4.3% in women (Table 7). Overall, the lung cancer death rate dropped by 58% from 1990 to 2020 in men and by 36% from 2002 to 2020 in women.

Long-term reductions in mortality for CRC—the second-most common cause of cancer death in men and women combined—also contribute to overall progress, with rates dropping by 55% among males since 1980 and by 61% among females since 1969. (CRC death rates were declining in women before 1969, but earlier data years are not exclusive of deaths from small intestine cancer.) The CRC mortality rate decreased during the most recent decade (2011–2020) by about 2% per year. However, similar to incidence, this trend masks increasing mortality among young adults; the CRC death rate continued to rise by 1.2% per year in individuals younger than 50 years and by 0.6% per year in those aged 50–54 years from 2005 through 2020.

Female breast cancer mortality peaked in 1989 and has since decreased by 43% because of earlier diagnosis through mammography screening and increased awareness, coupled with improvements in treatment. Declines in breast cancer mortality have slowed in recent years, from 2% to 3% annually during the 1990s and 2000s to 1% annually from 2011 to 2020, perhaps reflecting the slight but steady increase in incidence and stagnant mammography uptake in recent years. Similarly, the slowing decline in prostate cancer mortality, from 3% to 4% annually during 1994 through 2013 to 0.6% during 2013 through 2020, likely reflects the uptick in advanced-stage diagnoses associated with reductions in PSA testing since 2008.[99,100] Prostate cancer mortality has declined by 53% since the peak in 1993 because of earlier detection through widespread screening with the PSA test and advances in treatment.[101,102]

The third leading cause of cancer death in men and women combined is pancreatic cancer, for which mortality has increased slowly in men, from 12.1 (per 100,000 men) in 2000 to 12.7 per 100,000 men in 2020, but remained relatively stable in women at 9.3–9.6 per 100,000 women. Liver cancer had the fastest increasing mortality for decades, but rates have stabilized in women and began a downturn in men (1.3% decline from 2017 to 2020; Table 7), mirroring patterns in incidence. Mortality declines of about 2% per year

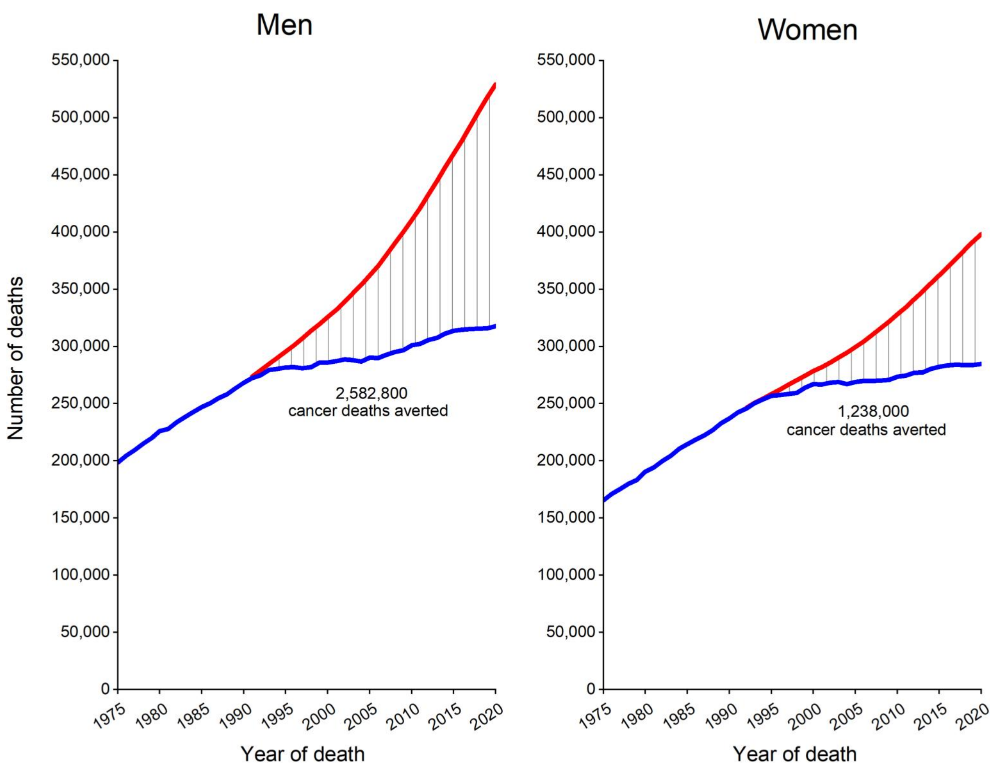

FIGURE 8 Total number of cancer deaths averted from 1991 through 2020 in men and from 1992 to 2020 in women, United States. The blue line represents the actual number of cancer deaths recorded in each year; the red line represents the number of cancer deaths that would have been expected if cancer death rates had remained at their peak.

TABLE 7 Trends in mortality rates for selected cancers by sex, United States, 1975–2020

	Trend 1		Trend 2		Trend 3		Trend 4		Trend 5		Trend 6		AAPC		
Cancer site	Years	APC	Years	APC	Years	APC	Years	APC	Years	APC	Years	APC	2011–2015	2016–2020	2011–2020
All sites															
Overall	1975–1984	0.6[a]	1984–1992	0.3[a]	1992–2001	−1.0[a]	2001–2015	−1.5[a]	2015–2020	−2.0[a]			−1.5[a]	−2.0[a]	−1.8[a]
Male	1975–1979	1.0[a]	1979–1990	0.3[a]	1990–1993	−0.5	1993–2001	−1.5[a]	2001–2015	−1.8[a]	2015–2020	−2.2[a]	−1.8[a]	−2.2*	−2.0[a]
Female	1975–1990	0.6[a]	1990–1995	−0.2	1995–1998	−1.2[a]	1998–2001	−0.4	2001–2016	−1.4[a]	2016–2020	−1.9[a]	−1.4[a]	−1.9[a]	−1.6[a]
Female breast	1975–1990	0.4[a]	1990–1995	−1.8[a]	1995–1998	−3.3[a]	1998–2011	−1.9[a]	2011–2020	−1.3[a]			−1.3[a]	−1.3[a]	−1.3[a]
Colon & rectum															
Overall	1975–1978	0.2	1978–1985	−0.8[a]	1985–2002	−1.8[a]	2002–2005	−3.8[a]	2005–2012	−2.5[a]	2012–2020	−1.9[a]	−2.1[a]	−1.9[a]	−2.0[a]
Male	1975–1979	0.6	1979–1987	−0.6[a]	1987–2002	−1.9[a]	2002–2005	−4.0[a]	2005–2012	−2.6[a]	2012–2020	−2.0[a]	−2.1[a]	−2.0[a]	−2.0[a]
Female	1975–1984	−1.0[a]	1984–2001	−1.8[a]	2001–2010	−2.9[a]	2010–2020	−2.1[a]					−2.1[a]	−2.1[a]	−2.1[a]
Liver & intrahepatic bile duct															
Overall	1975–1980	0.2	1980–1987	2.0[a]	1987–1996	3.8[a]	1996–2000	0.7	2000–2015	2.5[a]	2015–2020	−0.5[a]	2.5[a]	−0.5[a]	0.8[a]
Male	1975–1985	1.5[a]	1985–1996	3.8[a]	1996–1999	0.3	1999–2013	2.7[a]	2013–2017	0.7	2017–2020	−1.3[a]	1.7[a]	−0.8	0.4
Female	1975–1984	0.2	1984–1995	3.1[a]	1995–2008	1.2[a]	2008–2014	3.1[a]	2014–2020	0.5			2.5[a]	0.5	1.4[a]
Lung & bronchus															
Overall	1975–1980	3.0[a]	1980–1990	1.8[a]	1990–1995	−0.2	1995–2005	−0.9[a]	2005–2014	−2.4[a]	2014–2020	−4.8[a]	−3.0[a]	−4.8[a]	−4.0[a]
Male	1975–1982	1.8[a]	1982–1991	0.4[a]	1991–2005	−1.9[a]	2005–2014	−3.1[a]	2014–2020	−5.3[a]			−3.6[a]	−5.3[a]	−4.6[a]
Female	1975–1982	6.0[a]	1982–1990	4.2[a]	1990–1995	1.8[a]	1995–2005	0.2[a]	2005–2014	−1.8[a]	2014–2020	−4.3[a]	−2.4[a]	−4.3[a]	−3.5[a]
Melanoma of skin															
Overall	1975–1988	1.6[a]	1988–2013	0.0	2013–2017	−6.3[a]	2017–2020	−1.3					−3.2[a]	−2.6[a]	−3.3[a]
Male	1975–1989	2.3[a]	1989–2013	0.3[a]	2013–2017	−6.8[a]	2017–2020	−1.5					−3.3[a]	−2.9[a]	−3.5[a]
Female	1975–1988	0.8[a]	1988–2012	−0.5[a]	2012–2020	−3.8[a]							−3.0[a]	−3.8[a]	−4.0[a]
Ovary	1975–1982	−1.2[a]	1982–1992	0.3[a]	1992–1998	−1.2[a]	1998–2003	0.6	2003–2017	−2.3[a]	2017–2020	−3.8[a]	−2.3[a]	−3.4[a]	−2.8[a]
Oral cavity & pharynx															
Overall	1975–1991	−1.5[a]	1991–2000	−2.6[a]	2000–2009	−1.3[a]	2009–2020	0.4[a]					0.4[a]	0.4[a]	0.4[a]
Male	1975–1980	−0.9	1980–2006	−2.2[a]	2006–2020	0.4[a]							0.4[a]	0.4[a]	0.4[a]
Female	1975–1989	−0.9[a]	1989–2009	−2.2[a]	2009–2020	0.3							0.3	0.3	0.3
Tongue, tonsil, oropharynx	1975–2000	−1.6[a]	2000–2009	−0.1	2009–2020	1.8[a]							1.8[a]	1.8[a]	1.8[a]
Other oral cavity	1975–1992	−1.6[a]	1992–2006	−2.9[a]	2006–2020	−0.8[a]							−0.8[a]	−0.8[a]	−0.8[a]
Pancreas															
Overall	1975–2002	−0.1[a]	2002–2005	1.0	2005–2020	0.1[a]							0.1[a]	0.1[a]	0.1[a]
Male	1975–1986	−0.8[a]	1986–1998	−0.3[a]	1998–2020	0.2[a]							0.2[a]	0.2[a]	0.2[a]
Female	1975–1984	0.8[a]	1984–2003	0.1	2003–2006	1.0	2006–2020	0.1					0.1	0.1	0.1
Prostate	1975–1987	0.9[a]	1987–1991	3.0[a]	1991–1994	−0.5	1994–1998	−4.3[a]	1998–2013	−3.5[a]	2013–2020	−0.6[a]	−2.0[a]	−0.6[a]	−1.2[a]
Uterine corpus	1975–1989	−1.6[a]	1989–1997	−0.7[a]	1997–2009	0.4[a]	2009–2016	2.3[a]	2016–2020	0.7[a]			2.3[a]	0.7[a]	1.6[a]

Note: Trends were analyzed using the Joinpoint Regression Program, version 4.9.1.0, allowing up to five joinpoints.

Abbreviations: APC, annual percent change (based on mortality rates age adjusted to the 2000 US standard population); AAPC, average annual percent change.

[a]The APC or AAPC is significantly different from zero ($p < .05$).

during 2016 through 2020 for leukemia, melanoma, and kidney cancer, despite stable or increasing incidence, highlight the impact of improved treatment. In contrast, accelerated declines in ovarian cancer mortality, from 2% per year to almost 4% per year from 2017 through 2020 (Table 7), likely reflect steeper incidence reductions, from 1.5% per year during the 2000s to 2.9% per year from 2015 through 2019.[37] Mortality rates continue to increase for uterine corpus cancer, by about 1% per year, and, for oral cavity cancers associated with HPV-infection (cancers of the tongue, tonsil, and oropharynx), by about 2% per year in men and 1% per year in women.

Recorded number of deaths in 2020

In total, 3,383,729 deaths were recorded in the United States in 2020, an increase of 528,891 deaths over 2019 (Table 8); this was 34 times larger than the increase from 2018 to 2019 (15,633 deaths). COVID-19 infection was the underlying cause of death for only two thirds of the increase, highlighting a substantial excess burden in 2020 for other causes. Most notably, the increase in heart disease deaths from 2019 to 2020 was 10-fold larger than the increase from 2018 to 2019. Among all leading causes, only chronic lower respiratory diseases had a drop in deaths from 2019 to 2020, with a decrease in the age-standardized death rate of 4.7%; cancer was the only other cause for which the death rate declined (by 1.5%). The impact of the pandemic on mortality will continue to unfold over many years and will likely parallel the disproportionate COVID-19 burden in the United States compared with other countries. For example, a recent study found that life expectancy continued to decline in the United States between 2020 and 2021 (based on provisional data) versus a slight recovery on average in 21 peer countries, widening the gap in life expectancy between the United States and peer countries to >5 years (76.4 vs. 81.9 years).[103]

In 2020, cancer accounted for 18% of all deaths and remained the second leading cause of death after heart diseases. However, it is the leading cause of death among women aged 40–79 years and men aged 60–79 years (Table 9). Table 10 presents the number of deaths in 2020 for the five leading cancer types by age and sex. Brain and other nervous system tumors are the leading cause of cancer death among children and adolescents younger than 20 years. However, CRC has surpassed brain tumors in men aged 20–39 years and is the leading cause of cancer death among men aged 20–49 years, whereas breast cancer leads among women in that age group. Despite being one of the most preventable cancers, cervical cancer is consistently the second leading cause of cancer death in women aged 20–39 years (Table 10). Lung cancer is the leading cause of cancer death in both men and women aged 50 years and older, causing far more deaths than breast cancer, prostate cancer, and CRC combined.

Cancer disparities by race and ethnicity

Overall cancer incidence is highest among White people, followed closely by AIAN and Black people (Table 5). However, sex-specific incidence is highest in Black men, among whom rates during 2015 through 2019 were 79% higher than those in AAPI men, who have the lowest rates, and 5% higher than those in White men, who rank second. High overall cancer incidence in Black men is largely because of prostate cancer, which is 70% higher than in White men, two times higher than in AIAN and Hispanic men, and three times higher than in AAPI men. Among women, AIAN and White women have the highest incidence, which is 10% higher than that in Black women, who rank third. However, AIAN and Black women have the highest cancer mortality rates—16% and 12% higher, respectively—than White women. Even more striking, Black women have 4% lower breast cancer incidence than White women but 40% higher breast cancer mortality, a disparity that has remained stagnant for the past decade.

TABLE 8 Leading causes of death in the United States in 2020 versus 2019

	2020			2019		
Cause of death	No.[a]	Rate[b]	Percentage	No.[a]	Rate[b]	Absolute change in the no. of deaths
All causes	3,383,729	835.2		2,854,838	715.7	528,891
1. Heart diseases	696,962	168.2	21	659,041	161.6	37,921
2. Cancer	602,350	143.8	18	599,601	146.0	2749
3. COVID-19	350,831	85.0	10	0	—	350,831
4. Accidents (unintentional injuries)	200,955	57.5	6	173,040	49.2	27,915
5. Cerebrovascular diseases	160,264	38.9	5	150,005	37.0	10,259
6. Chronic lower respiratory diseases	152,657	36.4	5	156,979	38.2	−4322
7. Alzheimer disease	134,242	32.6	4	121,499	29.9	12,743
8. Diabetes mellitus	102,188	24.8	3	87,647	21.6	14,541
9. Influenza and pneumonia	53,544	13.1	2	49,783	12.3	3761
10. Nephritis, nephrotic syndrome, & nephrosis	52,547	12.7	2	51,565	12.7	982

Abbreviation: COVID-19, coronavirus disease 2019 (the respiratory disease caused by severe acute respiratory syndrome coronavirus 2).
[a]Counts include unknown age. Rates for 2019 may differ from those published previously because of updated population denominators.
[b]Rates are per 100,000 and are age adjusted to the 2000 US standard population.
Source: National Center for Health Statistics, Centers for Disease Control and Prevention

TABLE 9 Ten leading causes of death in the United States by age and sex, 2020

	All ages		Age 1–19 years		Aged 20–39 years		Age 40–59 years		Aged 60–79 years		Aged ≥80 years	
Ranking	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
All causes	1,769,884	1,613,845	14,339	7091	101,431	43,674	269,932	160,847	765,217	564,802	608,027	828,671
1	Heart diseases	Heart diseases	Accidents (unintentional injuries)	Accidents (unintentional injuries)	Accidents (unintentional injuries)	Accidents (unintentional injuries)	Heart diseases	Cancer	Cancer	Cancer	Heart diseases	Heart diseases
	382,776	314,186	5061	2312	42,831	15,525	54,798	42,175	181,355	149,254	151,989	190,889
2	Cancer	Cancer	Assault (homicide)	Cancer	Intentional self-harm (suicide)	Cancer	Cancer	Heart diseases	Heart diseases	Heart diseases	Cancer	Cancer
	317,731	284,619	2714	738	13,061	4463	41,968	23,295	169,371	96,674	89,624	87,955
3	COVID-19	COVID-19	Intentional self-harm (suicide)	Intentional self-harm (suicide)	Assault (homicide)	Intentional self-harm (suicide)	Accidents (unintentional injuries)	Accidents (unintentional injuries)	COVID-19	COVID-19	COVID-19	COVID-19
	192,512	158,319	2079	738	11,584	3073	41,328	16,461	90,751	58,186	73,670	85,688
4	Accidents (unintentional injuries)	Alzheimer disease	Cancer	Assault (homicide)	Heart diseases	Heart diseases	COVID-19	COVID-19	Chronic lower respiratory diseases	Chronic lower respiratory diseases	Cerebrovascular disease	Alzheimer disease
	133,205	92,969	910	623	6150	2956	24,704	12,703	39,066	37,041	32,573	77,896
5	Chronic lower respiratory diseases	Cerebrovascular diseases	Congenital anomalies	Congenital Anomalies	Cancer	Assault (homicide)	Chronic liver disease & cirrhosis	Chronic liver disease & cirrhosis	Diabetes mellitus	Cerebrovascular disease	Alzheimer disease	Cerebrovascular disease
	72,942	90,627	465	422	3851	2039	13,050	7152	30,043	25,694	31,549	59,003
6	Cerebrovascular diseases	Chronic lower respiratory diseases	Heart diseases	Heart diseases	COVID-19	COVID-19	Intentional self-harm (suicide)	Diabetes mellitus	Cerebrovascular disease	Diabetes mellitus	Chronic lower respiratory diseases	Chronic lower respiratory diseases
	69,637	79,715	334	239	3263	1641	11,154	6010	28,677	20,860	28,121	36,721
7	Diabetes mellitus	Accidents (unintentional injuries)	Chronic lower respiratory diseases	Influenza & pneumonia	Chronic liver disease & cirrhosis	Chronic liver disease & cirrhosis	Diabetes mellitus	Chronic lower respiratory diseases	Accidents (unintentional injuries)	Alzheimer disease	Accidents (unintentional injuries)	Accidents (unintentional injuries)
	57,532	67,750	156	116	2417	1424	10,791	5489	27,169	14,780	16,111	19,359
8	Alzheimer disease	Diabetes mellitus	Influenza & pneumonia	Cerebrovascular disease	Diabetes mellitus	Pregnancy, childbirth, & puerperium	Cerebrovascular disease	Cerebrovascular disease	Chronic liver disease & cirrhosis	Accidents (unintentional injuries)	Diabetes mellitus	Diabetes mellitus
	41,273	44,656	137	109	1591	1051	7384	5145	15,028	13,581	15,022	16,752

(Continues)

TABLE 9 (Continued)

Ranking	All ages		Age 1–19 years		Aged 20–39 years		Age 40–59 years		Aged 60–79 years		Aged ≥80 years	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
9	Intentional self-harm (suicide)	Influenza & pneumonia	COVID-19	Chronic lower respiratory diseases	Cerebrovascular disease	Diabetes mellitus	Chronic lower respiratory diseases	Intentional self-harm (suicide)	Nephritis, nephrotic syndrome, & nephrosis	Nephritis, nephrotic syndrome, & nephrosis	Parkinson disease	Hypertension & hypertensive renal disease[a]
	36,551	25,799	98	100	849	964	5160	3402	12,127	10,054	14,778	14,384
10	Chronic liver disease & cirrhosis	Nephritis, nephrotic syndrome, & nephrosis	Cerebrovascular disease	COVID-19	Influenza & pneumonia	Cerebrovascular disease	Assault (homicide)	Septicemia	Influenza & pneumonia	Influenza & pneumonia	Influenza & pneumonia	Influenza & pneumonia
	32,546	25,254	97	88	675	627	4258	2709	11,678	9066	11,931	13,641

Note: Deaths within each age group do not sum to all ages combined due to the inclusion of unknown ages and deaths occurring in individuals aged younger than 1 year. 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, and *assault* excludes legal intervention.

Abbreviations: COVID-19 coronavirus disease 2019 (the respiratory disease caused by severe acute respiratory syndrome coronavirus 2).

[a]Includes primary and secondary hypertension.

Source: US Final Mortality Data, 2020: National Center for Health Statistics, Centers for Disease Control and Prevention, 2022.

The highest mortality rate for both sexes combined is among AIAN people, followed closely by Black people. The death rate in AIAN and Black men is double that in AAPI men and 18% higher than that in White men. Among men and women combined, the Black–White disparity in overall cancer mortality has declined from a peak of 33% in 1993 (279.0 vs. 210.5 per 100,000 persons, respectively) to 12% in 2020 (166.8 vs. 149.3 per 100,000 persons). Notably, progress is driven by faster declines in smoking-related cancers because of the steep drop in smoking initiation among Black teens from the late 1970s to the early 1990s,[104] as opposed to targeted efforts to reduce inequalities.

Racial disparities are largely a consequence of less access to high-quality care across the cancer continuum. However, increasing access alone is insufficient to close these gaps. For example, even among individuals with a median annual household income of ≥$75,000, 5-year relative cancer survival is lower among Black people (67%) than among White people (72%).[105] Similarly, a recent study based on information in the National Cancer Database found that Black individuals residing in neighborhoods with the highest socioeconomic status are more likely than White individuals residing in neighborhoods with the lowest socioeconomic status to be diagnosed with advanced-stage lung cancer.[106] Even for childhood cancer, Black children are 24% more likely to be diagnosed with distant-stage disease than White children, regardless of family insurance status.[107]

Racial disparities in cancer occurrence and outcomes are largely the result of longstanding inequalities in wealth that lead to differences in both risk factor exposures and access to equitable cancer prevention, early detection, and treatment.[108,109] Ultimately, disproportionate wealth stems from hundreds of years of structural racism, including segregationist and discriminatory policies in criminal justice, housing, education, and employment that have altered the balance of prosperity, security, and other social determinants of health.[110] The social determinants of health are defined by the World Health Organization as the conditions in which individuals are born, grow, live, work, and age[111] because these influences are consistently and strongly associated with life expectancy and disease mortality.[112,113] The most recent example is the disproportionate impact of the COVID-19 pandemic on people of color in the United States.[3,4,114] A recent study by researchers at the NCI observed that Black, AIAN, and Hispanic individuals had double the rate of overall excess deaths in 2020 compared with White individuals and had two to four times the rate of non–COVID-19–related excess deaths.[115] Furthermore, routine health care, such as mammography screening, that was suspended early in the pandemic has been slower to rebound among people of color.[116]

Geographic variation in cancer occurrence

Tables 11 and 12 show cancer incidence and mortality rates for selected cancers by state. State variation reflects differences in the prevalence of cancer risk factors, such as smoking and obesity; prevention and early detection practices, such as screening; and access

TABLE 10 Five leading causes of cancer death in the United States by age and sex, 2020

Ranking	All ages	Birth to 19 years	Aged 20–39 years	Aged 40–49 years	Aged 50–64 years	Aged 65–79 years	Aged 80 years and older
Male							
All sites	317,731	932	3851	8655	70,248	144,420	89,624
1	Lung & bronchus	Brain & ONS	Colon & rectum	Colon & rectum	Lung & bronchus	Lung & bronchus	Lung & bronchus
	72,949	282	562	1574	16,517	37,860	17,329
2	Prostate	Leukemia	Brain & ONS	Lung & bronchus	Colon & rectum	Prostate	Prostate
	32,707	218	541	1059	7860	13,407	15,995
3	Colon & rectum	Bones & joints	Leukemia	Brain & ONS	Pancreas	Pancreas	Colon & rectum
	28,043	107	433	813	6024	12,080	7159
4	Pancreas	Soft tissue (including heart)	Testis	Pancreas	Liver[a]	Colon & rectum	Urinary bladder
	24,279	88	212	696	5650	10,884	5751
5	Liver[a]	Liver[a]	Non-Hodgkin lymphoma	Esophagus	Esophagus	Liver[a]	Pancreas
	18,636	27	198	405	3614	9298	5369
Female							
All sites	284,619	770	4463	10,241	62,434	118,754	87,955
1	Lung & bronchus	Brain & ONS	Breast	Breast	Lung & bronchus	Lung & bronchus	Lung & bronchus
	63,135	240	1062	2823	13,771	30,643	17,658
2	Breast	Leukemia	Uterine cervix	Colon & rectum	Breast	Breast	Breast
	42,275	174	487	1158	11,337	15,461	11,590
3	Colon & rectum	Bones & joints	Colon & rectum	Lung & bronchus	Colon & rectum	Pancreas	Colon & rectum
	23,826	89	394	902	5236	10,375	8862
4	Pancreas	Soft tissue (including heart)	Brain & ONS	Uterine cervix	Pancreas	Colon & rectum	Pancreas
	22,495	66	333	709	4322	8173	7285
5	Ovary	Kidney & renal pelvis	Leukemia	Ovary	Ovary	Ovary	Leukemia
	13,438	31	314	553	3532	5898	4108

Note: Ranking order excludes "other" categories.
Abbreviation: ONS, other nervous system.
[a]Includes intrahepatic bile duct.

to care. The largest geographic variation is for the most preventable cancers, such as lung cancer, cervical cancer, and melanoma of the skin. For example, lung cancer incidence and mortality rates in Kentucky, where smoking prevalence was historically highest, are three to four times higher than those in Utah and Puerto Rico, where it was lowest. These patterns are also consistent with contemporary smoking prevalence. In 2020, the highest smoking prevalence was in West Virginia (23%), Kentucky (21%), Mississippi (20%), and Arkansas (20%) compared with 8% in Utah and California and 10% in New Jersey, Maryland, and Puerto Rico.[117]

Despite being one of the most preventable cancers, cervical cancer incidence varies 2-fold by state, ranging from 5 or less per 100,000 women in Vermont, New Hampshire, Massachusetts, and Maine to 10 per 100,000 women in Kentucky, Oklahoma, and Alabama and 13 per 100,000 women in Puerto Rico (Table 11). Ironically, advances in cancer control typically exacerbate disparities because of the unequal dissemination of interventions across populations. Although HPV vaccination can virtually eliminate cervical cancer,[66] large state differences in coverage will likely widen existing disparities. In 2020, up-to-date HPV vaccination among boys and

TABLE 11 Incidence rates for selected cancers by state, United States, 2015–2019[a]

	All sites		Breast	Colon & rectum[b]		Lung & bronchus		Non-Hodgkin lymphoma		Prostate	Uterine cervix
State	Male	Female	Female	Male	Female	Male	Female	Male	Female	Male	Female
Alabama	514.5	406.1	122.8	47.1	35.2	79.5	49.3	19.6	12.8	124.0	9.5
Alaska	435.0	406.0	122.0	42.5	36.4	59.4	49.2	21.1	14.6	92.0	7.7
Arizona	404.5	367.2	114.6	34.5	26.1	47.3	40.6	18.3	12.0	77.6	6.5
Arkansas	547.3	436.3	122.3	49.8	36.1	91.8	62.4	22.9	15.0	118.5	9.5
California	427.9	387.7	123.1	37.9	28.9	43.8	36.0	21.7	14.9	95.2	7.4
Colorado	414.1	387.8	130.4	34.3	26.9	41.5	38.1	20.8	13.9	93.2	6.2
Connecticut	511.0	445.6	141.1	38.0	28.0	61.9	54.2	25.9	17.6	123.2	5.6
Delaware	520.0	442.0	136.1	40.7	30.2	68.8	56.2	22.6	15.2	125.9	7.7
District of Columbia	447.7	400.6	136.3	37.4	30.6	48.6	40.8	17.8	11.8	131.3	7.8
Florida	498.2	433.1	122.3	39.7	30.0	63.6	49.9	26.6	19.0	97.9	9.2
Georgia	531.8	423.6	129.1	45.6	32.8	72.9	49.8	22.0	14.7	132.6	8.0
Hawaii	442.2	402.2	140.2	43.9	32.0	52.9	35.5	18.4	12.4	100.3	6.8
Idaho	487.0	418.2	129.4	38.0	28.9	51.6	45.2	23.0	15.9	115.5	7.4
Illinois	501.4	443.0	134.0	46.0	33.9	69.1	55.6	23.2	16.2	113.3	7.5
Indiana	497.8	430.3	124.3	45.4	34.1	80.5	60.7	22.1	15.1	99.9	8.4
Iowa	535.8	460.2	135.1	45.5	35.1	72.2	54.8	25.8	17.4	119.0	7.7
Kansas	496.1	435.5	133.1	43.4	32.7	61.5	49.5	23.6	15.5	114.0	8.1
Kentucky	564.0	484.5	128.3	52.4	38.4	100.9	76.7	23.1	16.7	108.0	9.8
Louisiana	557.3	429.7	128.4	51.1	36.7	78.2	51.9	22.6	15.6	138.5	9.2
Maine	506.6	457.3	128.2	37.6	30.3	76.0	66.3	26.2	15.6	97.0	5.4
Maryland	494.9	427.5	133.6	38.6	30.8	59.2	50.1	21.7	14.8	132.7	6.7
Massachusetts	484.9	437.6	137.6	36.7	27.9	63.2	58.2	23.4	15.5	111.6	5.3
Michigan	485.1	420.2	124.2	39.8	31.0	68.7	56.3	23.5	16.1	110.6	6.9
Minnesota	508.2	447.2	135.6	39.8	30.2	60.2	52.1	26.5	17.1	113.2	5.6
Mississippi	552.0	419.9	123.3	54.8	39.6	92.9	57.5	20.6	14.0	135.6	9.3
Missouri	484.6	433.2	131.9	43.5	32.9	79.8	62.0	22.1	15.4	95.6	8.4
Montana	503.9	435.7	136.8	42.0	28.9	50.4	49.9	21.3	14.7	130.7	7.0
Nebraska	510.1	442.6	131.6	44.2	35.8	61.2	49.8	23.7	17.2	127.9	7.7
Nevada[c]	394.4	367.2	109.4	38.6	29.8	46.9	46.2	17.5	11.9	86.4	8.5
New Hampshire	517.1	459.9	142.1	38.9	28.9	65.4	60.8	25.0	17.8	114.1	5.3
New Jersey	536.3	458.8	138.8	44.1	32.8	58.5	50.1	26.6	18.2	140.1	7.7
New Mexico	389.7	365.2	114.4	36.4	27.9	40.5	32.5	17.0	12.5	84.2	8.4
New York	529.4	456.6	135.7	41.7	31.1	63.7	53.4	25.8	18.1	130.7	7.7
North Carolina	522.0	434.2	137.7	39.8	30.0	77.8	55.4	21.7	14.6	122.9	7.0
North Dakota	487.0	433.2	135.2	44.7	33.8	61.6	53.5	22.1	15.1	121.6	5.9
Ohio	510.8	446.2	130.6	44.6	33.6	77.1	58.8	23.5	15.9	112.5	7.9
Oklahoma	490.4	423.7	124.2	45.9	34.1	76.5	57.2	20.3	15.0	100.4	9.7
Oregon	449.2	415.8	130.6	36.2	28.2	54.7	48.7	22.1	14.8	96.4	6.8
Pennsylvania	513.6	454.4	132.0	43.7	33.0	69.9	55.6	24.2	17.3	109.2	7.4

TABLE 11 (Continued)

State	All sites		Breast	Colon & rectum[b]		Lung & bronchus		Non-Hodgkin lymphoma		Prostate	Uterine cervix
	Male	Female	Female	Male	Female	Male	Female	Male	Female	Male	Female
Rhode Island	511.7	456.0	142.2	36.0	27.2	74.5	63.7	23.4	15.7	114.9	6.9
South Carolina	494.0	407.1	130.9	41.5	30.4	74.6	50.7	20.0	12.9	113.3	7.9
South Dakota	487.5	428.3	125.4	44.4	32.9	60.7	53.2	22.3	15.5	120.3	6.3
Tennessee	524.2	424.7	123.8	44.6	32.8	87.3	61.9	21.7	14.5	117.2	8.1
Texas	458.9	384.9	117.0	44.0	30.2	57.6	41.0	20.9	14.3	102.7	9.4
Utah	445.9	378.3	115.8	30.2	24.1	30.2	23.0	22.2	14.8	117.2	5.5
Vermont	479.1	444.6	132.6	37.8	27.9	64.2	54.2	22.7	16.1	98.6	4.8
Virginia	437.9	391.3	126.1	37.6	28.9	61.3	47.7	20.0	13.9	100.3	6.0
Washington	467.7	425.7	133.3	37.0	28.8	54.9	49.1	23.3	15.9	100.0	6.7
West Virginia	517.7	467.5	121.7	49.8	38.0	89.1	69.2	23.4	16.9	98.3	9.4
Wisconsin	512.2	441.9	135.1	38.6	29.9	65.3	53.4	25.6	17.3	118.3	6.5
Wyoming	433.1	384.8	113.0	36.0	28.8	43.2	40.8	19.9	13.9	113.6	8.2
Puerto Rico[d]	411.7	337.5	98.5	47.7	32.6	21.7	11.4	17.3	12.5	148.6	12.6
United States	488.2	423.3	128.1	41.5	31.2	64.1	50.3	22.9	15.7	109.9	7.7

[a]Rates are per 100,000, age adjusted to the 2000 US standard population.

[b]Rates exclude appendix except for Nevada.

[c]Data for this state are not included in US combined rates because it did not meet high-quality standards for all years during 2015 through 2019 according to the North American Association of Central Cancer Registries (NAACCR). Rates for this state are based on data published in the NAACCR's *Cancer in North America*, Volume II.

[d]Data for Puerto Rico are not included in US combined rates for comparability with previously published US rates. Puerto Rico incidence data for 2017 reflect diagnoses from January through June due to disruptions caused by hurricane Irma.

girls aged 13–17 years ranged from 32% in Mississippi and 43% in West Virginia to 73% in Massachusetts, 74% in Hawaii, and 83% in Rhode Island.[118] State/territory differences in initiatives to improve health, such as Medicaid expansion, may also contribute to future geographic disparities.[119,120]

Cancer in children and adolescents

Cancer is the second most common cause of death among children aged 1–14 years in the United States, surpassed only by accidents, and is the fourth most common cause of death among adolescents (aged 15–19 years). In 2023, an estimated 9910 children (from birth to age 14 years) and 5280 adolescents (aged 15–19 years) will be diagnosed with cancer, and 1040 and 550, respectively, will die from the disease. About 1 in 260 children and adolescents will be diagnosed with cancer before age 20 years.[9]

Leukemia is the most common childhood cancer, accounting for 28% of cases, followed by brain and other nervous system tumors (26%), nearly one third of which are benign or borderline malignant (Table 13). Cancer types and their distribution in adolescents differ from those in children; for example, brain and other nervous system tumors, more than one half of which are benign or borderline malignant, are the most common cancer (21%), followed closely by lymphoma (19%). In addition, there are one half as many cases of non-Hodgkin lymphoma as Hodgkin lymphoma among adolescents; whereas, among children, the reverse is true. Thyroid carcinoma and melanoma of the skin account for 12% and 3% of cancers, respectfully, in adolescents but for only 2% and 1% of cancers in children.

The overall cancer incidence rate stabilized in children during 2010 through 2019 after increasing since at least 1975, but continued to rise in adolescents by 1% per year. In contrast, death rates per 100,000 persons declined from 1970 through 2020 continuously from 6.3 to 1.9 per 100,000 persons in children and from 7.2 to 2.6 per 100,000 persons in adolescents, for overall reductions of 70% and 64%, respectively. Much of this progress reflects the dramatic declines in mortality for leukemia of 84% in children and 75% in adolescents. Remission rates of 90%–100% have been achieved for childhood acute lymphocytic leukemia over the past 4 decades, primarily through the optimization of established chemotherapeutic regimens as opposed to the development of new therapies.[121] However, progress among adolescents has lagged behind that in children, partly because of differences in tumor biology, clinical trial enrollment, treatment protocols, and tolerance and compliance with treatment.[122] Mortality reductions from 1970 to 2020 are also lower in adolescents for other common cancers, including non-Hodgkin lymphoma (94% in children and 88% in adolescents) and brain and other nervous system

TABLE 12 Mortality rates for selected cancers by state, United States, 2016–2020[a]

	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	207.4	137.2	20.9	18.1	12.0	59.6	33.1	6.7	3.5	14.0	10.1	20.2
Alaska	170.3	127.2	17.1	16.0	13.8	36.8	29.1	6.3	4.6	12.2	8.8	19.6
Arizona	154.8	113.6	18.0	14.6	10.0	31.9	24.2	5.8	3.3	11.8	8.8	17.1
Arkansas	206.5	141.7	19.5	17.9	12.4	61.0	38.5	6.8	3.8	13.0	9.5	18.6
California	158.3	118.2	18.8	14.2	10.3	29.8	21.6	6.4	3.8	11.7	9.1	19.8
Colorado	152.8	113.1	18.7	13.1	9.8	27.0	22.0	6.0	3.3	10.9	8.6	21.9
Connecticut	162.2	118.2	17.5	12.6	8.5	34.9	26.9	6.5	3.7	12.4	9.6	18.1
Delaware	190.4	133.8	20.8	15.6	10.8	45.8	33.1	7.5	3.9	14.7	10.4	17.7
District of Columbia	171.5	136.3	23.5	15.9	12.4	33.2	22.4	5.3	3.3	14.0	12.2	26.9
Florida	166.5	121.2	18.5	14.8	10.3	40.6	28.4	6.1	3.7	12.2	8.9	16.1
Georgia	186.7	129.5	20.8	17.1	11.6	48.2	28.9	6.1	3.6	12.7	9.5	21.2
Hawaii	151.4	105.5	15.9	14.1	9.8	33.6	20.8	5.8	3.5	12.2	9.4	14.9
Idaho	169.7	126.7	20.0	14.4	10.9	32.4	25.5	6.6	4.7	12.6	9.3	21.1
Illinois	183.3	135.7	20.5	16.8	11.7	44.7	31.8	6.8	4.0	13.5	10.1	19.5
Indiana	201.3	142.2	20.4	17.4	12.4	55.3	36.9	7.6	4.5	13.9	10.3	19.5
Iowa	185.3	131.4	18.1	16.2	11.4	45.8	31.8	7.5	4.2	12.6	9.7	20.3
Kansas	183.7	134.9	19.8	16.8	11.9	44.7	32.9	7.1	4.4	13.0	9.4	18.1
Kentucky	220.3	155.3	21.6	19.2	13.6	67.0	45.3	7.7	4.6	13.0	10.2	18.3
Louisiana	205.6	140.6	22.4	19.2	12.8	56.4	33.5	7.0	4.0	13.8	10.8	19.9
Maine	196.4	140.8	17.7	14.6	11.5	50.0	38.8	7.4	4.1	12.9	10.0	19.0
Maryland	175.4	130.6	21.0	15.7	11.3	39.1	29.3	6.6	3.5	13.1	9.8	20.1
Massachusetts	172.6	123.1	16.5	13.1	9.3	38.4	30.2	6.5	3.8	13.5	9.9	18.2
Michigan	189.4	139.6	20.2	15.7	11.5	48.0	35.0	7.6	4.6	14.1	10.9	18.6
Minnesota	169.9	125.0	17.4	14.0	9.9	36.1	28.7	7.8	4.0	12.6	9.7	19.6
Mississippi	225.9	148.5	23.5	21.9	14.0	67.0	36.3	6.5	3.6	14.3	11.0	24.3
Missouri	195.7	139.0	19.8	16.7	11.3	53.8	37.3	7.0	4.1	13.7	9.5	17.8
Montana	167.9	125.6	18.3	14.4	9.8	32.8	28.8	6.4	3.5	11.4	9.2	22.3
Nebraska	175.6	132.2	20.4	16.8	12.2	39.6	29.3	7.1	3.7	13.9	10.1	18.1
Nevada	171.1	133.6	21.8	17.1	12.4	37.3	32.8	6.5	3.9	11.8	9.3	19.4
New Hampshire	178.5	130.0	18.0	14.7	10.1	41.2	34.0	6.4	4.1	12.6	9.7	19.2
New Jersey	162.7	126.4	20.3	15.3	11.1	35.0	26.8	6.4	3.7	12.8	10.1	16.7
New Mexico	159.1	116.2	19.9	15.3	10.2	28.4	19.8	5.6	3.4	11.4	8.2	19.3
New York	159.8	121.7	18.6	14.0	10.2	35.7	26.0	6.4	3.7	12.6	9.7	16.8
North Carolina	187.5	131.0	20.0	14.9	10.7	50.7	31.9	6.7	3.6	12.5	9.6	19.7
North Dakota	167.8	122.8	17.2	16.3	10.4	39.4	28.1	6.5	3.5	12.1	9.0	17.7
Ohio	199.6	142.0	21.0	17.4	12.2	53.1	35.2	7.5	4.3	14.0	10.6	19.3
Oklahoma	209.2	149.6	22.4	19.6	13.5	57.0	38.2	7.7	4.7	12.8	9.7	20.0
Oregon	174.0	132.6	19.3	14.2	10.6	36.7	30.4	7.3	4.3	12.9	10.0	20.3
Pennsylvania	187.7	135.9	20.3	16.5	11.5	45.3	31.2	7.3	4.4	14.0	10.4	18.4
Rhode Island	182.6	130.9	17.3	12.6	10.9	43.3	33.5	7.1	3.9	14.7	9.4	18.4

TABLE 12 (Continued)

State	All sites		Breast	Colorectum		Lung & bronchus		Non-Hodgkin lymphoma		Pancreas		Prostate
	Male	Female	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
South Carolina	193.7	132.4	21.5	16.8	10.7	50.7	30.3	6.0	3.9	13.5	9.8	20.8
South Dakota	181.4	132.4	18.9	16.9	12.2	41.4	32.6	7.5	4.3	12.9	9.9	19.1
Tennessee	207.7	142.7	21.6	17.9	12.2	59.5	37.3	7.4	4.2	12.8	9.8	19.5
Texas	173.8	122.5	19.7	17.1	11.0	39.1	25.1	6.6	3.8	12.0	9.1	17.6
Utah	140.5	104.7	19.8	11.9	9.4	19.8	13.8	6.5	3.5	11.1	8.2	21.8
Vermont	185.0	134.3	16.4	15.9	12.7	41.5	32.2	7.5	4.4	11.9	10.3	21.1
Virginia	179.8	127.9	20.6	15.9	10.9	44.0	28.7	6.6	3.8	13.0	9.6	20.0
Washington	170.0	127.5	19.2	14.0	9.9	35.8	28.7	6.9	4.1	12.2	9.7	20.0
West Virginia	211.3	151.4	21.2	20.0	13.7	60.6	41.0	7.9	4.3	12.6	9.6	17.0
Wisconsin	181.5	131.2	18.4	14.2	10.4	41.1	31.2	7.5	4.2	13.7	10.0	20.8
Wyoming	159.8	120.3	18.6	13.6	10.9	32.4	26.2	6.2	4.0	12.6	8.6	18.4
Puerto Rico[b]	132.1	86.4	19.6	17.7	10.7	14.8	7.2	4.3	2.6	7.9	5.2	21.4
United States	177.5	128.7	19.6	15.7	11.0	42.2	29.3	6.7	3.9	12.7	9.6	18.8

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

[b]Rates for Puerto Rico are not included in US combined rates.

tumors (39% and 25%, respectively). The 5-year relative survival rate for all cancers combined improved from 58% during the mid-1970s to 85% during 2012 through 2018 in children and from 68% to 86% in adolescents, but varies substantially by cancer type and age at diagnosis (Table 13).

LIMITATIONS

The estimated numbers of new cancer cases and deaths in 2023 provide a reasonably accurate portrayal of the contemporary cancer burden. However, they are model-based, 3-year (mortality) and 4-year (incidence) ahead projections that should not be used to track trends over time for several reasons. First, new methodologies are adopted regularly, most recently as of the 2021 estimates,[26,27] to take advantage of improved modeling techniques and cancer surveillance coverage. Second, although the models are robust, they can only account for trends through the most recent data year (currently, 2019 for incidence and 2020 for mortality) and thus do not reflect reduced access to cancer care because of the COVID-19 pandemic. Similarly, the models cannot anticipate abrupt fluctuations for cancers affected by changes in detection practice, such as those that occur for prostate cancer because of changes in PSA testing. Third, the model can be oversensitive to sudden or steep changes in observed data. The most informative metrics for tracking cancer trends are age-standardized or age-specific cancer incidence rates from the SEER Program, the NPCR, and/or the NAACCR and cancer death rates from the NCHS.

Errors in reporting race and ethnicity in medical records and on death certificates result in underestimated cancer incidence and mortality in persons who are not White, particularly Native American populations. Although racial misclassification in mortality data among Native Americans is somewhat mitigated because of newly available adjustment factors published by researchers at the NCHS, these are currently only available for all cancers combined.[22] It is also important to note that cancer data in the United States are primarily reported for broad, heterogeneous racial and ethnic groups, masking important differences in the cancer burden within these populations. For example, although lung cancer incidence is approximately 50% lower in AAPI men than in White men overall, it is equivalent in Native Hawaiian men, who are classified within this broad category.[123]

CONCLUSION

The cancer mortality rate has decreased continuously since 1991, resulting in an overall drop of 33% and approximately 3.8 million cancer deaths averted. This steady progress is because of reductions in smoking; uptake of screening for breast, colorectal, and prostate cancers; and improvements in treatment, such as adjuvant chemotherapies for colon and breast cancers. More recently, advances in the development of targeted treatment and immunotherapy have accelerated progress in lung cancer mortality well beyond reductions in incidence and are reflected in large mortality reductions for cancers with increasing or stable incidence (leukemia, melanoma, and kidney cancer). Treatment breakthroughs have particularly improved the management of some difficult-to-treat cancers, such as nonsmall cell lung cancer and metastatic melanoma. Of concern are rising incidence for breast, prostate, and

TABLE 13 Incidence rates, case distribution, and 5-year relative survival by age and International Classification of Childhood Cancer type, ages birth to 19 years, United States[a]

	Birth to 14 years			Aged 15–19 years		
Cancer site	Incidence rate per million[b]	Distribution, %	Survival,[c] %	Incidence rate per million[b]	Distribution, %	Survival,[c] %
All ICCC groups combined (malignant only)	173.4	100	85	242.3	100	86
Leukemias, myeloproliferative & myelodysplastic diseases	53.1	28	88	35.6	13	76
Lymphoid leukemia	40.3	21	92	18.6	7	77
Acute myeloid leukemia	7.8	4	68	9.1	3	68
Lymphomas and reticuloendothelial neoplasms	22.2	12	95	53.0	19	94
Hodgkin lymphoma	5.8	3	99	31.8	11	98
Non-Hodgkin lymphoma (including Burkitt)	10.3	5	91	19.3	7	89
Central nervous system neoplasms	48.6	26	74	59.4	21	75
Benign/borderline malignant tumors	15.2	8	97	37.7	13	98
Neuroblastoma & other peripheral nervous cell tumors	11.6	6	82	1.1	<1	78[d]
Retinoblastoma	4.2	2	97	<0.1	<1	–[e]
Nephroblastoma & other nonepithelial renal tumors	8.2	4	93	0.3	<1	–[e]
Hepatic tumors	3.1	2	79	1.4	<1	46[d]
Hepatoblastoma	2.7	1	82	<0.1	<1	–[e]
Malignant bone tumors	7.8	4	74	14.6	5	69
Osteosarcoma	4.3	2	69	8.0	3	67
Ewing tumor & related bone sarcomas	2.7	1	78	4.6	2	64
Rhabdomyosarcoma	5.2	3	71	3.7	1	54[d]
Germ cell & gonadal tumors	5.7	3	91	27.0	10	94
Thyroid carcinoma	3.6	2	>99	33.8	12	>99
Malignant melanoma	1.8	1	96	8.7	3	96

Abbreviation: ICCC, International Classification of Childhood Cancer.

[a]Benign and borderline brain tumors were excluded from survival rates but included in incidence rates for central nervous system neoplasms and denominators for case distribution.

[b]Incidence rates are based on diagnoses during 2015-2019 and age-adjusted to the US standard population.

[c]Survival rates are adjusted for normal life expectancy and are based on diagnoses during 2012-2018 and follow-up of all patients through 2019.

[d]The standard error of the survival rate is between 5 and 10 percentage points.

[e]The statistic could not be calculated because there were <25 cases during 2012 through 2018.

uterine corpus cancers, all of which have a wide racial disparity in mortality and are amenable to early detection. Expanding access to care and increasing investment for the broad application of existing cancer control interventions and for research to advance treatment options and develop successful interventions to reduce inequalities would help mitigate disparities and accelerate progress against cancer.

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