Cancer Statistics, 2021

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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. Incidence data (through 2017) were collected by the Surveillance, Epidemiology, and End Results Program; the National Program of Cancer Registries; and the North American Association of Central Cancer Registries. Mortality data (through 2018) were collected by the National Center for Health Statistics. In 2021, 1,898,160 new cancer cases and 608,570 cancer deaths are projected to occur in the United States. After increasing for most of the 20th century, the cancer death rate has fallen continuously from its peak in 1991 through 2018, for a total decline of 31%, because of reductions in smoking and improvements in early detection and treatment. This translates to 3.2 million fewer cancer deaths than would have occurred if peak rates had persisted. Long-term declines in mortality for the 4 leading cancers have halted for prostate cancer and slowed for breast and colorectal cancers, but accelerated for lung cancer, which accounted for almost one-half of the total mortality decline from 2014 to 2018. The pace of the annual decline in lung cancer mortality doubled from 3.1% during 2009 through 2013 to 5.5% during 2014 through 2018 in men, from 1.8% to 4.4% in women, and from 2.4% to 5% overall. This trend coincides with steady declines in incidence (2.2%-2.3%) but rapid gains in survival specifically for nonsmall cell lung cancer (NSCLC). For example, NSCLC 2-year relative survival increased from 34% for persons diagnosed during 2009 through 2010 to 42% during 2015 through 2016, including absolute increases of 5% to 6% for every stage of diagnosis; survival for small cell lung cancer remained at 14% to 15%. Improved treatment accelerated progress against lung cancer and drove a record drop in overall cancer mortality, despite slowing momentum for other common cancers. **CA Cancer J Clin 2021;71:7-33. © 2021 American Cancer Society.**

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

Introduction

Cancer is a major public health problem worldwide and is the second leading cause of death in the United States. In 2020, the diagnosis and treatment of cancer was hampered by the coronavirus disease 2019 (COVID-19) pandemic. For example, reduced access to care because of health care setting closures resulted in delays in diagnosis and treatment that may lead to a short-term drop in cancer incidence followed by an uptick in advanced stage disease and ultimately increased mortality. However, this secondary consequence of the pandemic will take several years to quantify because of the lag in dissemination of population-based surveillance data.

In this article, we provide the estimated numbers of new cancer cases and deaths in 2021 in the United States nationally and for each state, as well as a comprehensive overview of cancer occurrence based on the most current population-based data for cancer incidence through 2017 and for mortality through 2018. We also estimate the total number of cancer deaths averted due to the decline in cancer mortality since the early 1990s.

Materials and Methods

Incidence, Survival, and Mortality Data

Population-based cancer incidence data in the United States have been collected by the National Cancer Institute's (NCI's) Surveillance, Epidemiology, and End Results (SEER) program since 1973 and by the Centers for Disease Control and Prevention's (CDC's) National Program of Cancer Registries (NPCR) since 1995. The SEER program is the only source for historic population-based incidence data. Long-term (1975-2017) incidence and survival trends were based on data from the 9 oldest SEER areas (Connecticut, Hawaii, Iowa, New Mexico, Utah, and the metropolitan areas of Atlanta, Detroit, San Francisco-Oakland, and Seattle-Puget Sound), representing approximately 9% of the US population.[1,2] Contemporary stage distribution and survival statistics were based on data from the 18 SEER registries (SEER 9 plus the Alaska Native Tumor Registry, California, Georgia, Kentucky, Louisiana, and New Jersey).[3] Contemporary incidence trends were based on all 21 SEER registries (SEER 18 plus Idaho, Massachusetts, and New York)[4] unless otherwise specified, as was the probability of developing cancer, which was calculated using the NCI's DevCan software, version 6.7.8.[5] Some of the statistical information presented herein was adapted from data previously published in the *SEER Cancer Statistics Review 1975-2017*.[6]

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. 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 2021 and cross-sectional incidence rates by state and race/ethnicity.[7,8] Some of the incidence data presented herein were previously published in volumes 1 and 2 of *Cancer in North America: 2013-2017*.[9,10]

Mortality data from 1930 to 2018 were provided by the National Center for Health Statistics (NCHS).[11,12] 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.[12,13] Mortality rates (2013-2017) for Puerto Rico were previously published in volume 3 of the NAACCR's *Cancer in North America: 2013-2017*.[14]

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.[15,16] Causes of death were classified according to the *International Classification of Diseases*.[17] All incidence and death rates were age-standardized to the 2000 US standard population and expressed per 100,000 persons, as calculated using the NCI's SEER*Stat software, version 8.3.7.[18] The annual percent change in rates was quantified using the NCI's Joinpoint Regression Program (version 4.8.0.1).[19] All tests of statistical significance were 2-sided, and a P value $<.05$ was considered statistically significant.

Whenever possible, cancer incidence rates were adjusted for delays in reporting, which occur because of a lag in case capture or data corrections. Delay adjustment has the largest effect on the most recent data years for cancers that are frequently diagnosed in outpatient settings (eg, melanoma, leukemia, and prostate cancer) and provides the most accurate portrayal of cancer occurrence in the most recent time period.[20] For example, the leukemia incidence rate for 2017 in the 9 oldest SEER registries was 10% higher after adjusting for reporting delays (15.3 vs 13.9 per 100,000).[6]

Projected Cancer Cases and Deaths in 2021

The most recent year for which incidence and mortality data are available lags 2 to 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 2021 to provide an estimate of the contemporary cancer burden. The methodology for calculating contemporary cases and deaths was revised for 2021 to take advantage of advances in statistical modeling and improved cancer registration coverage. Basal cell and squamous cell skin cancers cannot be estimated because incidence data are not collected by most cancer registries. The 2021 projections are based on currently available incidence and mortality data and thus do not reflect the impact of COVID-19 on cancer cases and deaths.

The first step in calculating the number of invasive cancer cases expected in 2021 was to estimate complete counts in every state from 2003 through 2017 using delay-adjusted, high-quality NAACCR incidence data from 50 states and the District of Columbia (98% population coverage; data were unavailable for a few sporadic years for a limited number of states). A generalized linear mixed model (Liu et al., unpublished data) was used that accounted for geographic variations in sociodemographic and lifestyle factors, medical settings, and cancer screening behaviors.[21] Modeled state- and national-level counts were projected forward using a novel, data-driven joinpoint algorithm to estimate cases for 2021 (Miller et al., unpublished data).

New cases of ductal carcinoma in situ (DCIS) of the female breast and in situ melanoma of the skin diagnosed in 2021 were estimated by first approximating the number of cases occurring annually from 2008 through 2017 based on age-specific NAACCR incidence rates (data from 49 states with high-quality data available for all 10 years) and US Census Bureau population estimates obtained using SEER*Stat.[7,22] Counts were then adjusted for delays in reporting using SEER 21 delay factors for invasive disease (delay factors are unavailable for in situ cases) and projected to 2021 based on the average annual percent change generated by the joinpoint regression model.[4]

The number of cancer deaths expected to occur in 2021 was estimated by applying the data-driven joinpoint algorithm described for the invasive cases methodology to reported cancer deaths from 2004 through 2018 at the state and national levels as reported to the NCHS (Miller et al., unpublished data).

Other Statistics

The number of cancer deaths averted in men and women due to the reduction in cancer death rates since the early 1990s was estimated by summing the difference between the annual number of recorded cancer deaths from the number that would have been expected if cancer death rates had remained at their peak. The expected number of deaths was estimated by applying the 5-year age-specific 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 2018.

Selected Findings

Expected Numbers of New Cancer Cases and the Probability of Cancer

Table 1 presents the estimated numbers of new invasive cancer cases in the United States in 2021 by sex and cancer type. In total, there will be approximately 1,898,160 cancer cases diagnosed, the equivalent of 5200 new cases each day. In addition, there will be about 49,290 new cases of DCIS diagnosed in women and 101,280 new cases of melanoma in situ of the skin. The estimated numbers of new cases by state are shown in Table 2.

Figure 1 depicts the most common cancers diagnosed in men and women in 2021. Prostate, lung and bronchus (lung hereafter), and colorectal cancers (CRCs) account for 46% of all incident cases in men, with prostate cancer alone accounting for 26% of diagnoses. For women, breast cancer, lung, and CRCs account for 50% of all new diagnoses, with breast cancer alone accounting for 30% of female cancers.

The probability of being diagnosed with invasive cancer is slightly higher for men (40.5%) than for women (38.9%) (Table 3), reflecting differences in life expectancy as well as cancer risk.[23] The sex disparity in overall cancer incidence has narrowed over time, with the male-to-female incidence rate ratio (IRR) dropping from 1.39 (95% CI, 1.38-1.40) in 1995 to 1.14 (95% CI, 1.13-1.14) in 2017 This is because incidence rates declined during this time period by 2% overall among women versus 20% among men, largely driven by differences in lung cancer trends. (See section on incidence trends for more information.)

However, these overall sex differences mask variation in risk in both direction and size among younger age groups. For example, during childhood (ages 0-14 years), incidence is about 10% higher in boys than in girls (IRR, 1.11; 95% CI, 1.09-1.13),[24] whereas, during early adulthood (ages 20-49 years), it is 44% lower in men (IRR, 0.56; 95% CI, 0.558-0.563), largely because of breast cancer occurrence in young women.[25] Reasons for sex differences are not fully understood but probably largely reflect differences in exposure to environmental risk factors and endogenous hormones, as well as complex interactions between these influences. Sex differences in immune function and response may also play a role.[26]

Expected Number of Cancer Deaths

An estimated 608,570 Americans will die from cancer in 2021, corresponding to more than 1600 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 (Fig. 1). Table 4 provides estimated number of deaths for these and other common cancers by state.

Almost one-quarter of all cancer deaths are due to lung cancer, 82% of which is directly caused by cigarette smoking.[27] This translates to approximately 107,870 smoking-attributable lung cancer deaths in 2021, with an additional 3590 due to second-hand smoke exposure, leaving a residual 20,420 lung cancer deaths. Thus nonsmoking-related lung cancer accounts for a substantial burden, ranking among the top 10 causes of cancer death among sexes combined.

Women have a larger fraction of nonsmoking-related lung cancer than men,[27] despite an equivalent relative risk associated with smoking,[28] because they have not smoked to the same extent as men. Similarly, the proportion of nonsmoking-related lung cancer is slowly increasing in both sexes because of continuous declines in smoking prevalence.[29] (Temporal trends in the incidence of nonsmoking-related lung cancer are unknown because data on smoking status have only recently begun to be collected by cancer registries.) Nevertheless, even among recently diagnosed lung cancer patients (2011-2016), 84% of women and 90% of men had ever smoked, including 72% and 81%, respectively, of those aged 20 to 49 years.[30] Smoking continues to be the leading preventable cause of death in the United States, costing more than $300 billion annually. As a result, CDC has redoubled efforts to increase cessation, including publication of a new Surgeon General's report this year.[31,32]

TABLE 1. Estimated New Cancer Cases and Deaths by Sex, United States, 2021[a]

	ESTIMATED NEW CASES			ESTIMATED DEATHS		
	BOTH SEXES	MALE	FEMALE	BOTH SEXES	MALE	FEMALE
All Sites	**1,898,160**	**970,250**	**927,910**	**608,570**	**319,420**	**289,150**
Oral cavity & pharynx	**54,010**	**38,800**	**15,210**	**10,850**	**7,620**	**3,230**
Tongue	17,960	13,040	4,920	2,870	1,930	940
Mouth	14,290	8,400	5,890	2,650	1,520	1,130
Pharynx	18,470	14,990	3,480	3,870	3,060	810
Other oral cavity	3,290	2,370	920	1,460	1,110	350
Digestive system	**338,090**	**191,090**	**147,000**	**169,280**	**98,140**	**71,140**
Esophagus	19,260	15,310	3,950	15,530	12,410	3,120
Stomach	26,560	16,160	10,400	11,180	6,740	4,440
Small intestine	11,390	6,130	5,260	2,100	1,110	990
Colon[b]	104,270	52,590	51,680	52,980	28,520	24,460
Rectum	45,230	26,930	18,300			
Anus, anal canal, & anorectum	9,090	3,020	6,070	1,430	560	870
Liver & intrahepatic bile duct	42,230	29,890	12,340	30,230	20,300	9,930
Gallbladder & other biliary	11,980	5,730	6,250	4,310	1,770	2,540
Pancreas	60,430	31,950	28,480	48,220	25,270	22,950
Other digestive organs	7,650	3,380	4,270	3,300	1,460	1,840
Respiratory system	**254,170**	**132,910**	**121,260**	**137,040**	**73,340**	**63,700**
Larynx	12,620	9,940	2,680	3,770	3,020	750
Lung & bronchus	235,760	119,100	116,660	131,880	69,410	62,470
Other respiratory organs	5,790	3,870	1,920	1,390	910	480
Bones & joints	**3,610**	**2,100**	**1,510**	**2,060**	**1,190**	**870**
Soft tissue (including heart)	**13,460**	**7,720**	**5,740**	**5,350**	**2,840**	**2,510**
Skin (excluding basal & squamous)	**115,320**	**68,120**	**47,200**	**11,540**	**7,660**	**3,880**
Melanoma of the skin	106,110	62,260	43,850	7,180	4,600	2,580
Other nonepithelial skin	9,210	5,860	3,350	4,360	3,060	1,300
Breast	**284,200**	**2,650**	**281,550**	**44,130**	**530**	**43,600**
Genital system	**376,970**	**260,210**	**116,760**	**69,110**	**35,030**	**34,080**
Uterine cervix	14,480		14,480	4,290		4,290
Uterine corpus	66,570		66,570	12,940		12,940
Ovary	21,410		21,410	13,770		13,770
Vulva	6,120		6,120	1,550		1,550
Vagina & other genital, female	8,180		8,180	1,530		1,530
Prostate	248,530	248,530		34,130	34,130	
Testis	9,470	9,470		440	440	
Penis & other genital, male	2,210	2,210		460	460	
Urinary system	**164,000**	**115,750**	**48,250**	**31,940**	**21,640**	**10,300**
Urinary bladder	83,730	64,280	19,450	17,200	12,260	4,940
Kidney & renal pelvis	76,080	48,780	27,300	13,780	8,790	4,990
Ureter & other urinary organs	4,190	2,690	1,500	960	590	370
Eye & orbit	**3,320**	**1,750**	**1,570**	**400**	**220**	**180**
Brain & other nervous system	**24,530**	**13,840**	**10,690**	**18,600**	**10,500**	**8,100**
Endocrine system	**47,200**	**13,730**	**33,470**	**3,290**	**1,620**	**1,670**
Thyroid	44,280	12,150	32,130	2,200	1,050	1,150
Other endocrine	2,920	1,580	1,340	1,090	570	520
Lymphoma	**90,390**	**50,460**	**39,930**	**21,680**	**12,740**	**8,940**
Hodgkin lymphoma	8,830	4,830	4,000	960	570	390
Non-Hodgkin lymphoma	81,560	45,630	35,930	20,720	12,170	8,550
Myeloma	**34,920**	**19,320**	**15,600**	**12,410**	**6,840**	**5,570**
Leukemia	**61,090**	**35,530**	**25,560**	**23,660**	**13,900**	**9,760**
Acute lymphocytic leukemia	5,690	3,000	2,690	1,580	900	680
Chronic lymphocytic leukemia	21,250	13,040	8,210	4,320	2,620	1,700
Acute myeloid leukemia	20,240	11,230	9,010	11,400	6,620	4,780
Chronic myeloid leukemia	9,110	5,150	3,960	1,220	680	540
Other leukemia[c]	4,800	3,110	1,690	5,140	3,080	2,060
Other & unspecified primary sites[c]	**32,880**	**16,270**	**16,610**	**47,230**	**25,610**	**21,620**

NOTE: These are model-based estimates that should be interpreted with caution and not compared with those for previous years.
[a]Rounded to the nearest 10; cases exclude basal cell and squamous cell skin cancer and in situ carcinoma except urinary bladder. Approximately 49,290 cases of female breast ductal carcinoma in situ and 101,280 cases of melanoma in situ will be diagnosed in 2021.
[b]Deaths for colon and rectal cancers are combined because a large number of deaths from rectal cancer are misclassified as colon.
[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.

TABLE 2. Estimated New Cases for Selected Cancers by State, 2021[a]

STATE	ALL CASES	FEMALE BREAST	UTERINE CERVIX	COLON & RECTUM	UTERINE CORPUS	LEUKEMIA	LUNG & BRONCHUS	MELANOMA OF THE SKIN	NON-HODGKIN LYMPHOMA	PROSTATE	URINARY BLADDER
Alabama	30,830	4,460	250	2,470	820	870	4,520	1,590	1,080	4,020	1,300
Alaska	3,190	520	[b]	330	100	100	370	110	110	440	160
Arizona	39,640	5,850	300	3,060	1,290	1,110	4,550	2,900	1,690	4,680	1,910
Arkansas	17,980	2,370	160	1,500	540	520	2,970	930	680	2,470	780
California	187,140	30,730	1,720	15,880	7,470	5,830	17,760	11,450	8,510	25,880	7,730
Colorado	28,630	4,580	200	2,140	930	870	2,570	2,240	1,090	3,920	1,230
Connecticut	22,910	3,540	120	1,560	860	650	2,750	1,300	1,010	3,160	1,180
Delaware	7,090	990	[b]	490	250	200	910	430	290	900	320
Dist. of Columbia	3,450	630	[b]	270	140	80	360	120	110	550	110
Florida	148,010	20,160	1,260	11,220	4,870	6,660	18,470	9,680	8,440	19,950	6,870
Georgia	58,060	8,770	490	4,840	1,820	1,840	7,250	3,800	2,100	8,550	2,150
Hawaii	7,570	1,390	60	710	360	200	930	460	330	880	300
Idaho	10,240	1,410	70	740	330	350	1,060	860	450	1,260	500
Illinois	74,980	11,190	560	6,200	2,710	2,120	9,600	4,030	3,010	10,250	3,320
Indiana	39,010	5,460	290	3,310	1,300	1,150	5,960	2,310	1,570	4,260	1,830
Iowa	20,000	2,710	120	1,570	700	740	2,610	1,290	890	2,530	880
Kansas	16,980	2,380	100	1,440	530	570	2,160	940	690	2,420	710
Kentucky	30,270	3,820	200	2,540	910	870	4,970	1,740	1,130	3,710	1,270
Louisiana	27,880	4,020	240	2,440	720	850	3,910	1,130	1,110	3,990	1,120
Maine	10,090	1,430	50	700	380	330	1,530	650	430	1,110	600
Maryland	34,590	5,470	220	2,550	1,260	980	4,230	1,870	1,360	5,020	1,320
Massachusetts	42,750	6,650	210	2,940	1,500	1,000	5,550	2,530	1,730	5,290	2,080
Michigan	62,150	8,700	380	4,690	2,240	1,800	8,590	3,440	2,620	8,940	3,010
Minnesota	33,260	4,850	160	2,490	1,210	1,380	3,970	1,850	1,520	4,020	1,520
Mississippi	18,750	2,550	160	1,670	500	510	2,870	750	630	2,380	700
Missouri	37,390	5,490	250	2,930	1,280	1,180	5,570	1,840	1,500	4,280	1,640
Montana	6,930	950	†	500	210	240	810	510	310	750	340
Nebraska	11,180	1,560	80	950	360	390	1,350	670	460	1,420	510
Nevada	16,970	2,490	160	1,400	480	530	2,080	1,000	740	2,090	790
New Hampshire	9,560	1,340	50	670	380	270	1,240	770	410	1,180	560
New Jersey	56,360	8,330	420	4,250	2,260	1,840	5,900	2,570	2,460	8,120	2,620
New Mexico	10,970	1,640	90	860	410	350	960	680	460	1,350	430
New York	120,200	17,540	920	8,920	4,810	4,110	13,950	4,290	5,480	15,840	5,610
North Carolina	63,930	9,850	430	4,650	2,110	2,050	8,830	4,250	2,480	8,970	2,650
North Dakota	4,200	570	†	350	140	170	490	250	190	560	200
Ohio	73,320	10,450	500	5,860	2,750	1,930	10,350	4,610	2,890	9,010	3,330
Oklahoma	22,820	3,230	200	1,900	660	760	3,300	1,110	900	2,710	920
Oregon	24,790	3,870	160	1,810	930	720	2,990	1,710	1,070	3,130	1,270
Pennsylvania	85,440	12,140	560	6,670	3,290	2,690	11,170	3,690	3,840	11,160	4,260
Rhode Island	6,910	1,000	50	490	250	210	950	410	310	920	370
South Carolina	33,030	4,990	240	2,570	1,060	1,010	4,510	1,970	1,260	4,860	1,340
South Dakota	5,330	740	[b]	450	170	190	650	310	230	750	240
Tennessee	41,980	5,850	350	3,370	1,250	1,180	6,410	1,830	1,560	5,430	1,720
Texas	133,730	20,900	1,470	11,280	4,590	4,820	15,010	4,600	5,780	14,200	4,780
Utah	12,750	1,850	80	900	480	400	770	1,610	510	1,980	480
Vermont	4,310	610	[b]	310	170	110	570	380	190	430	230
Virginia	46,340	7,450	310	3,600	1,500	1,310	5,820	2,530	1,840	6,540	1,940
Washington	42,170	6,810	310	3,140	1,320	1,290	4,780	2,730	1,870	5,370	2,000
West Virginia	12,500	1,610	80	1,090	440	410	2,020	720	530	1,430	660
Wisconsin	36,520	5,210	210	2,620	1,390	1,240	4,540	2,410	1,560	4,930	1,810
Wyoming	3,050	440	[b]	230	100	90	320	250	130	490	150
United States	**1,898,160**	**281,550**	**14,480**	**149,500**	**66,570**	**61,090**	**235,760**	**106,110**	**81,560**	**248,530**	**83,730**

Note: These are model-based estimates that should be interpreted with caution. State estimates may not sum to US total due to 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 not available.

[b]Estimate is fewer than 50 cases.

Estimated New Cases

Males			Females		
Prostate	248,530	26%	Breast	281,550	30%
Lung & bronchus	119,100	12%	Lung & bronchus	116,660	13%
Colon & rectum	79,520	8%	Colon & rectum	69,980	8%
Urinary bladder	64,280	7%	Uterine corpus	66,570	7%
Melanoma of the skin	62,260	6%	Melanoma of the skin	43,850	5%
Kidney & renal pelvis	48,780	5%	Non-Hodgkin lymphoma	35,930	4%
Non-Hodgkin lymphoma	45,630	5%	Thyroid	32,130	3%
Oral cavity & pharynx	38,800	4%	Pancreas	28,480	3%
Leukemia	35,530	4%	Kidney & renal pelvis	27,300	3%
Pancreas	31,950	3%	Leukemia	25,560	3%
All Sites	**970,250**	**100%**	**All Sites**	**927,910**	**100%**

Estimated Deaths

Males			Females		
Lung & bronchus	69,410	22%	Lung & bronchus	62,470	22%
Prostate	34,130	11%	Breast	43,600	15%
Colon & rectum	28,520	9%	Colon & rectum	24,460	8%
Pancreas	25,270	8%	Pancreas	22,950	8%
Liver & intrahepatic bile duct	20,300	6%	Ovary	22,950	5%
Leukemia	13,900	4%	Uterine corpus	12,940	4%
Esophagus	12,410	4%	Liver & intrahepatic bile duct	9,930	3%
Urinary bladder	12,260	4%	Leukemia	9,760	3%
Non-Hodgkin lymphoma	12,170	4%	Non-Hodgkin lymphoma	8,550	3%
Brain & other nervous system	10,500	3%	Brain & other nervous system	8,100	3%
All Sites	**319,420**	**100%**	**All Sites**	**289,150**	**100%**

FIGURE 1. Ten Leading Cancer Types for the Estimated New Cancer Cases and Deaths by Sex, United States, 2021. 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.

Smokers who quit by age 40 years reduce their risk of death from smoking-related disease by about 90% compared with continued smoking.[33]

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 rapid changes in prostate cancer incidence rates due to a surge in detection of asymptomatic disease as a result of widespread prostate-specific antigen (PSA) testing among previously unscreened men.[34]

The overall cancer incidence rate in men generally decreased from the early 1990s until around 2013 but has since remained stable (through 2017), reflecting slowing declines for CRC and a halt in the decline for prostate cancer (Fig. 3). The sharp drop in prostate cancer incidence rates from 2007 to 2014 is attributed to decreased PSA testing in the wake of US Preventive Services Task Force recommendations against routine use of the test to screen for prostate cancer (grade D) because of growing concerns about overdiagnosis and overtreatment.[35,36] However, this decision was largely based on clinical trial data that have been criticized for widespread screening among control subjects and insufficient follow-up time.[37] Since around 2010, there has been an increase in distant-stage prostate cancer diagnoses across age and race,[38-40] and, in 2017 the US Preventive Services Task Force upgraded their recommendation for men aged 55 to 69 years to informed decision making (grade C).[41-43] There is some evidence that the long-term benefit of screening is underappreciated, particularly given recent advances in mitigating over detection through more stringent diagnostic criteria and reducing overtreatment via active surveillance for low-risk disease.[37,44,45]

TABLE 3. Probability (%) of Developing Invasive Cancer Within Selected Age Intervals by Sex, United States, 2015 to 2017[a]

	BIRTH TO 49	50 TO 59	60 TO 69	70 AND OLDER	BIRTH TO DEATH
All sites[b]					
Male	3.5 (1 in 29)	6.2 (1 in 16)	13.6 (1 in 7)	33.2 (1 in 3)	40.5 (1 in 2)
Female	5.8 (1 in 17)	6.4 (1 in 16)	10.3 (1 in 10)	26.8 (1 in 4)	38.9 (1 in 3)
Breast					
Female	2.1 (1 in 49)	2.4 (1 in 42)	3.5 (1 in 28)	7.0 (1 in 14)	12.9 (1 in 8)
Colorectum					
Male	0.4 (1 in 254)	0.7 (1 in 143)	1.1 (1 in 92)	3.2 (1 in 32)	4.3 (1 in 23)
Female	0.4 (1 in 266)	0.5 (1 in 191)	0.8 (1 in 128)	2.9 (1 in 34)	4.0 (1 in 25)
Kidney & renal pelvis					
Male	0.2 (1 in 410)	0.4 (1 in 263)	0.7 (1 in 151)	1.4 (1 in 73)	2.2 (1 in 46)
Female	0.2 (1 in 647)	0.2 (1 in 541)	0.3 (1 in 310)	0.8 (1 in 133)	1.3 (1 in 80)
Leukemia					
Male	0.3 (1 in 391)	0.2 (1 in 549)	0.4 (1 in 255)	1.4 (1 in 69)	1.8 (1 in 55)
Female	0.2 (1 in 500)	0.1 (1 in 834)	0.2 (1 in 427)	0.9 (1 in 110)	1.3 (1 in 78)
Lung & bronchus					
Male	0.1 (1 in 776)	0.6 (1 in 163)	1.7 (1 in 58)	5.9 (1 in 17)	6.6 (1 in 15)
Female	0.1 (1 in 679)	0.6 (1 in 172)	1.4 (1 in 70)	4.9 (1 in 21)	6.0 (1 in 17)
Melanoma of the skin[c]					
Male	0.4 (1 in 230)	0.5 (1 in 198)	0.9 (1 in 109)	2.7 (1 in 37)	3.7 (1 in 27)
Female	0.6 (1 in 156)	0.4 (1 in 241)	0.5 (1 in 187)	1.2 (1 in 86)	2.5 (1 in 40)
Non-Hodgkin lymphoma					
Male	0.3 (1 in 375)	0.3 (1 in 345)	0.6 (1 in 177)	1.9 (1 in 54)	2.4 (1 in 42)
Female	0.2 (1 in 523)	0.2 (1 in 463)	0.4 (1 in 242)	1.4 (1 in 73)	1.9 (1 in 52)
Prostate					
Male	0.2 (1 in 451)	1.8 (1 in 55)	5.0 (1 in 20)	8.7 (1 in 12)	12.1 (1 in 8)
Thyroid					
Male	0.2 (1 in 447)	0.1 (1 in 703)	0.2 (1 in 571)	0.2 (1 in 412)	0.7 (1 in 146)
Female	0.9 (1 in 114)	0.4 (1 in 258)	0.4 (1 in 283)	0.4 (1 in 263)	1.9 (1 in 53)
Uterine cervix					
Female	0.3 (1 in 362)	0.1 (1 in 837)	0.1 (1 in 916)	0.2 (1 in 590)	0.6 (1 in 158)
Uterine corpus					
Female	0.3 (1 in 322)	0.6 (1 in 157)	1.1 (1 in 94)	1.5 (1 in 67)	3.1 (1 in 32)

[a]For people free of cancer at beginning of age interval.
[b]All sites excludes basal cell and squamous cell skin cancers and in situ cancers except urinary bladder.
[c]Probabilities for non-Hispanic Whites only.

Overall cancer incidence in women has ticked up slightly in recent years after stable rates over the past couple of decades.[46] This partly reflects a slowing decline for CRC coupled with increasing rates for breast and uterine corpus cancers (Fig. 3). Breast cancer incidence rates continue to increase by about 0.5% per year, which is attributed at least in part to continued declines in the fertility rate and increased body weight.[47] These factors may also contribute to the continued increase in uterine corpus cancer incidence of about 1% per year,[48] although a recent study indicated that this trend is driven by nonendometrioid subtypes, which are not as strongly associated with obesity as endometrioid carcinoma.[49] Thyroid cancer incidence has begun to decline in women (although not yet in men) after the implementation of more conservative diagnostic practices in response to the sharp uptick in largely indolent tumors in recent decades.[50,51]

Lung cancer incidence continues to decline twice as fast in men as in women, reflecting historical differences in tobacco uptake and cessation as well as upturns in female smoking prevalence in some birth cohorts.[52,53] However, smoking patterns do not appear to fully explain higher lung cancer incidence in women than in men among individuals born since circa 1960.[54] In contrast, CRC incidence patterns

TABLE 4. Estimated Deaths for Selected Cancers by State, 2021[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	10,590	310	720	920	350	470	2,860	270	220	820	480
Alaska	940	[b]	60	110	[b]	[b]	180	[b]	[b]	60	50
Arizona	12,510	410	900	1,240	490	590	2,580	420	310	1,060	780
Arkansas	6,250	140	400	500	210	280	1,810	200	130	450	270
California	61,860	1,990	4,730	5,390	2,300	3,780	9,900	2,190	1,640	4,940	4,140
Colorado	8,420	300	690	700	300	420	1,290	270	180	660	560
Connecticut	6,400	210	420	440	250	320	1,350	230	160	550	390
Delaware	2,170	60	160	160	90	120	540	80	50	190	90
Dist. of Columbia	1,020	70	100	90	[b]	50	140	[b]	[b]	100	70
Florida	47,170	1,370	3,120	4,360	1,930	2,080	10,940	1,590	1,020	3,700	2,850
Georgia	17,760	570	1,410	1,700	640	890	4,200	550	410	1,380	1,030
Hawaii	2,430	60	170	230	90	180	540	90	[b]	230	180
Idaho	3,230	110	250	330	140	140	620	120	80	250	200
Illinois	23,070	680	1,750	2,100	890	1,090	4,990	770	550	2,110	1,210
Indiana	13,460	380	910	1,160	510	610	3,520	450	290	1,030	760
Iowa	6,510	190	390	550	260	240	1,460	240	140	450	440
Kansas	5,620	180	370	500	250	270	1,360	190	140	420	270
Kentucky	10,090	300	630	930	390	400	2,660	330	180	730	440
Louisiana	9,380	240	670	860	330	610	2,360	290	240	660	490
Maine	3,390	110	190	230	120	130	840	120	70	250	160
Maryland	11,010	310	860	1,050	430	540	2,440	350	250	840	640
Massachusetts	12,540	430	780	1,000	500	640	2,770	490	310	1,070	690
Michigan	21,260	600	1,420	1,640	800	940	5,040	750	380	1,750	980
Minnesota	10,220	350	640	850	470	480	1,950	400	210	820	560
Mississippi	6,580	190	450	650	270	370	1,740	170	120	530	340
Missouri	12,960	340	850	1,070	510	680	3,250	410	250	960	630
Montana	2,150	70	140	180	80	110	480	70	50	160	170
Nebraska	3,560	120	240	320	160	100	680	120	80	290	270
Nevada	5,410	170	400	560	210	270	1,080	180	130	420	300
New Hampshire	2,840	90	170	290	80	120	730	90	100	200	150
New Jersey	15,870	520	1,250	1,410	640	760	3,050	570	360	1,360	760
New Mexico	3,820	110	290	350	130	280	560	130	110	280	220
New York	33,920	990	2,510	2,820	1,410	1,330	6,860	1,220	870	2,920	1,880
North Carolina	20,150	590	1,470	1,590	760	950	4,790	630	410	1,560	970
North Dakota	1,310	[b]	80	110	60	60	300	50	[b]	100	70
Ohio	25,140	720	1,720	2,110	960	1,130	6,180	870	390	2,000	1,450
Oklahoma	8,610	240	600	770	310	440	2,030	270	190	590	400
Oregon	8,430	270	570	650	320	460	1,690	310	240	690	520
Pennsylvania	27,960	830	1,970	2,340	1,100	1,140	6,140	980	620	2,300	1,510
Rhode Island	2,140	70	120	160	120	120	430	70	[b]	180	100
South Carolina	10,940	360	780	880	410	580	2,550	320	180	860	620
South Dakota	1,710	60	110	170	60	70	410	60	80	130	80
Tennessee	14,050	390	1,070	1,220	540	690	3,390	480	340	1,040	710
Texas	42,840	1,330	3,420	4,030	1,710	2,800	8,300	1,420	940	3,220	2,180
Utah	3,470	150	300	290	170	160	460	150	100	280	240
Vermont	1,470	60	80	130	50	50	340	50	[b]	110	70
Virginia	15,550	480	1,240	1,400	580	710	3,520	580	360	1,220	940
Washington	13,130	470	940	1,020	510	780	2,690	470	330	1,030	850
West Virginia	4,580	120	290	430	190	210	1,190	160	90	310	180
Wisconsin	11,700	360	750	900	490	490	2,490	400	260	870	730
Wyoming	990	50	70	80	[b]	60	210	[b]	[b]	80	50
United States	**608,570**	**18,600**	**43,600**	**52,980**	**23,660**	**30,230**	**131,880**	**20,720**	**13,770**	**48,220**	**34,130**

Note: These are model-based estimates that should be interpreted with caution. State estimates may not sum to US total due to rounding and exclusion of states with fewer than 50 deaths.
[a]Rounded to the nearest 10. Estimates for Puerto Rico are not available.
[b]Estimate is fewer than 50 deaths.

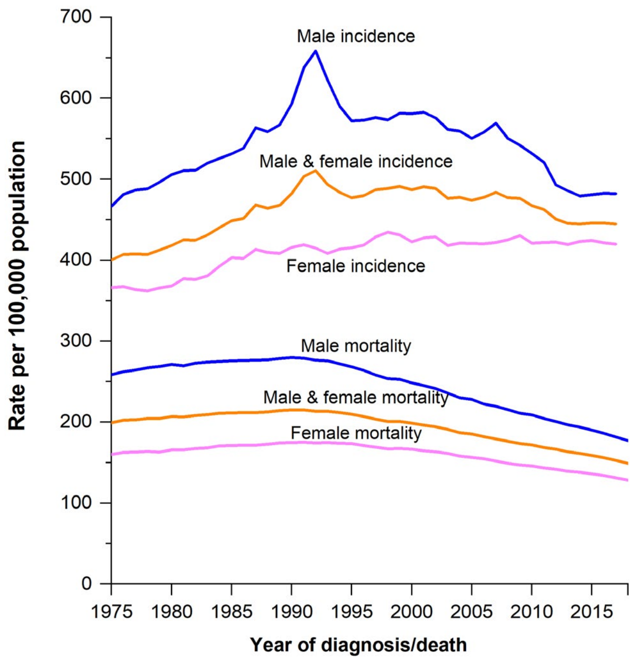

FIGURE 2. Trends in Cancer Incidence (1975-2017) and Mortality (1975-2018) Rates by Sex, United States. Rates are age adjusted to the 2000 US standard population. Incidence rates are also adjusted for delays in reporting.

are generally similar in men and women, with both experiencing rapid declines during the 2000s in the wake of widespread colonoscopy uptake that have slowed in recent years (Fig. 3). Importantly, declines in overall CRC incidence mask increasing rates among adults aged <65 years.[55]

Incidence continues to increase in both men and women for cancers of the kidney, pancreas, and oral cavity and pharynx (non-Hispanic Whites [NHWs]) and melanoma of the skin, although melanoma has begun to decline in recent birth cohorts.[25,56] Liver cancer incidence has stabilized in men after decades of steep increase but continues to rise in women by >2% annually. The majority (71%) of these cases are potentially preventable because most liver cancer risk factors are modifiable (eg, obesity, excess alcohol consumption, cigarette smoking, and hepatitis B virus and hepatitis C virus [HCV]).[27] Chronic HCV infection, the most common chronic blood-borne infection in the United States, confers the largest relative risk and accounts for 1 in 4 liver cancer cases.[57] Although well tolerated antiviral therapies achieve >90% cure rates and could potentially avert much of the future burden of HCV-associated disease,[58] most infected individuals are undiagnosed and thus untreated. Compounding the challenge is a greater than 3-fold spike in acute HCV infections reported to the CDC between 2010 and 2017 as a consequence of the opioid epidemic, 75% to 85% of which will progress to chronic infection.[59] In a renewed attempt to mitigate the rising HCV-associated disease burden, the CDC and the US Preventive Services Task Force issued new recommendations in 2020 for one-time HCV testing of all adults aged ≥18 years.[60-62]

Cancer Survival

The 5-year relative survival rate for all cancers combined diagnosed during 2010 through 2016 was 67% overall, 68% in White individuals, and 63% in Black individuals.[6] Figure 4 shows 5-year relative survival rates for selected cancer types by stage at diagnosis and race. For all stages combined, survival is highest for prostate cancer (98%), melanoma of the skin (93%), and female breast cancer (90%) and lowest for cancers of the pancreas (10%), liver (20%), esophagus (20%), and lung (21%). Survival rates are lower for Black patients than for Whites for every cancer type illustrated in Figure 4 except pancreas and kidney, for which they are the same. For kidney cancer, however, these overall statistics are misleading because they reflect the higher proportion in Black patients of papillary and chromophobe renal cell carcinomas (RCCs), which have a better prognosis than clear cell RCC, which is more common among Whites; indeed, Black patients have lower survival for every RCC subtype.[63] The largest Black-White survival differences in absolute terms are for melanoma (25%) and cancers of the uterine corpus (21%), oral cavity and pharynx (18%), and urinary bladder (13%). Although these disparities partly reflect later stage diagnosis in patients who are Black (Fig. 5), Black individuals also have lower stage-specific survival for most cancer types (Fig. 4). After adjusting for sex, age, and stage at diagnosis, the relative risk of death is 33% higher in Black than in White patients with cancer.[64] The disparity is even larger for American Indian/Alaska Native patients, among whom the risk of cancer death is 51% higher than in White patients.

Cancer survival has improved since the mid-1970s for all of the most common cancers except uterine cervix and uterine corpus,[64] largely reflecting the absence of major treatment advances for these cancers.[65,66] For cervical cancer, it may also reflect an increasing proportion of adenocarcinoma over time because of widespread cytology screening, which mostly detects squamous precancerous lesions and invasive squamous cell carcinomas.[67] Screening also hinders the utility of tracking trends in survival to measure progress against breast and prostate cancers because of lead-time bias and the detection of indolent cancers.[68] Gains in survival have been especially rapid for hematopoietic and lymphoid malignancies due to improvements in treatment protocols, including the development of targeted therapies. For example, the 5-year relative survival rate for chronic myeloid leukemia increased from 22% in the mid-1970s to 72% for those diagnosed during 2010 through 2016,[6] and most patients treated

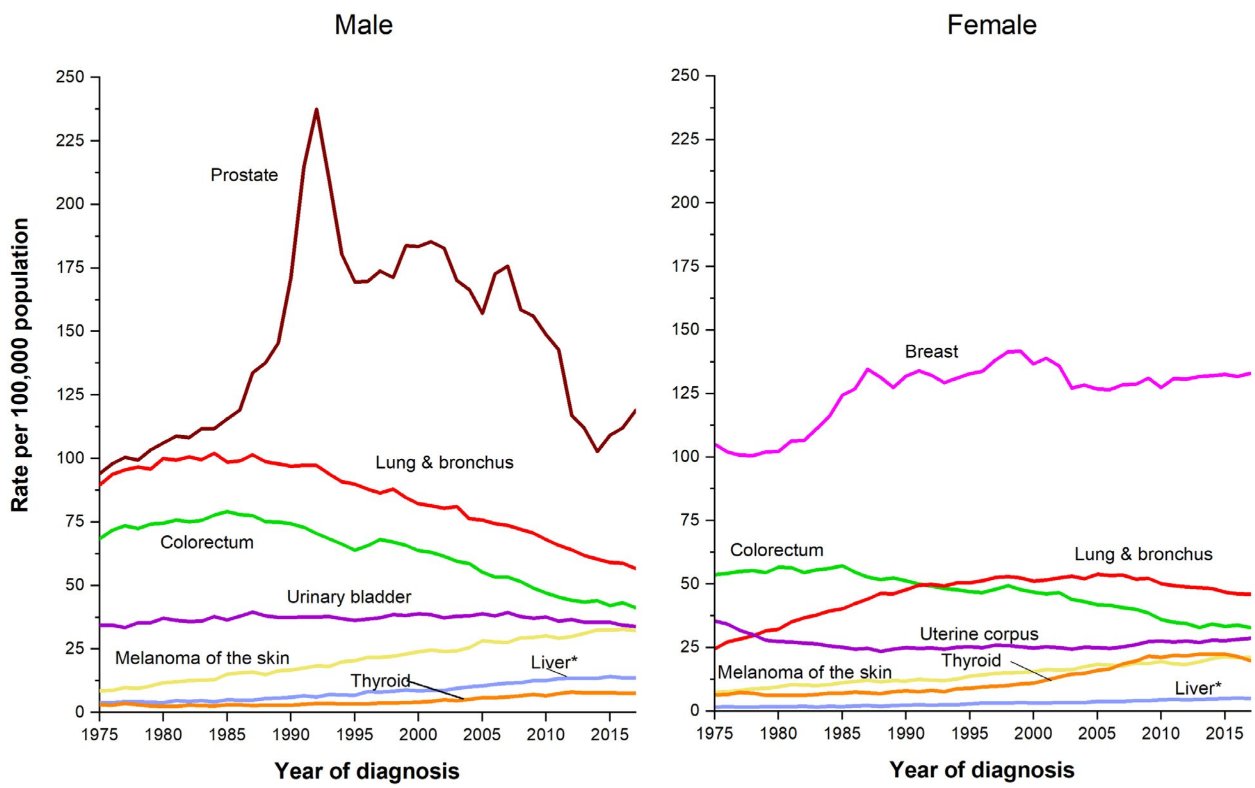

FIGURE 3. Trends in Incidence Rates for Selected Cancers by Sex, United States, 1975 to 2017. Rates are age adjusted to the 2000 US standard population and adjusted for delays in reporting. *Liver includes the intrahepatic bile duct.

with tyrosine kinase inhibitors experience near-normal life expectancy.[69]

Low lung cancer survival rates reflect the large proportion of patients (57%) diagnosed with metastatic disease (Fig. 5), for which the 5-year relative survival rate is 6% (Fig. 4). However, the 5-year survival for localized stage disease is 59%, and there is potential for earlier diagnoses through annual screening with low-dose computed tomography, which demonstrated a 20% reduction in lung cancer mortality in ≥30 pack-year current and former smokers compared with chest radiography in the National Lung Screening Trial.[70] More recently, the Multicentric Italian Lung Detection trial, which included more screening rounds, longer follow-up, and a more moderate risk pool (≥20 pack-years), reported a 39% reduction in lung cancer mortality compared with no intervention.[71] As a result, the US Preventive Services Task Force updated their 2013 screening recommendation in a draft statement issued in July 2020 that expanded the eligibility pool from adults 55 to 80 years with a 30 pack-year smoking history to ages 50 to 80 years with a 20 pack-year history. However, the implementation of widespread screening within the general population remains challenging and inappropriate testing is not uncommon.[72,73] Broad implementation of recommended lung cancer screening will require new systems to facilitate unique aspects of the process, including the identification of eligible patients and education of physicians about the details of shared decision making, which is required for reimbursement by the Centers for Medicaid and Medicare Services.

Trends in Cancer Mortality

Mortality rates are a better indicator of progress against cancer than incidence or survival because they are less affected by biases resulting from changes in detection practices.[74] The cancer death rate rose during most of the 20th century, 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 of 215.1 (per 100,000) in 1991. The overall drop of 31% as of 2018 (149.0 per 100,000) translates to an estimated 3,188,500 fewer cancer deaths (2,170,700 in men and 1,017,800 in women) than what would have occurred if mortality rates had remained at their peak (Fig. 6). 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 (Fig. 7).

The progress against cancer reflects large decreases in mortality for the 4 major sites (lung, breast, prostate, and colorectal) (Fig. 7). Specifically, as of 2018, the death rate had dropped from its peak for lung cancer by 54% among

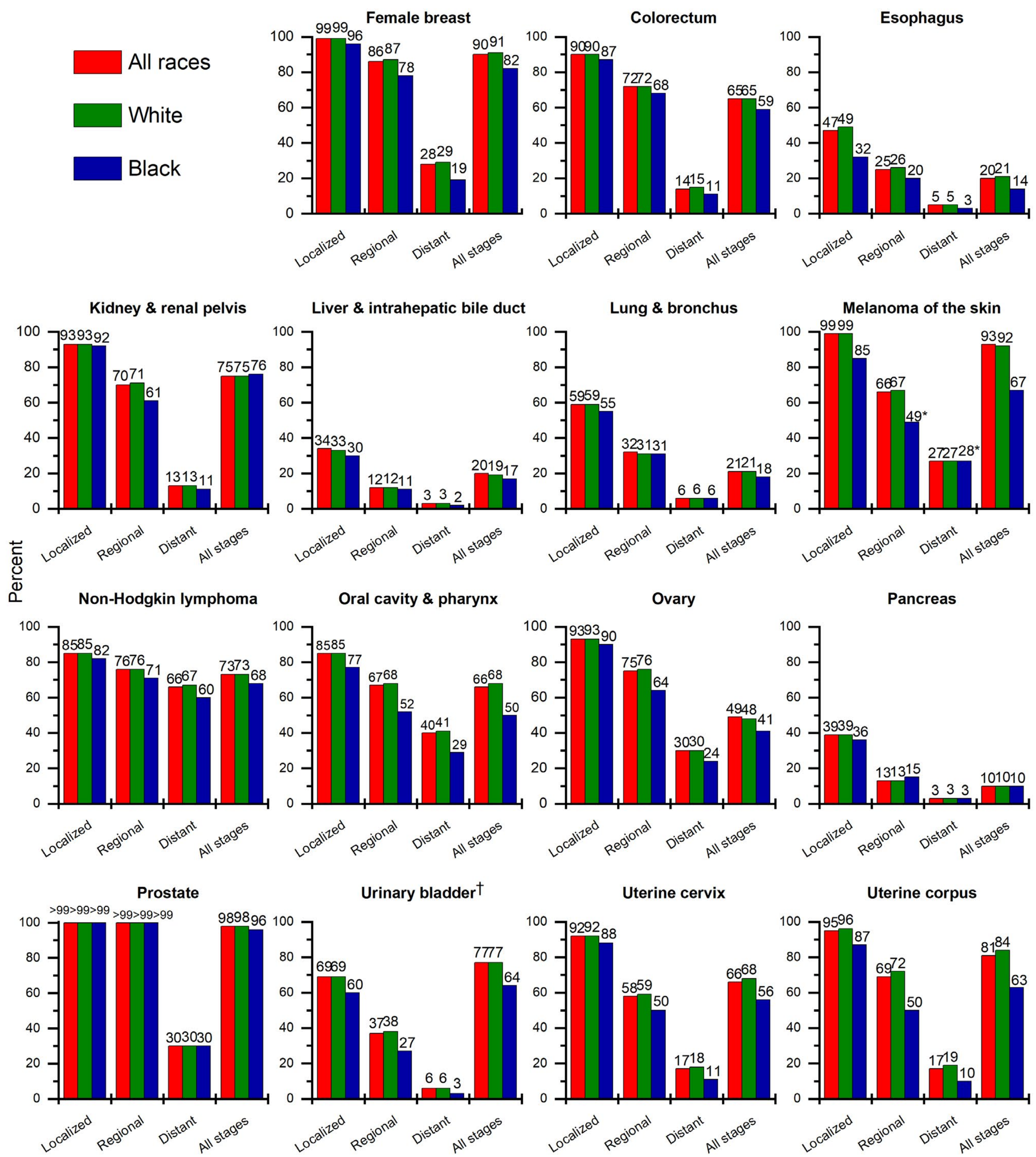

FIGURE 4. Five-Year Relative Survival for Selected Cancers by Race and Stage at Diagnosis, United States, 2010 to 2016. *The standard error of the survival rate is between 5 and 10 percentage points. †The survival rate for carcinoma in situ of the urinary bladder is 96% in all races, 96% in Whites, and 93% in Blacks.

males (since 1990) and by 30% among females (since 2002); for female breast cancer by 41% (since 1989); for prostate cancer by 52% (since 1993); and for CRC by 53% among males (since 1980) and by 59% among females (since 1969). (Although CRC death rates were declining in women before 1969, earlier data years are not exclusive of deaths from small intestine cancer.) However, in recent years, mortality declines have slowed for female breast cancer and CRC and have halted for prostate cancer (Table 5). During the late 1990s and 2000s, the prostate cancer death rate declined by 4% per year on average because of advances in treatment and earlier stage diagnosis through PSA testing.[75,76] However, PSA testing dropped by about 10 percentage points in absolute terms

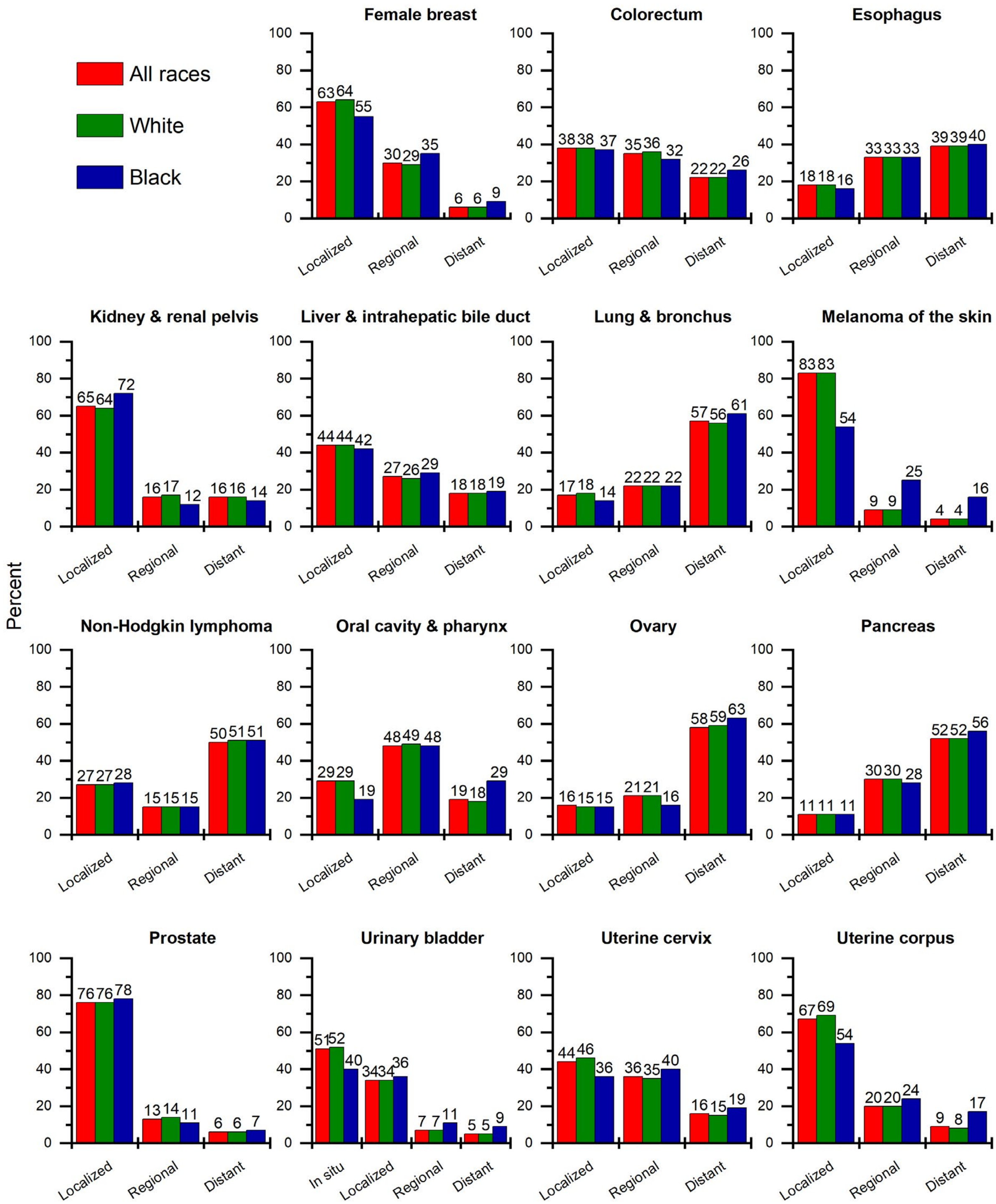

FIGURE 5. Stage Distribution for Selected Cancers by Race, United States, 2010 to 2016. Stage categories do not sum to 100% because sufficient information is not available to stage all cases.

from 2008 to 2013,[77,78] which coincided with an uptick in distant-stage diagnoses[38,40] followed by a stable mortality trend from 2013 to 2018.

In contrast, declines in mortality for melanoma and lung cancer have accelerated in recent years, likely due to improvements in treatment.[79,80] For example, the death rate for melanoma was stable from 2009 to 2013, but decreased over the next 5 years (2014-2018) by 5.7% annually. Over the same time period, the pace of the annual decline for lung cancer doubled from 3.1% to 5.5% in men, from 1.8% to 4.4% in women, and from 2.4% to 5% overall (Table 5). Lung cancer accounted for almost one-half (46%) of the total decline in cancer mortality from 2014 to 2018 of 7.7%, which is reduced to 4.1% with the exclusion

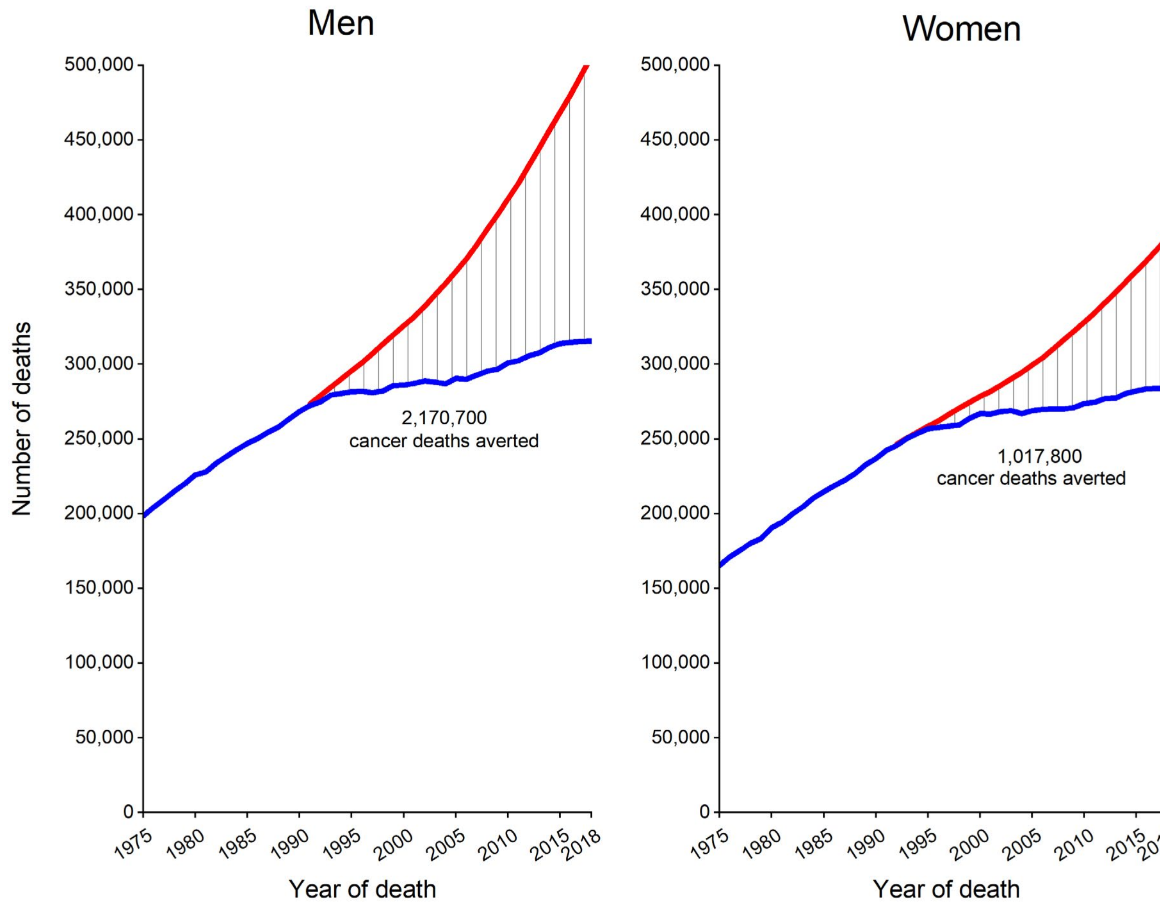

FIGURE 6. Total Number of Cancer Deaths Averted During 1991 to 2018 in Men and 1992 to 2018 in Women, United States. The blue line represents the actual number of cancer deaths recorded in each year; the red line represents the number of cancer deaths that would have been expected if cancer death rates had remained at their peak.

of lung cancer. Expedited progress in lung cancer mortality likely reflects improved treatment because incidence rates decreased steadily from 2008 to 2017 by about 2.2% to 2.3% per year based on cancer registry data covering 69% of the US population.[7] These findings are also consistent with a recent SEER analysis by Howlader et al, who also examined stage at diagnosis and found no evidence of a shift to earlier diagnosis, suggesting little impact of lung cancer screening on population-based mortality trends, likely due to low adherence.[80,81] In contrast to steady incidence trends, the 2-year relative survival rate for lung cancer increased from 30% during 2009 through 2010 to 36% during 2015 through 2016. This progress is confined to the 80% of individuals diagnosed with nonsmall cell lung cancer (NSCLC), for whom 2-year survival increased from 34% to 42%, with absolute gains of 5% to 6% for every stage of diagnosis (Fig. 8). Meanwhile, survival for small cell lung cancer remained low and steady at 14% to 15%. Increased survival for regional-stage small cell lung cancer coincides with a steep decline for unstaged cancers and thus likely reflects improved staging (Fig. 8).

Therapeutic advances that likely contributed to survival gains include epidermal growth factor receptor tyrosine kinase inhibitors that are targeted against the most common NSCLC driver mutations.[82] Immunotherapy (ie, programmed cell death protein-1/programmed death ligand-1 inhibitors) may have played a small role,[83] although these drugs were not approved by the US Food and Drug Administration for second-line treatment until 2015.[84] Notably these therapies are directed at metastatic disease, so the comparable survival improvements for earlier stage cancers likely reflect advances in diagnostic and surgical procedures, such as pathologic staging and video-assisted thoracoscopic surgery.[85,86] In addition, increased access to care for many individuals after the 2014 implementation of the Patient Protection and Affordable Care Act and Medicaid expansion was recently found to be independently associated with survival gains for NSCLC.[87]

Despite the steady progress in mortality for most cancers, rates continue to increase for some common sites. The increase in death rates for uterine corpus cancer has accelerated from 0.3% per year from 1997 through 2008

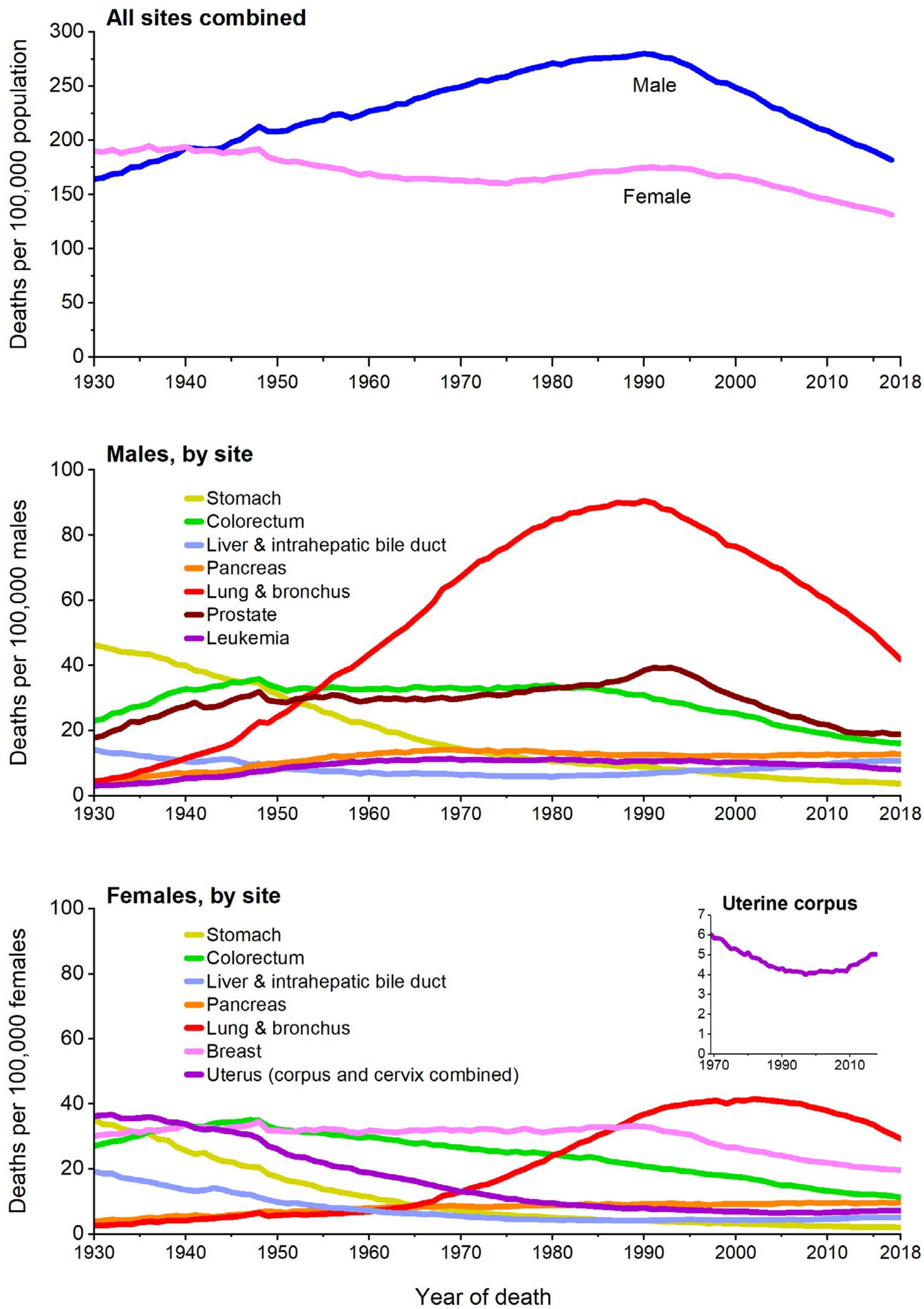

FIGURE 7. Trends in Cancer Mortality Rates by Sex Overall and for Selected Cancers, United States, 1930 to 2018. Rates are age adjusted to the 2000 US standard population. Because of improvements in International Classification of Diseases coding over time, numerator data for cancers of the lung and bronchus, colon and rectum, liver, and uterus differ from those for the contemporary time period. For example, rates for lung and bronchus include pleura, trachea, mediastinum, and other respiratory organs.

to 1.9% per year from 2008 through 2018 (Table 5), twice the pace of the increase in incidence.[6,46] This may reflect the increase in nonendometrioid carcinoma, which is associated with a poor prognosis.[49] Death rates are also increasing for cancers of the oral cavity and pharynx overall by 0.5% per year from 2009 to 2018, although, consistent with incidence,[6,88,89] this trend is confined to subsites associated with HPV; the death rate rose by about 2% per year for cancers of the tongue, tonsil, and oropharynx but continued to decline by about 1% per year for other oral cavity cancers (Table 5). Pancreatic cancer death rates continued to increase slowly in men (0.3% annually since 2000) but remained stable in women, despite incidence rising by about 1% per year in both sexes. Recent liver cancer trends are promising as the long-term rise in mortality slowed among women and stabilized among men.

TABLE 5. Trends in Mortality Rates for Selected Cancers by Sex, United States, 1975 to 2018

	TREND 1		TREND 2		TREND 3		TREND 4		TREND 5		TREND 6		AAPC		
	YEARS	APC	YEARS	APC	YEARS	APC	YEARS	APC	YEARS	APC	YEARS	APC	2009-2013	2014-2018	2009-2018
All sites															
Overall	1975-1990	0.5[a]	1990-1993	−0.3	1993-2002	−1.1[a]	2002-2016	−1.5[a]	2016-2018	−2.3[a]			−1.5[a]	−1.9[a]	−1.7[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]	2015-2018	−2.3[a]	−1.8[a]	−2.2[a]	−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]	2016-2018	−2.1[a]	−1.4[a]	−1.7[a]	−1.5[a]
Female breast	1975-1990	0.4[a]	1990-1995	−1.8[a]	1995-1998	−3.3[a]	1998-2013	−1.9[a]	2013-2018	−1.0[a]			−1.9[a]	−1.0[a]	−1.4[a]
Colorectum															
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]	2012-2018	−1.8[a]	−2.4[a]	−1.8[a]	−2.1[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]	2012-2018	−1.9[a]	−2.4[a]	−1.9[a]	−2.1[a]
Female	1975-1984	−1.0[a]	1984-2001	−1.8[a]	2001-2010	−3.0[a]	2010-2018	−2.0[a]					−2.2[a]	−2.0[a]	−2.1[a]
Liver & intrahepatic bile duct															
Overall	1975-1980	0.2	1980-1987	2.0[a]	1987-1995	3.8[a]	1995-2007	1.9[a]	2007-2013	3.2[a]	2013-2018	0.5	3.2[a]	0.5	1.7[a]
Male	1975-1985	1.5[a]	1985-1996	3.8[a]	1996-1999	0.3	1999-2013	2.7[a]	2013-2018	0.4			2.7[a]	0.4	1.4[a]
Female	1975-1984	0.2	1984-1995	3.1[a]	1995-2008	1.2[a]	2008-2013	3.3[a]	2013-2018	1.1[a]			3.3	1.1[a]	2.1
Lung & bronchus															
Overall	1975-1980	3.0[a]	1980-1990	1.8[a]	1990-1995	−0.2	1995-2005	−1.0[a]	2005-2014	−2.4[a]	2014-2018	−5.0[a]	−2.4[a]	−5.0[a]	−3.6[a]
Male	1975-1982	1.8[a]	1982-1991	0.4[a]	1991-1995	−1.9[a]	1995-2014	−3.1[a]	2014-2018	−5.5[a]			−3.1[a]	−5.5[a]	−4.2[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]	2014-2018	−4.4[a]	−1.8[a]	−4.4[a]	−3.0[a]
Melanoma of skin															
Overall	1975-1989	1.5[a]	1989-2013	−0.0	2013-2018	−5.7[a]							−0.0	−5.7[a]	−3.2[a]
Male	1975-1989	2.3[a]	1989-2013	0.3[a]	2013-2018	−6.2[a]							0.3[a]	−6.2[a]	−3.4[a]
Female	1975-1988	0.8[a]	1988-2012	−0.5[a]	2012-2018	−4.2[a]							−1.4[a]	−4.2[a]	−3.0[a]
Oral cavity and pharynx															
Overall	1975-1979	−0.5	1979-1993	−1.7[a]	1993-2000	−2.7[a]	2000-2009	−1.3[a]	2009-2018	0.5[a]			0.5[a]	0.5[a]	0.5[a]
Male	1975-1980	−0.9	1980-2006	−2.2[a]	2006-2018	0.4[a]							0.4[a]	0.4[a]	0.4[a]
Female	1975-1990	−0.9[a]	1990-2003	−2.4[a]	2003-2013	−1.4[a]	2013-2016	2.4	2016-2018	−3.4			−1.4[a]	−0.5	−0.6
Tongue, tonsil, oropharynx	1975-2000	−1.6[a]	2000-2009	−0.1	2009-2018	1.9[a]							1.9[a]	1.9[a]	1.9[a]
Other oral cavity	1975-1992	−1.6[a]	1992-2006	−2.9[a]	2006-2018	−0.8[a]							−0.8[a]	−0.8[a]	−0.8[a]
Pancreas															
Overall	1975-1998	−0.1[a]	1998-2018	0.3[a]									0.3[a]	0.3[a]	0.3[a]
Male	1975-1986	−0.8[a]	1986-2000	−0.3[a]	2000-2018	0.3[a]							0.3[a]	0.3[a]	0.3[a]
Female	1975-1984	0.8[a]	1984-2003	0.1	2003-2006	1.0	2006-2018	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	−4.2[a]	1998-2013	−3.5[a]	2013-2018	−0.4	−3.5[a]	−0.4	−1.8[a]
Uterine corpus	1975-1989	−1.6[a]	1989-1997	−0.7[a]	1997-2008	0.3[a]	2008-2018	1.9[a]					1.9[a]	1.9[a]	1.9[a]

Abbreviations: AAPC, average annual percent change; APC, annual percent change based on mortality rates age adjusted to the 2000 US standard population.
Note: Trends analyzed by the Joinpoint Regression Program, version 4.7, allowing up to 5 joinpoints.
[a]The APC or AAPC is significantly different from zero ($P < .05$).

Recorded Number of Deaths in 2018

In total, 2,813,503 deaths were recorded in the United States in 2018, 21% of which were from cancer (Table 6). The death rate for all causes combined decreased steadily from 1975 to 2010 but remained stable through 2018 because of slowing declines for heart and cerebrovascular diseases and a sharp uptick for accidents (Table 7). In contrast, the decline in cancer mortality accelerated from about 1% annually in the 1990s to 1.5% in the 2000s and early 2010s to 2.3% during 2016 through 2018, partly driven by lung cancer (see Trends in Cancer Mortality, above). From 2017 to 2018, the cancer death rate dropped by 2.4%, the largest single-year drop since rates began declining in 1992.

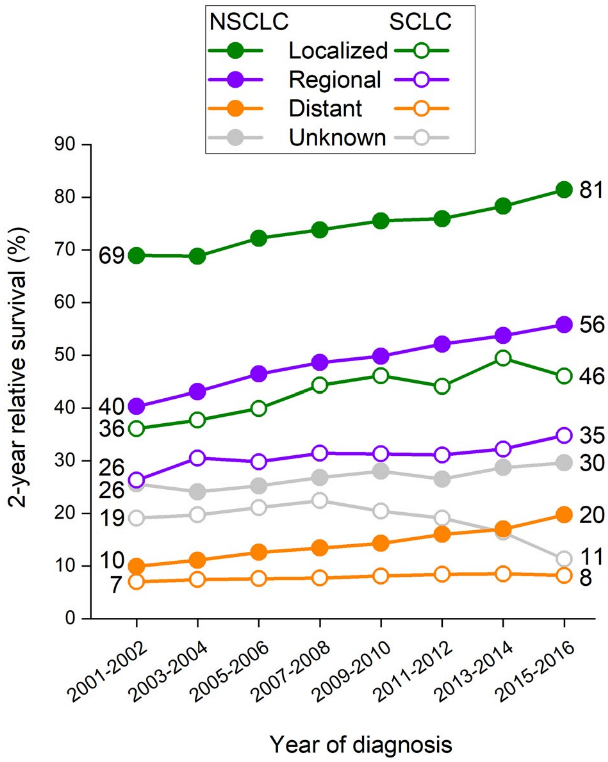

FIGURE 8. Trends in 2-Year Relative Survival for Lung Cancer by Subtype and Stage at Diagnosis, 2001 to 2016. Survival is based on patients diagnosed during 2001 through 2016, all followed through 2017. NSCLC indicates nonsmall cell lung cancer; SCLC, small cell lung cancer.

Cancer is the second leading cause of death after heart disease in both men and women nationally but is the leading cause of death in many states[90] and in people who are Hispanic, Asian American,[91,92] or Alaska Native. Cancer is the first or second leading cause of death for every age group shown in Table 8 among females, whereas, among males aged <40 years, accidents, suicide, and homicide predominate. Table 9 presents the number of deaths in 2018 for the 5 leading cancer types by age and sex. Brain and other nervous system tumors are the leading cause of cancer death among men aged <40 years and women aged <20 years, whereas breast cancer leads among women aged 20 to 59 years. CRC overtook leukemia in 2018 as the second leading cause of cancer death in men aged 20 to 39 years, and it is the leading cause in men <50 years, reflecting increasing trends in CRC in this age group, as well as declining mortality for leukemia. Lung cancer is the leading cause of cancer death in men aged ≥40 years and women aged ≥60 years, causing far more deaths than breast cancer, prostate cancer, and CRC combined.

Despite being one of the most preventable cancers through screening, cervical cancer took the lives of 4138 women in 2018; this is the equivalent of 11 women per day, one-half of whom were aged ≤58 years at death. It also continues to be the second leading cause of cancer death in women aged 20 to 39 years. Although cervical cancer incidence has declined for decades overall, distant-stage disease and cervical adenocarcinoma, which is often undetected by cytology, are increasing, largely driven by trends in young women.[93] These findings underscore the need for more targeted efforts to increase both HPV vaccination among all individuals aged ≤26 years and primary HPV testing or HPV/cytology cotesting every 5 years among women beginning at age 25 years, as recommended by the American Cancer Society in updated guidelines published in 2020.[94,95]

Screening rates are lowest among women who have less educational attainment (high school or less), are uninsured, or do not have a primary care provider,[96] consistent

TABLE 6. Ten Leading Causes of Death in the United States, 2017 and 2018

		2017			2018			
		NO.	PERCENT	RATE	NO.	PERCENT	RATE	RELATIVE CHANGE IN RATE
All causes		**2,813,503**		**732.6**	**2,839,205**		**723.9**	**−1.2%**
1	Heart diseases	647,457	23%	165.2	655,381	23%	163.7	−0.9%
2	Cancer	599,108	21%	152.6	599,274	21%	149.0	−2.4%
3	Accidents (unintentional injuries)	169,936	6%	49.4	167,127	6%	47.9	−3.0%
4	Chronic lower respiratory diseases	160,201	6%	41.1	159,486	6%	39.8	−3.2%
5	Cerebrovascular disease	146,383	5%	37.6	147,810	5%	37.1	−1.3%
6	Alzheimer disease	121,404	4%	31.1	122,019	4%	30.6	−1.6%
7	Diabetes mellitus	83,564	3%	21.5	84,946	3%	21.4	−0.5%
8	Influenza and pneumonia	55,672	2%	14.3	59,120	2%	14.9	4.2%
9	Nephritis, nephrotic syndrome, & nephrosis	50,633	2%	13.0	51,386	2%	12.9	−0.8%
10	Intentional self-harm (suicide)	47,173	2%	14.0	48,344	2%	14.2	1.4%

Rates are per 100,000 and age adjusted to the 2000 US standard population.
Source: National Center for Health Statistics, Centers for Disease Control and Prevention.

TABLE 7. Trends in Mortality Rates for the 5 Leading Causes of Death, United States, 1975 to 2018

	TREND 1		TREND 2		TREND 3		TREND 4		TREND 5		TREND 6		AAPC		
	YEARS	APC	YEARS	APC	YEARS	APC	YEARS	APC	YEARS	APC	YEARS	APC	2009-2013	2014-2018	2009-2018
All causes	1975-1979	−1.6[a]	1979-2002	−0.8[a]	2002-2010	−1.8[a]	2010-2018	−0.2					−0.6[a]	−0.2	−0.4[a]
Heart diseases	1975-1986	−1.4[a]	1986-1991	−3.4[a]	1991-1995	−1.5[a]	1995-2002	−2.7[a]	2002-2010	−4.1[a]	2010-2018	−0.8[a]	−1.7[a]	−0.8[a]	−1.2[a]
Cancer	1975-1990	0.5[a]	1990-1993	−0.3	1993-2002	−1.1[a]	2002-2016	−1.5[a]	2016-2018	−2.3[a]			−1.5[a]	−1.9[a]	−1.7[a]
Accidents (unintentional injuries)	1975-1992	−2.1[a]	1992-2000	−0.0	2000-2006	2.0[a]	2006-2012	−0.8	2012-2018	4.7[a]			0.5	4.7[a]	2.8[a]
Chronic lower respiratory diseases	1975-1986	3.7[a]	1986-2000	1.7[a]	2000-2018	−0.5[a]							−0.5[a]	−0.5[a]	−0.5[a]
Cerebrovascular disease	1975-1982	−5.3[a]	1982-1991	−3.2[a]	1991-2001	−0.6[a]	2001-2007	−5.4[a]	2007-2012	−3.2[a]	2012-2018	0.5	−2.3[a]	0.5	−0.7[a]

Abbreviations: AAPC, average annual percent change; APC, annual percent change based on mortality rates age adjusted to the 2000 US standard population.
Note: Trends analyzed by the Joinpoint Regression Program, version 4.8.0.1, allowing up to 5 joinpoints.
[a]The APC or AAPC is significantly different from zero ($P < .05$).

with cervical cancer death rates, which are 2 times higher in high-poverty versus low-poverty areas.[97] HPV vaccination in the United States falls far behind that in other high-income countries.[98] Among female adolescents, for example, up-to-date coverage in 2019 was 57% in the United States[99] compared with 67% in Canada,[100] >80% in Australia (ncci.canceraustralia.gov.au/), and >90% in the United Kingdom-Scotland.[98] In 2020, the first population-based evaluation of the efficacy of the quadrivalent vaccine for preventing invasive cervical cancer reported adjusted incidence rate ratios of 0.12 (95% CI, 0.00-0.34) and 0.47 (95% CI, 0.27-0.75) for women who had been vaccinated before age 17 years and between ages 17 and 30 years, respectively, compared with women who had not been vaccinated.[101]

Cancer Disparities by Race/Ethnicity

Cancer occurrence and outcomes vary considerably between racial and ethnic groups, largely because of inequalities in wealth that lead to differences in risk factor exposures and barriers to high-quality cancer prevention, early detection, and treatment.[102,103] These inequalities ultimately stem from hundreds of years of structural racism, including residential, educational, and occupational segregation and discriminatory policies in criminal justice and housing that have altered the balance of prosperity, security, and health.[104] One of many examples is redlining, a previously legal form of lending discrimination whereby credit-worthy applicants who lived in predominantly Black neighborhoods were denied loans for home ownership or improvement, preventing people of color from integrating into suburban White neighborhoods. A recent study found that women who lived in areas of redlining had breast cancer mortality rates 2 times higher than those who did not reside in these areas.[105]

Overall cancer incidence rates are highest among NHWs because of their high rates of lung and female breast cancers (Table 10). However, sex-specific incidence is highest in non-Hispanic Black (NHB) men, among whom rates during 2013 through 2017 were 81% higher than those in Asian/Pacific Islander men, who have the lowest rates, and 7% higher than NHW men, who rank second. Among women, those who are NHW have the highest incidence—9% higher than those who are NHB (who rank second); however, NHB women have the highest sex-specific cancer mortality rates—12% higher than NHW women. The mortality disparity among men is larger, with the death rate in NHB men double that in Asian/Pacific Islander men and 19% higher than that in NHW men. Notably, the Black-White disparity in overall cancer mortality among men and women combined has declined from a peak of 33% in 1993 (279.0 vs 210.5 per 100,000, respectively) to 13% in 2018 (174.2 vs 154.1 per 100,000, respectively). This progress is largely due to more rapid declines in deaths from smoking-related cancers among Blacks because of the steep drop in smoking prevalence unique to Black teens from the late 1970s to the early 1990s.[106]

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 detection practices and the prevalence of risk factors, such as smoking, obesity, and other health behaviors. The largest geographic variation is for cancers that are potentially most preventable,[27] such as lung cancer, cervical cancer, and melanoma of the skin.[56] For example, lung cancer incidence and mortality rates in Kentucky, where smoking prevalence was historically highest, are 3 to 5 times higher than those in Utah and Puerto Rico, where it was

TABLE 8. Ten Leading Causes of Death in the United States by Age and Sex, 2018

	ALL AGES		1 TO 19		20 TO 39		40 TO 59		60 TO 79		≥80	
	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
	All Causes	All Causes	All Causes	All Causes	All Causes	All Causes	All Causes	All Causes	All Causes	All Causes	All Causes	All Causes
	1,458,469	1,380,736	12,704	6,956	80,015	36,220	226,144	142,419	614,895	464,501	512,534	721,206
1	Heart diseases 354,404	Heart diseases 300,977	Accidents (unintentional injuries) 3,992	Accidents (unintentional injuries) 2,208	Accidents (unintentional injuries) 33,236	Accidents (unintentional injuries) 12,189	Heart diseases 51,018	Cancer 45,070	Cancer 175,882	Cancer 144,858	Heart diseases 146,128	Heart diseases 189,612
2	Cancer 315,553	Cancer 283,721	Intentional self-harm (suicide) 2,260	Cancer 771	Intentional self-harm (suicide) 12,550	Cancer 4,604	Cancer 45,321	Heart diseases 21,756	Heart diseases 151,194	Heart diseases 86,498	Cancer 89,315	Cancer 88,908
3	Accidents (unintentional injuries) 107,869	Chronic lower respiratory diseases 84,236	Assault (homicide) 1,910	Intentional self-harm (suicide) 749	Assault (homicide) 8,639	Intentional self-harm (suicide) 3,229	Accidents (unintentional injuries) 32,432	Accidents (unintentional injuries) 13,921	Chronic lower respiratory diseases 39,546	Chronic lower respiratory diseases 37,990	Cerebrovascular disease 29,902	Alzheimer disease 72,172
4	Chronic lower respiratory diseases 75,250	Cerebrovascular disease 84,738	Cancer 1,019	Assault (homicide) 518	Heart diseases 5,549	Heart diseases 2,738	Intentional self-harm (suicide) 12,474	Chronic liver disease & cirrhosis 5,881	Cerebrovascular disease 25,604	Cerebrovascular disease 22,861	Chronic lower respiratory diseases 29,857	Cerebrovascular disease 56,685
5	Cerebrovascular disease 62,843	Alzheimer disease 84,062	Congenital abnormalities 501	Congenital abnormalities 428	Cancer 3,983	Assault (homicide) 1,686	Chronic liver disease & cirrhosis 11,202	Chronic lower respiratory diseases 5,622	Diabetes mellitus 24,690	Diabetes mellitus 16,961	Alzheimer disease 29,433	Chronic lower respiratory diseases 40,607
6	Diabetes mellitus 47,551	Accidents (unintentional injuries) 60,214	Heart diseases 335	Heart diseases 225	Chronic liver disease & cirrhosis 1,391	Chronic liver disease & cirrhosis 911	Diabetes mellitus 8,947	Diabetes mellitus 5,084	Accidents (unintentional injuries) 22,782	Accidents (unintentional injuries) 11,972	Accidents (unintentional injuries) 14,738	Accidents (unintentional injuries) 18,479
7	Alzheimer disease 37,957	Diabetes mellitus 37,395	Influenza & pneumonia 170	Influenza & pneumonia 145	Diabetes mellitus 1,129	Diabetes mellitus 791	Cerebrovascular disease 6,464	Cerebrovascular disease 4,919	Chronic liver disease & cirrhosis 12,775	Alzheimer disease 11,970	Influenza & pneumonia 14,202	Influenza & pneumonia 18,362
8	Intentional self-harm (suicide) 37,761	Influenza & pneumonia 29,114	Chronic lower respiratory diseases 137	Chronic lower respiratory diseases 104	Cerebrovascular disease 718	Cerebrovascular disease 569	Chronic lower respiratory diseases 5,346	Intentional self-harm (suicide) 4,192	Nephritis, nephrotic syndrome, & nephrosis 11,658	Nephritis, nephrotic syndrome, & nephrosis 9,631	Diabetes mellitus 12,722	Diabetes mellitus 14,496
9	Influenza & pneumonia 28,682	Nephritis, nephrotic syndrome, & nephrosis 24,889	Cerebrovascular disease 100	Cerebrovascular disease 86	HIV disease 683	Pregnancy, childbirth, & puerperium 533	Assault (homicide) 3,561	Septicemia 2,498	Influenza & pneumonia 10,660	Influenza & pneumonia 8,961	Parkinson disease 12,258	Nephritis, nephrotic syndrome, & nephrosis 13,264
10	Chronic liver disease & cirrhosis 27,226	Septicemia 20,898	Septicemia 78	Septicemia 74	Influenza & pneumonia 562	Influenza & pneumonia 417	Influenza & pneumonia 2,986	Influenza & pneumonia 2,317	Septicemia 9,237	Septicemia 8,716	Nephritis, nephrotic syndrome, & nephrosis 11,669	Hypertension & hypertensive renal diseases[a] 12,861

Abbreviation: HIV, human immunodeficiency virus.
Note: Deaths within each age group do not sum to all ages combined because of the inclusion of unknown ages. In accordance with the National Center for Health Statistics' cause-of-death ranking, "Symptoms, signs, and abnormal clinical or laboratory findings" and categories that begin with "Other" and "All other" were not ranked.
[a]Includes primary and secondary hypertension.
Source: US Final Mortality Data, 2018, National Center for Health Statistics, Centers for Disease Control and Prevention, 2020.

TABLE 9. Five Leading Causes of Cancer Death in the United States by Age and Sex, 2018

ALL AGES	<20	20 TO 39	40 TO 59	60 TO 79	≥80
MALE					
All sites	**All sites**	**All sites**	**All sites**	**All sites**	**All sites**
315,553	**1,046**	**3,983**	**45,321**	**175,882**	**89,315**
Lung & bronchus	Brain & ONS	Brain & ONS	Lung & bronchus	Lung & bronchus	Lung & bronchus
76,234	290	583	9,674	47,948	18,432
Prostate	Leukemia	Colorectum	Colorectum	Prostate	Prostate
31,489	258	522	5,971	14,396	15,723
Colorectum	Bones & joints	Leukemia	Pancreas	Pancreas	Colorectum
27,964	117	458	3,641	14,160	7,345
Pancreas	Soft tissue (including heart)	Non-Hodgkin lymphoma	Liver[a]	Colorectum	Urinary bladder
23,178	103	225	3,442	14,118	5,577
Liver[a]	Non-Hodgkin lymphoma	Soft tissue (including heart)	Brain & ONS	Liver[a]	Pancreas
18,594	40	220	2,397	12,083	5,246
FEMALE					
All sites	**All sites**	**All sites**	**All sites**	**All sites**	**All sites**
283,721	**795**	**4,604**	**45,070**	**144,858**	**88,391**
Lung & bronchus	Brain & ONS	Breast	Breast	Lung & bronchus	Lung & bronchus
65,847	242	1,102	9,847	38,866	18,412
Breast	Leukemia	Uterine cervix	Lung & bronchus	Breast	Breast
42,466	201	467	8,394	19,935	11,581
Colorectum	Soft tissue (including heart)	Colorectum	Colorectum	Pancreas	Colorectum
24,199	89	395	4,223	11,903	9,189
Pancreas	Bones & joints	Brain & ONS	Ovary	Colorectum	Pancreas
21,737	78	340	2,708	10,386	7,176
Ovary	Kidney & renal pelvis	Leukemia	Pancreas	Ovary	Leukemia
13,748	26	325	2,575	7,540	3,999

Abbreviation: ONS, other nervous system.
Note: Ranking order excludes category titles that begin with the word "other."
[a]Includes intrahepatic bile duct.

lowest. Even in 2018, 1 in 4 residents of Kentucky, Arkansas, and West Virginia were current smokers compared with 1 in 10 residents of Utah and California.[107]

Similarly, cervical cancer incidence and mortality currently vary 2-fold to 3-fold, with incidence rates ranging from <5 per 100,000 in Vermont and New Hampshire, to 10 per 100,000 in Arkansas and Kentucky, and 13 per 100,000 in Puerto Rico (Table 11). Ironically, advances in cancer control often exacerbate disparities, and state gaps for cervical and other HPV-associated cancers may widen in the wake of unequal uptake of the HPV vaccine. In 2019, up-to-date HPV vaccination among adolescents (aged 13-17 years) ranged from 32% in Mississippi to 78% in Rhode Island among girls and from 29% in Mississippi to 80% in Rhode Island among boys.[108] The HPV vaccine was recently confirmed to reduce the risk of invasive cervical cancer by 88% among women who were inoculated with the quadrivalent vaccine before age 17 years.[101] State/territory differences in other initiatives to improve health, including Medicaid expansion, may also contribute to future geographic disparities.[109,110]

Cancer in Children and Adolescents

Cancer is the second most common cause of death among children aged 1 to 14 years in the United States, surpassed only by accidents. In 2021, an estimated 10,500 children (aged birth to 14 years) and 5090 adolescents (aged 15-19 years) will be diagnosed with cancer, and 1190 and 590, respectively, will die from the disease. These estimates require 15 years of historical incidence data (see Methods), and thus exclude benign and borderline malignant brain tumors, which were not required to be reported to cancer registries until 2004.

Leukemia is the most common childhood cancer, accounting for 28% of cases, followed by brain and other nervous system tumors (27%), more than one-quarter of which are benign/borderline malignant (Table 13). Cancer types and their distribution in adolescents differ from those in children; for

TABLE 10. Incidence and Mortality Rates for Selected Cancers by Race and Ethnicity, United States, 2013 to 2018

	ALL RACES COMBINED	NON-HISPANIC WHITE	NON-HISPANIC BLACK	ASIAN/PACIFIC ISLANDER	AMERICAN INDIAN/ ALASKA NATIVE[a]	HISPANIC
Incidence, 2013 to 2017						
All sites	449.0	465.6	457.6	291.0	379.8	346.9
Male	489.1	501.4	534.0	294.3	399.8	371.3
Female	422.4	442.2	406.6	292.6	368.8	335.5
Breast (female)	126.0	131.6	127.3	95.6	94.9	94.8
Colon & rectum[b]	36.9	36.6	43.6	29.2	42.3	32.9
Male	42.6	42.0	51.6	34.6	47.2	39.6
Female	32.1	31.8	37.9	24.8	38.3	27.6
Kidney & renal pelvis	16.9	17.1	18.9	8.0	23.9	16.7
Male	22.9	23.1	26.1	11.3	31.3	21.9
Female	11.7	11.7	13.3	5.3	17.7	12.4
Liver & intrahepatic bile duct	8.5	7.1	11.0	12.6	15.7	13.5
Male	12.9	10.7	18.0	19.3	22.9	20.1
Female	4.6	3.8	5.5	7.1	9.4	7.9
Lung & bronchus	58.4	62.6	60.9	34.4	52.7	29.7
Male	67.6	70.8	79.8	43.2	59.2	37.1
Female	51.3	56.4	47.9	27.9	47.9	24.3
Prostate	104.6	97.7	171.6	53.8	67.7	85.6
Stomach	6.5	5.3	10.0	10.0	8.8	9.6
Male	8.9	7.5	13.7	13.1	11.4	12.0
Female	4.6	3.5	7.4	7.7	6.8	7.7
Uterine cervix	7.6	7.2	9.0	6.1	8.8	9.5
Mortality rates, 2014 to 2018						
All sites	155.5	160.2	182.5	97.2	141.1	110.8
Male	185.5	190.2	227.2	114.6	169.3	134.0
Female	133.5	137.8	154.9	84.6	120.1	94.6
Breast (female)	20.1	20.1	28.2	11.7	14.8	13.8
Colon & rectum	13.7	13.6	18.5	9.4	15.1	10.9
Male	16.3	16.1	23.2	11.2	18.5	14.0
Female	11.5	11.5	15.3	7.9	12.4	8.6
Kidney & renal pelvis	3.6	3.8	3.6	1.7	5.5	3.4
Male	5.3	5.5	5.5	2.5	8.3	4.9
Female	2.3	2.3	2.3	1.1	3.2	2.2
Liver & intrahepatic bile duct	6.6	5.8	8.6	8.8	10.6	9.3
Male	9.7	8.4	13.4	13.1	14.8	13.3
Female	4.0	3.6	4.9	5.4	7.0	6.0
Lung & bronchus	38.5	41.7	41.3	21.2	32.1	16.8
Male	46.9	49.4	57.0	28.0	38.4	23.0
Female	32.0	35.6	30.6	16.3	27.4	12.3
Prostate	19.0	17.9	38.3	8.8	18.5	15.6
Stomach	3.0	2.2	5.3	5.0	4.7	4.9
Male	4.0	3.1	7.8	6.3	6.3	6.3
Female	2.2	1.6	3.6	4.0	3.5	3.9
Uterine cervix	2.2	2.0	3.4	1.7	2.4	2.6

Rates are per 100,000 population and age adjusted to the 2000 US standard population and exclude data from Puerto Rico.
[a]Data based on Purchased/Referred Care Delivery Area (PRCDA) counties.
[b]Colorectal cancer incidence rates exclude appendix.

example, brain and other nervous system tumors, more than one-half of which are benign/borderline malignant, are most common (21%), followed closely by lymphoma (19%). In addition, there are almost twice as many cases of Hodgkin as non-Hodgkin lymphoma among adolescents, whereas among children it is the reverse. Thyroid carcinoma and melanoma of the skin account for 11% and 3% of cancers, respectively, in adolescents, but only 2% and 1%, respectively, in children.

The overall cancer incidence rate in children and adolescents has been increasing slightly (by 0.6% and 0.7% per year in children and adolescents, respectively) since 1975 for reasons that remain unclear. In contrast, death rates have declined continuously from 6.3 per 100,000 in children and 7.1 per 100,000 in adolescents in 1970 to 2.0 and 2.9 per 100,000, respectively, in 2018, for overall reductions of 68% in children and 59% in adolescents.

TABLE 11. Incidence Rates for Selected Cancers by State, United States, 2013 to 2017

	ALL SITES		BREAST	COLON & RECTUM[a]		LUNG & BRONCHUS		NON-HODGKIN LYMPHOMA		PROSTATE	UTERINE CERVIX
STATE	MALE	FEMALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
Alabama	517.6	403.3	121.6	48.9	36.2	84.1	50.0	19.8	13.4	121.0	9.4
Alaska	437.2	403.2	120.1	43.9	39.0	64.8	47.6	21.0	13.5	83.4	7.2
Arizona	409.8	370.1	114.3	36.3	27.1	51.2	43.0	18.5	12.9	79.1	6.5
Arkansas	537.2	424.8	118.2	49.7	36.2	95.8	62.7	22.0	15.2	112.4	9.5
California	432.9	387.6	121.5	38.9	29.7	46.4	37.8	22.4	15.1	93.0	7.2
Colorado	419.4	388.5	127.6	35.5	28.1	44.1	39.6	20.8	14.1	92.7	6.2
Connecticut	504.9	449.9	140.5	38.7	29.1	65.0	55.8	26.2	17.1	111.3	6.1
Delaware	537.5	453.1	134.7	42.1	30.8	75.3	60.8	24.5	16.8	124.5	7.8
Dist. of Columbia	452.8	417.8	139.4	38.9	34.7	49.8	44.5	19.2	12.1	127.4	8.8
Florida	499.1	425.9	118.3	40.5	30.4	66.5	50.5	28.2	20.1	93.9	8.9
Georgia	532.1	421.4	126.8	47.0	34.0	79.0	50.6	22.3	14.9	124.2	7.8
Hawaii	437.7	406.4	138.9	45.7	34.5	57.3	36.3	19.8	13.5	88.2	6.8
Idaho	473.1	419.5	126.7	38.0	29.7	54.3	45.7	23.0	16.0	105.3	6.5
Illinois	504.2	442.0	133.1	48.0	35.1	73.8	56.3	23.7	16.2	109.1	7.7
Indiana	503.6	430.7	122.9	47.4	35.8	86.4	61.4	22.3	15.6	94.2	8.2
Iowa	523.9	449.2	128.9	47.7	36.9	74.7	54.5	25.8	17.3	107.7	7.5
Kansas	493.3	425.2	126.0	43.3	32.5	64.9	49.7	23.6	16.0	108.3	7.6
Kentucky	574.4	483.3	126.7	54.3	39.1	109.0	77.5	24.5	16.6	104.1	9.6
Louisiana	556.1	425.6	125.9	51.8	37.0	82.6	53.6	23.3	15.9	131.2	9.1
Maine	500.5	458.9	127.4	38.7	30.8	80.3	65.8	25.4	16.7	88.1	5.9
Maryland	493.8	428.0	132.9	39.3	31.3	62.9	51.7	21.5	15.3	124.7	6.6
Massachusetts	483.3	443.1	137.9	38.6	29.8	65.5	59.2	23.4	15.6	102.6	5.2
Michigan	487.9	421.7	122.6	40.8	31.9	71.8	56.9	23.7	16.4	106.3	6.7
Minnesota	503.6	443	132.5	40.8	31.9	61.5	52.2	26.1	17.3	108.8	5.5
Mississippi	547.4	414.2	118.0	55.0	39.4	97.6	57.7	20.5	14.0	127.7	9.4
Missouri	490.3	431.9	130.5	45.5	33.4	83.6	63.2	22.7	15.5	91.4	8.0
Montana	490.5	435.4	128.5	43.3	30.3	53.3	54.7	22.6	15.4	118.3	6.8
Nebraska	501.9	433.6	127.2	46.4	36.1	65.4	50.8	24.7	17.0	116.7	7.8
Nevada[b]	405.6	379.6	110.3	40.3	31.1	53.9	51.6	17.4	12.3	85.1	8.9
New Hampshire	511.6	463.9	144.7	40.3	29.8	67.2	61.8	25.2	17.3	109.2	4.7
New Jersey	530.5	458.8	136.6	45.4	34.1	60.8	51.7	26.1	18.3	131.3	7.7
New Mexico	391.5	365.7	111.8	36.5	28.4	43.9	34.3	17.1	13.4	82.8	8.2
New York	531.6	456.3	132.8	43.3	32.2	66.2	53.4	26.3	18.0	125.0	7.8
North Carolina	522.2	431.7	134.0	41.1	31.0	82.8	56.4	21.4	14.6	117.4	7.1
North Dakota	489.6	430.1	128.6	46.8	37.2	65.4	52.3	21.9	16.4	113.5	5.5
Ohio	502.9	441.3	128.9	45.7	34.9	80.0	58.7	23.5	15.7	104.1	7.9
Oklahoma	490.8	421.2	122.7	46.9	34.7	80.5	57.1	21.0	15.6	93.8	9.2
Oregon	460.2	417.7	125.5	37.6	29.3	58.7	50.6	22.8	15.7	93.3	7.0
Pennsylvania	522.3	462.2	132.3	45.9	34.2	73.4	56.4	25.0	17.9	103.7	7.3
Rhode Island	489.8	460.4	137.8	36.3	28.2	75.4	65.6	24.7	16.5	96.5	7.0
South Carolina	511.0	413.1	129.9	42.5	31.4	80.1	52.3	20.5	13.8	114.5	7.9
South Dakota	496.7	434.1	128.3	46.2	35.4	66.7	54.1	22.6	16.1	114.8	7.3
Tennessee	520.7	422.1	122.6	44.4	33.7	91.6	61.4	21.9	14.1	111.5	8.4
Texas	450.3	378.4	112.8	43.7	30.2	61.3	42.2	20.9	14.3	94.0	9.2
Utah	439.1	375.2	114.4	31.6	25.2	30.2	22.5	23.0	14.8	112.8	5.4
Vermont	478.1	440.7	131.3	35.5	30.7	67.9	55.6	25.2	16.1	87.1	4.3
Virginia	445.6	397.4	127.3	38.5	30.2	65.9	49.2	20.7	14.2	99.4	6.0
Washington	473.6	429.8	134.3	37.7	30.1	58.8	50.3	24.1	16.0	98.7	6.7
West Virginia	512.7	457.1	117.5	51.3	39.7	94.0	68.9	22.5	16.4	92.1	9.2
Wisconsin	503.7	438.3	131.5	39.5	30.7	66.6	53.5	25.1	17.1	109.3	6.4
Wyoming	431.5	376.6	112.5	34.2	27.9	45.2	40.0	20.7	13.5	108.1	6.4
Puerto Rico[c]	409.4	333.7	93.9	50.1	34.0	23.6	12.0	17.2	12.4	142.5	13.0
United States	**489.1**	**422.4**	**126.0**	**42.6**	**32.1**	**67.6**	**51.3**	**23.3**	**16.0**	**104.6**	**7.6**

Rates are per 100,000, age adjusted to the 2000 US standard population.
[a]Colorectal cancer incidence rates exclude appendix, with the exception of Nevada.
[b]Data for this state are not included in US combined rates because either the registry did not consent or incidence data did not meet inclusion standards for all years during 2013 to 2017 according to the North American Association of Central Cancer Registries (NAACCR). Rates for this state are based on data published in NAACCR's *Cancer in North America*, Volume II.
[c]Data for Puerto Rico are not included in US combined rates for comparability to previously published US rates. Puerto Rico incidence data for 2017 reflect diagnoses that occurred January through June only.

TABLE 12. Mortality Rates for Selected Cancers by State, United States, 2014 to 2018

	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	216.6	142.3	21.5	19.0	12.6	65.5	35.7	6.7	3.8	13.6	10.2	21.0
Alaska	175.8	133.6	18.8	16.4	14.0	41.5	32.0	6.6	4.4	11.7	9.1	18.6
Arizona	162.1	118.1	18.5	15.3	10.2	36.4	27.1	5.8	3.7	11.7	8.8	17.3
Arkansas	216.8	148.0	20.3	19.0	12.8	67.6	41.0	6.9	4.1	12.9	9.4	18.4
California	164.9	122.5	19.3	14.6	10.7	33.2	24.1	6.6	4.1	11.7	9.1	19.9
Colorado	157.9	116.3	18.9	13.6	10.2	29.2	24.5	6.1	3.4	11.0	8.1	21.4
Connecticut	167.5	122.9	17.4	12.6	9.1	38.0	29.6	7.0	3.9	12.4	9.8	17.8
Delaware	195.8	141.6	21.4	15.7	11.3	51.2	37.0	7.4	4.3	14.3	10.5	17.2
Dist. of Columbia	183.5	146.3	26.2	17.9	13.1	36.4	25.8	6.0	3.4	15.6	12.2	28.2
Florida	174.9	125.3	18.8	15.3	10.8	45.3	31.0	6.4	3.9	12.2	9.0	16.6
Georgia	196.4	133.7	21.6	18.4	12.2	53.9	31.1	6.6	3.9	12.6	9.5	21.7
Hawaii	156.7	109.6	16.1	14.2	9.7	37.4	22.6	5.7	3.5	12.1	10.0	15.0
Idaho	179.2	132.5	21.5	15.0	11.2	36.9	28.6	7.4	4.9	12.8	9.5	23.1
Illinois	192.1	140.6	21.0	17.7	12.4	50.0	34.5	7.2	4.1	13.3	9.7	20.0
Indiana	209.7	146.4	20.8	17.7	12.9	60.5	39.9	8.0	4.6	13.7	9.9	19.5
Iowa	193.7	136.6	18.6	16.7	12.4	50.9	34.1	8.1	4.4	12.7	10.0	20.0
Kansas	190.7	138.7	19.8	17.6	12.2	49.9	35.3	7.0	4.6	12.8	9.8	18.7
Kentucky	233.4	160.5	21.0	19.9	13.9	75.3	49.0	8.2	4.5	13.3	10.2	19.3
Louisiana	215.6	147.0	22.8	19.8	13.6	61.6	36.6	7.6	4.3	14.4	11.0	20.5
Maine	201.1	145.4	18.0	14.6	11.4	55.3	40.0	7.6	4.6	12.4	10.3	19.2
Maryland	183.5	135.5	21.7	16.4	11.6	44.1	32.1	6.9	3.9	13.4	9.8	20.0
Massachusetts	180.1	129.2	17.3	13.8	9.9	42.7	33.2	6.8	4.2	13.0	10.0	18.3
Michigan	196.1	144.1	20.8	16.1	11.8	52.4	37.8	7.8	4.8	14.0	10.6	18.7
Minnesota	176.2	129.4	17.7	14.2	10.6	40.2	31.3	7.8	4.2	12.5	9.6	19.9
Mississippi	235.4	151.5	23.2	22.3	14.6	72.3	38.1	6.8	3.8	15.5	10.8	24.4
Missouri	204.6	144.4	20.9	17.7	11.9	59.4	40.4	7.2	4.1	13.6	9.6	17.6
Montana	174.7	132.2	18.9	15.9	10.6	37.9	34.6	7.0	4.1	11.2	9.4	22.3
Nebraska	183.9	133.6	19.6	17.3	12.5	45.3	32.3	7.3	4.1	13.2	9.4	18.1
Nevada	178.6	139.0	21.6	18.7	13.3	42.6	36.4	6.5	3.5	11.8	9.2	19.0
New Hampshire	182.1	137.0	18.3	14.3	11.0	45.9	37.5	6.4	4.3	11.8	9.0	18.6
New Jersey	172.3	132.6	20.9	16.4	11.6	39.0	29.9	7.1	4.0	12.6	10.2	17.6
New Mexico	165.1	120.5	19.7	16.2	10.8	31.7	22.9	5.9	3.9	11.1	8.0	19.3
New York	170.0	127.7	19.1	14.9	10.9	40.3	28.7	6.9	3.9	12.7	9.7	17.8
North Carolina	197.7	135.7	20.9	16.0	11.2	56.8	34.6	6.9	3.9	12.9	9.4	19.9
North Dakota	174.6	126.6	18.0	16.4	10.1	42.3	29.4	7.1	4.4	12.7	8.8	19.3
Ohio	207.2	147.3	21.9	17.9	12.9	58.3	37.9	7.9	4.6	13.7	10.6	19.3
Oklahoma	216.6	151.4	22.7	20.5	13.7	62.2	40.4	7.9	4.7	12.7	9.5	20.1
Oregon	182.3	137.9	19.7	14.8	11.0	40.9	33.3	7.5	4.7	13.7	10.3	20.9
Pennsylvania	196.3	140.5	21.0	17.4	12.3	50.2	33.8	7.7	4.5	14.3	10.4	18.6
Rhode Island	192.2	136.4	17.6	14.8	10.5	49.8	37.1	6.9	3.9	13.9	9.8	18.2
South Carolina	203.6	136.9	21.6	17.0	11.5	55.8	32.7	6.3	4.2	13.3	9.9	21.5
South Dakota	190.0	132.7	18.9	19.2	12.8	47.5	33.5	7.2	4.0	12.4	9.7	19.2
Tennessee	217.4	148.1	22.0	18.0	12.6	66.1	40.0	7.8	4.6	12.9	9.8	19.7
Texas	179.5	125.9	19.8	17.3	11.1	43.0	27.3	6.7	4.0	11.7	9.0	17.6
Utah	144.3	107.6	20.1	12.4	9.6	21.8	14.9	6.9	3.9	10.8	8.0	20.4
Vermont	193.2	140.1	18.0	15.7	13.7	47.7	36.5	8.1	4.2	12.2	9.6	19.7
Virginia	187.2	133.0	21.5	16.4	11.3	48.5	31.4	6.9	3.9	13.1	9.5	19.7
Washington	177.6	132.6	19.7	14.3	10.2	40.4	31.6	7.3	4.2	12.3	9.6	20.3
West Virginia	218.7	158.2	21.9	20.0	15.2	67.1	43.0	7.7	4.5	11.9	9.6	17.0
Wisconsin	187.9	135.0	18.8	15.1	10.9	45.7	33.0	7.5	4.4	13.5	9.9	20.6
Wyoming	160.6	122.3	18.2	13.9	10.1	33.1	29.3	6.5	4.0	12.3	8.3	16.9
Puerto Rico[a]	143.9	90.9	17.9	19.0	11.7	17.9	8.1	4.7	2.6	8.1	5.3	24.7
United States	**185.5**	**133.5**	**20.1**	**16.3**	**11.5**	**46.9**	**32.0**	**7.0**	**4.1**	**12.7**	**9.6**	**19.0**

Rates are per 100,000 and age adjusted to the 2000 US standard population.
[a]Rates for Puerto Rico are for 2013 to 2017 and are not included in US combined rates.

TABLE 13. Case Distribution (2013-2017) and 5-Year Relative Survival (2010-2016)[a] by Age and ICCC Type, Ages Birth to 19 Years, United States

	BIRTH TO 14		15 TO 19	
	CASES, %	5-YEAR SURVIVAL, %	CASES, %	5-YEAR SURVIVAL, %
All ICCC groups combined		**84**		**85**
Leukemias, myeloproliferative & myelodysplastic diseases	28	87	13	73
Lymphoid leukemia	21	91	6	75
Acute myeloid leukemia	4	68	4	66
Lymphomas and reticuloendothelial neoplasms	12	93	19	94
Hodgkin lymphoma	3	99	12	98
Non-Hodgkin lymphoma (including Burkitt)	6	90	7	89
Central nervous system neoplasms	27	74	21	76
Benign/borderline malignant tumors[a]	8	97	13	98
Neuroblastoma & other peripheral nervous cell tumors	6	81	<1	63[b]
Retinoblastoma	2	96	<1	[c]
Nephroblastoma & other nonepithelial renal tumors	5	93	<1	[c]
Hepatic tumors	2	80	<1	51.9[b]
Hepatoblastoma	1	83	<1	[c]
Malignant bone tumors	4	73	5	68
Osteosarcoma	2	68	3	67
Ewing tumor & related bone sarcomas	1	75	2	58
Rhabdomyosarcoma	3	70	1	46
Germ cell & gonadal tumors	3	90	10	93
Thyroid carcinoma	2	>99	11	>99
Malignant melanoma	1	96	3	94

Abbreviation: ICCC, International Classification of Childhood Cancer.
Survival rates are adjusted for normal life expectancy and are based on follow-up of patients through 2017.
[a]Benign and borderline brain tumors were excluded from survival calculations for overall central nervous system tumors but were included in the denominator for case distribution.
[b]The standard error of the survival rate is between 5 and 10 percentage points.
[c]Statistic could not be calculated due to fewer than 25 cases during 2010 through 2016.

Much of this progress reflects dramatic declines in leukemia mortality of 83% and 68%, respectively. Remission rates of 90% to 100% have been achieved for childhood acute lymphocytic leukemia over the past 4 decades, primarily through the optimization of established chemotherapeutic agents as opposed to the development of new therapies.[111] However, progress among adolescents has lagged behind that among children for reasons that are complex but include differences in tumor biology, treatment protocols, and tolerance and compliance with treatment.[112] Mortality reductions from 1970 to 2018 are also lower in adolescents for other common cancers, including lymphoma (91% in children and 85% in adolescents) and brain and other nervous system tumors (37% and 29%, respectively). The 5-year relative survival rate for all cancers combined improved from 58% during the mid-1970s to 86% during 2010 through 2016 in children and from 68% to 86% in adolescents.[6] However, survival varies substantially by cancer type and age at diagnosis (Table 13).

Limitations

The estimated numbers of new cancer cases and deaths expected to occur in 2021 provide a reasonably accurate portrayal of the contemporary cancer burden, but they are model-based 3-year (mortality) or 4-year (incidence) ahead projections that should not be used to track trends over time for several reasons. First, a new methodology has been employed as of the 2021 estimates to take advantage of improvements in 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, 2017 for incidence and 2018 for mortality) and thus do not reflect the impact of the COVID-19 pandemic on reduced health care access and subsequent diagnosis delays. Similarly, the models cannot anticipate abrupt fluctuations for cancers affected by changes in detection practice (eg, PSA testing and prostate cancer). Third, the model can be oversensitive to sudden or large changes in observed data. The most informative metrics for tracking cancer trends are age-standardized or age-specific cancer incidence rates from SEER, NPCR, and/or NAACCR and cancer death rates from the NCHS.

Errors in reporting race/ethnicity in medical records and on death certificates may result in underestimates of cancer incidence and mortality in persons who are not White or Black, particularly Native American populations. It is also important to note that cancer data in the United States are primarily reported for broad, heterogeneous racial and ethnic groups, masking important differences in the cancer burden within these populations. For example, lung cancer incidence is equivalent in Native Hawaiian and NHW men but is approximately 50% lower in Asians/Pacific Islanders overall.[92]

Conclusion

The continuous decline in the cancer mortality rate since 1991 has resulted in an overall drop of 31%, translating to approximately 3.2 million fewer cancer deaths. This steady progress is largely due to reductions in smoking and subsequent declines in lung cancer mortality, which have accelerated in recent years because of improved management of NSCLC. Treatment breakthroughs are also responsible for rapid reductions in mortality from hematopoietic and lymphoid malignancies in both children and adults and, more recently, certain difficult-to-treat cancers, such as metastatic melanoma. Yet progress is slowing or halting for cancers amenable to early detection through screening, such as breast cancer, prostate cancer, and CRC. More concerning are the persistent racial, socioeconomic, and geographic disparities for highly preventable cancers, such as cervix and lung. Increased investment for both the equitable and broad application of existing cancer control interventions and basic and clinical research to further knowledge and advance treatment options would undoubtedly accelerate progress against cancer. ■

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