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ARTICLE

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Cancer treatment and survivorship statistics, 2025

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Abstract

The number of people living with a history of cancer in the United States continues to rise because of the growth and aging of the population as well as improved survival through advances in early detection and treatment. To assist the public health community serve the needs of these survivors, the American Cancer Society and the National Cancer Institute collaborate triennially to estimate cancer prevalence in the United States using data from the Surveillance, Epidemiology, and End Results cancer registries, the Centers for Disease Control and Prevention's National Center for Health Statistics, and the United States Census Bureau. In addition, cancer treatment patterns are presented from the National Cancer Database along with a brief overview of treatment-related side effects. As of January 1, 2025, about 18.6 million people were living in the United States with a history of cancer, and this number is projected to exceed 22 million by 2035. The three most prevalent cancers are prostate (3,552,460), melanoma of the skin (816,580), and colorectum (729,550) among males and breast (4,305,570), uterine corpus (945,540), and thyroid (859,890) among females. About one half (51%) of survivors were diagnosed within the past 10 years, and nearly four fifths (79%) were aged 60 years and older. Racial differences in treatment in 2021 were common across disease stage; for example, Black people with stage I-II lung cancer were less likely to undergo surgery than their White counterparts (47% vs. 52%). Larger disparities exist for rectal cancer, for which 39% of Black people with stage I disease undergo proctectomy or proctocolectomy compared to 64% of their White counterparts. Targeted, multi-level efforts to expand access to high-quality care and survivorship resources are vital to reducing disparities and advancing support for all survivors of cancer.

KEYWORDS
prevalence, statistics, survivorship, treatment patterns

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the National Cancer Institute.

INTRODUCTION

The number of people living in the United States with a history of cancer is rising because of a growing and aging population as well as advancements in early detection and treatment that have improved survival.[1] Many of these survivors face a myriad of challenges, including physical side effects of cancer and its treatment, functional and cognitive impairment, and psychological and economic sequelae.[2,3] To help the public health community better understand and address the needs of this unique population, the American Cancer Society collaborates with the National Cancer Institute (NCI) every 3 years to estimate the current and projected prevalence of the most common cancer types in the United States. This article also includes statistics on overall contemporary treatment patterns categorized by race for selected cancers. Racial and ethnic categories remain useful for describing health patterns in the United States because longstanding social and systemic factors have contributed to disproportionate disease occurrence and outcomes. In addition, this article reviews information on treatment-related side effects as well as the impact of the coronavirus disease 2019 (COVID-19) pandemic and extreme weather events on access to treatment and survivorship. Herein, *cancer survivor* refers to any person who has been diagnosed with cancer, although not all people with a history of cancer identify as survivors,[4] and *cancer prevalence* refers to the number of people with a history of cancer.

MATERIALS AND METHODS

Cancer prevalence

National estimates

National cancer prevalence as of January 1, 2025, was estimated using the Prevalence Incidence Approach Model with incidence and survival data from the Surveillance, Epidemiology, and End Results (SEER) Program, all-cause mortality data from the National Center for Health Statistics, and population estimates from the US Census Bureau.[5] Incidence rates from 1992 to 2021 (SEER-12 registries) were applied to US population estimates to obtain incidence counts by calendar year, age (single-year and 90 years and older), and cancer type. Since people may have multiple tumors, counts were confined to the first primary invasive diagnosis for each cancer site (except urinary bladder, which included in situ cases). Relative survival was obtained from SEER-12 registries by sex, age (birth to 54, 55–64, 65–74, 75–84, 85–89 years), and year of diagnosis (1992–1996, 1997–2001, 2002–2006, 2007–2011, 2012–2020), excluding patients who were diagnosed through death certificate or autopsy only and those who were lost to follow-up at the month of diagnosis. July 1, 2022, US Census Bureau National Population Projections (https://www.census.gov/data/tables/2023/demo/popproj/2023-summary-tables.html, Accessed November 18, 2024), which are based on the 2020 census, were used to project US incidence and mortality for 2022–2035 by applying the average of 2018, 2019, and 2021 estimated incidence rates to the respective US population projections from 2022 to 2035; survival for 2012–2020 was also assumed to be constant for the projections. For incidence projections, 2020 was excluded from the average because of the potential influence of the COVID-19 pandemic on cancer screening and diagnosis.[6] The prevalence proportions for ages 85–89 years were used to estimate prevalence counts for the population aged 90 years and older. Finally, a cancer-specific and sex-specific adjustment factor was used to align the 2025 projections with the 2021 complete prevalence estimates reported in the SEER*-Explorer application.[7]

State estimates

We used the December 2023 North American Association of Central Cancer Registries (NAACCR) submission of Cancer in North America data (https://apps.naaccr.org/explorer/, Accessed January 13, 2025) to calculate 10-year limited-duration prevalence on January 1, 2021, for all cancer sites combined by sex and 19 age groups in 47 US states. For the remaining three states and the District of Columbia, we calculated an average 10-year prevalence by age, sex, and race (White, Black, other) from nearest-neighbor states with similar incidence rates and applied the average prevalence to the respective state and District of Columbia populations by age, sex, and race. We then summed over race to estimate the 10-year limited duration prevalence by sex and age. We used the ComPrev method to estimate the January 1, 2021, complete prevalence by sex and age.[8] The total complete prevalence on January 1, 2025, was estimated by multiplying the January 1, 2021, complete prevalence by sex and age by the January 1, 2025, populations for each of the 50 states and the District of Columbia. The final 2025 state complete prevalence estimates for all sites were obtained by multiplying each state-specific prevalence by a separate adjustment factor for males and females. The respective adjustment factors were calculated by comparing the sums of the 2025 sex-specific prevalences over age and state with the sex-specific national 2025 complete prevalence projections obtained using the Prevalence Incidence Approach Model method. Ten-year prevalence data were not available for the District of Columbia or the states of Indiana, South Dakota, and Virginia. We selected the nearest-neighbor states with similar incidence rates; calculated 10-year limited-duration prevalence for the aggregated areas by age, sex, and race (White, Black, other); and applied these prevalences to the respective District of Columbia and state populations.

Treatment

We used the 2023 National Cancer Database (NCDB) submission data to describe treatment patterns based on staging categories in the

American Joint Committee on Cancer (AJCC) seventh and eighth editions of the *AJCC Cancer Staging Manual*[9,10] for the first course of treatment for cases diagnosed in 2021, which was the latest year for which complete data were available. Treatment patterns for diffuse large B-cell lymphoma and testicular cancer were estimated by using aggregated cases diagnosed during 2017–2021 because of sparse data. The NCDB is a hospital-based cancer registry jointly sponsored by the American Cancer Society and the American College of Surgeons and includes approximately 70% of all invasive cancers in the United States from more than 1500 facilities accredited by the American College of Surgeons' Commission on Cancer (CoC).[11,12] Because of the limited completeness of NCDB data for cancers typically diagnosed in outpatient settings, treatment data for melanoma, leukemia, thyroid and prostate cancer were derived from published literature.

The cancer treatment modalities reported are surgery, radiation therapy, and systemic therapy, including chemotherapy, targeted therapy, hormonal therapy, and immunotherapy. Many standard targeted therapies are classified as chemotherapy in the NCDB. For consistency and comparability, chemotherapy in this report includes targeted therapy and immunotherapies, except for diffuse large B-cell lymphoma, nonsmall cell lung cancer, and urinary bladder cancer, for which immunotherapy is presented separately. Treatment data by race are exclusive of Hispanic ethnicity for reduced racial misclassification. For more information regarding the prescription drug classification system used for the NCDB and other cancer registries, visit https://seer.cancer.gov/tools/seerrx/. For more details about the NCDB, visit https://www.facs.org/quality-programs/cancer-programs/national-cancer-database/.

All cancer cases were classified according to the *International Classification of Diseases for Oncology*, third edition,[13] except childhood and adolescent cancers, which were classified according to the *International Classification of Childhood Cancer*.[14,15]

Additional statistics

Incident cases in 2025

The estimated number of cancer cases diagnosed in 2025 presented herein were previously published by Siegel et al.,[16] where the methods are described.

Survival

The *AJCC Cancer Staging Manual*, seventh edition,[9] was used to categorize the 5-year relative survival for cases diagnosed from 2013 through 2017 as it transitioned to the eighth edition in 2018, with data sourced from SEER 17 registries,[17] representing 26.5% of the US population. Consequently, the contemporary 5-year survival (2014–2020) and stage distribution (2017–2021) by SEER summary stage, along with historical 5-year survival (1975–1977 and 1995–1997) by cancer type, are as previously published.[16] Contemporary 5-year relative survival (2014–2020) for leukemia, lymphoma, and testicular cancer subtypes were sourced from SEER 22 registries (excluding Massachusetts and Illinois),[18] covering 41.9% of the United States. Relative survival adjusts for normal life expectancy by comparing survival among people who have cancer with that of the general population, controlling for age, race, sex, and year. Survival data by race are exclusive of Hispanic ethnicity for reduced racial misclassification. All survival analyses were conducted using NCI's SEER*Stat software (version 8.4.3).[19]

Cancer subtype case distribution

The data on subtype and case distribution (2017–2021) for selected cancers were from NAACCR, which compiles and reports incidence data from 1995 forward for registries that participate in the SEER program and/or the National Program of Cancer Registries. These data approach nearly 100% coverage of the US population for the latest available years.[20]

SELECTED FINDINGS

Overall cancer prevalence

On January 1, 2025, about 18.6 million people with a history of cancer were alive, and this number is projected to exceed 22 million by 2035 (Figures 1 and 2). The number of survivors varies by state from almost 2 million in California to about 29,000 in the District of Columbia and 32,000 in Wyoming, reflecting variation in population size across states (Figure 1). These estimates do not include carcinoma in situ of any site except the urinary bladder, nor do they include basal cell or squamous cell skin cancers, which are not required to be reported to central cancer registries.

The three most prevalent cancers are prostate (3,552,460), melanoma of the skin (816,580), and colorectum (729,550) among males and breast (4,305,570), uterine corpus (945,540), and thyroid (859,890) among females as of January 1, 2025 (Figure 2). The distribution of prevalence differs from incidence because prevalence reflects survival and median age at diagnosis as well as cancer occurrence. About one half (51%) of survivors were diagnosed within the past 10 years, whereas 22% were diagnosed 20 or more years ago (Table 1). Nearly four fifths (79%) are aged 60 years and older (Figure 3), although age distributions vary by cancer type. For example, 87% of survivors of prostate cancer are aged 65 years or older compared with 53% of survivors of cervical cancer (Figure 4).

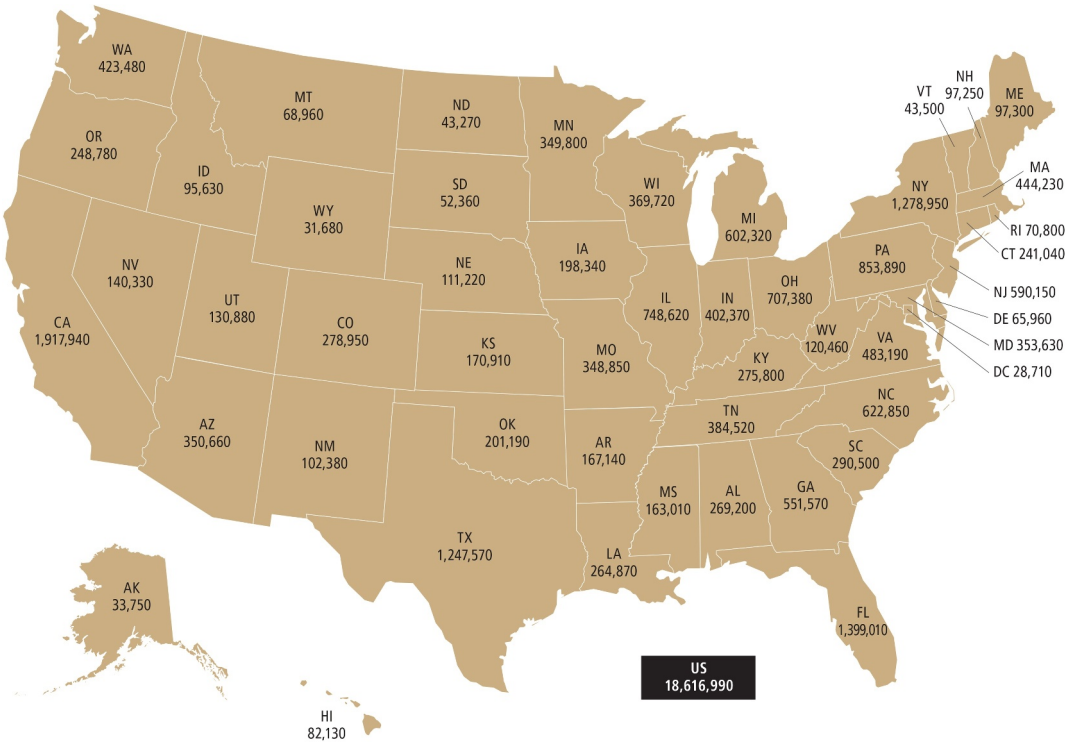

FIGURE 1 Estimated numbers of survivors of cancer in the United States by state as of January 1, 2025. State estimates do not sum to the US total because of rounding.

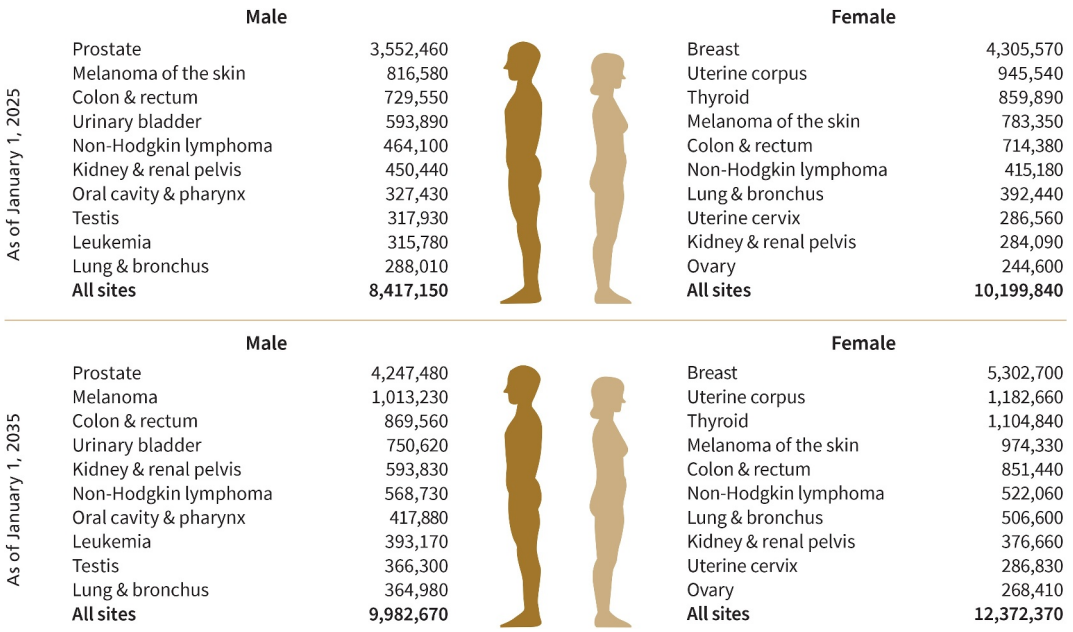

FIGURE 2 Estimated number of survivors of cancer in the United States by site. Estimates do not include in situ carcinoma of any site except the urinary bladder and do not include basal cell or squamous cell skin cancers.

Female breast

It is estimated that about 4.3 million women are living in the United States with a previous diagnosis of invasive breast cancer as of January 1, 2025, and this number is projected to reach 5.3 million by January 1, 2035 (Figure 2). In addition, 316,950 women are expected to be newly diagnosed with invasive breast cancer in 2025.[16] As of January 1 2025, nearly 170,000 survivors of breast cancer were projected to be living with metastatic disease.[21] About two thirds (67%) of survivors of breast cancer (>2.8 million women) are aged 65

TABLE 1 Estimated number of survivors of cancer in the United States by sex and years since diagnosis as of January 1, 2025.

	Male and Female			Male			Female		
Years since diagnosis	Number	Percent (%)	Cumulative percent (%)	Number	Percent (%)	Cumulative percent (%)	Number	Percent (%)	Cumulative percent (%)
0 to <5	5,554,410	30	30	2,677,210	32	32	2,877,200	28	28
5 to <10	3,874,650	21	51	1,787,960	21	53	2,086,690	20	49
10 to <15	2,958,130	16	67	1,340,190	16	69	1,617,950	16	65
15 to <20	2,201,470	12	78	1,009,360	12	81	1,192,110	12	76
20 to <25	1,457,170	8	86	610,310	7	88	846,860	8	85
25 to <30	920,140	5	91	340,520	4	92	579,620	6	90
≥30	1,651,030	9	100	651,610	8	100	999,420	10	100

Note: Percentages may not sum to totals and 100% because of rounding.

years and older, whereas 7% are younger than 50 years (Figure 4). The age distribution of survivors of breast cancer is younger than that for other common cancers in the United States, mainly because the median age at diagnosis is younger (e.g., 63 vs. 71 years for lung cancer).[22]

Treatment and survival

The most common treatment among women with early stage (I or II) breast cancer is breast-conserving surgery (BCS) with adjuvant radiotherapy (50%), although nearly one third of patients (32%) undergo mastectomy (Figure 5). By comparison, 61% of women with stage III breast cancer undergo mastectomy with or without radiotherapy, most of whom also receive chemotherapy. The most common treatment for metastatic disease (stage IV) is chemotherapy and/or radiation therapy (64%). Endocrine (hormonal) therapy is a cornerstone of treatment for hormone receptor-positive breast cancers, with about four in five women (81%) with these tumors receiving it across all stages (Figure 6). However, the utilization is lower among Black women, with a more pronounced disparity observed in those with stage III disease (65% vs. 74% in White women). Lower initiation and adherence rates largely drive the underuse of endocrine therapy in Black women. For example, Black women were less likely to report full adherence to endocrine therapy 2 years after diagnosis (75% vs. 83% for White women; $p < .001$) and experienced more treatment-related side effects.[23]

BCS followed by radiation to the breast is associated with long-term survival comparable to mastectomy when appropriately used for localized or regional breast cancer, with some studies suggesting a potential survival advantage for BCS.[24] Evidence from randomized controlled trials suggests that adjuvant radiation may be omitted without impacting survival in specific subsets of patients receiving BCS, such as women aged 70 years and older with small, localized, estrogen receptor-positive tumors.[25,26] Some BCS-eligible women elect mastectomy due to the fear of recurrence, reluctance to undergo radiation therapy, a contraindication to receiving radiation (e.g., prior ipsilateral radiation), or the absence of clear surgeon recommendation.[27,28] Logistical obstacles to receiving radiation therapy, such as time off work, distance to treatment, and/or transportation availability also play a role.[29] Younger women (aged <40 years) and those with high-risk genetic mutations (e.g., *BRCA1/BRCA2*) are more likely to undergo mastectomy[30]; however, higher risk may not always be a determining factor for undergoing contralateral prophylactic mastectomy (CPM). Over the past two decades, among the women with early-stage disease who choose mastectomy, the percentage who also underwent CPM increased from <2% in 1998 to 28%–30% during 2010–2012.[30] Despite this increase, CPM has not been shown to significantly improve overall survival in most women with unilateral breast cancer.[31] Following the American Society of Breast Surgeons 2016 recommendation against routine use of CPM in average-risk women with unilateral cancer,[32] comprehensive national analyses are needed to evaluate its impact, while efforts to enhance shared decision-making should continue.

Clinical factors that influence breast cancer survival include stage, tumor grade, hormone receptor (estrogen receptor and progesterone receptor) status, and expression of human epidermal growth factor receptor 2 (*HER2*). Historically, treatment advances have targeted hormone receptor-positive (e.g., aromatase inhibitors) and *HER2*-positive (e.g., trastuzumab) tumors, with triple-negative breast cancer mainly limited to cytotoxic chemotherapy. However, the evolving therapeutic landscape for triple-negative breast cancer has expanded treatment options across stages of the disease. Among women with early stage triple-negative disease, the addition of pembrolizumab, an anti–programmed cell death protein 1 (anti–PD-1) checkpoint inhibitor, to neoadjuvant chemotherapy has been shown to improve event-free survival.[33] In addition, adjuvant olaparib, a poly(ADP-ribose) polymerase (PARP) inhibitor, has shown effectiveness in reducing the risk of recurrence and potentially improving overall survival in patients with germline *BRCA1/BRCA2* mutations.[34] For women with metastatic

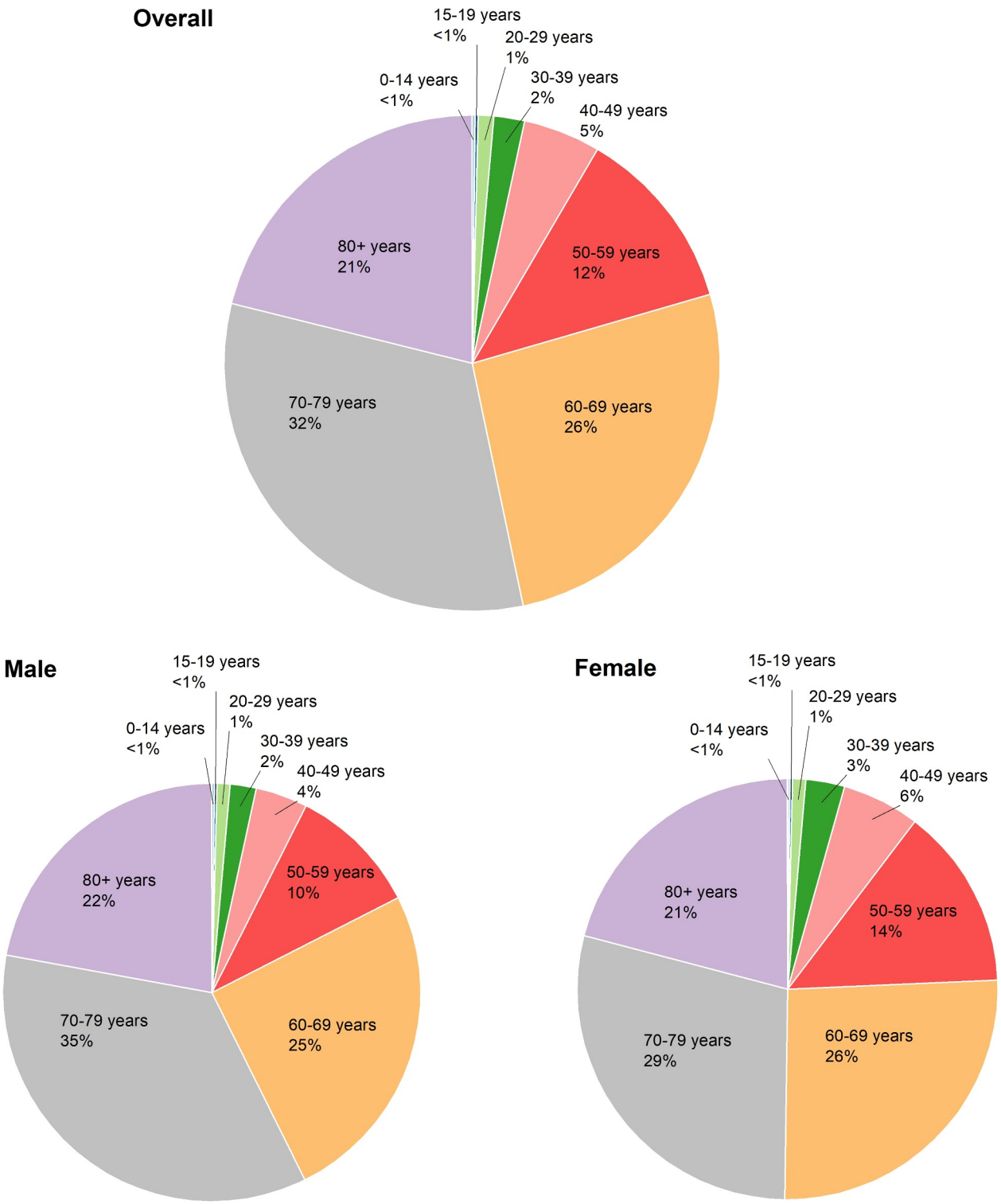

FIGURE 3 Distribution (%) of survivors of cancer in the United States as of January 1, 2025 by age at prevalence and sex. Percentages do not sum to 100% because of rounding.

disease, antibody–drug conjugates, including sacituzumab govitecan and trastuzumab durextecan, have demonstrated superior progression-free and overall survival compared with standard chemotherapy.[35–37]

The 5-year relative survival rate has increased from 75% for patients diagnosed in the mid-1970s to 91% in contemporary population-based data,[16] largely because of advances in hormonal treatments and earlier detection through increased mammography

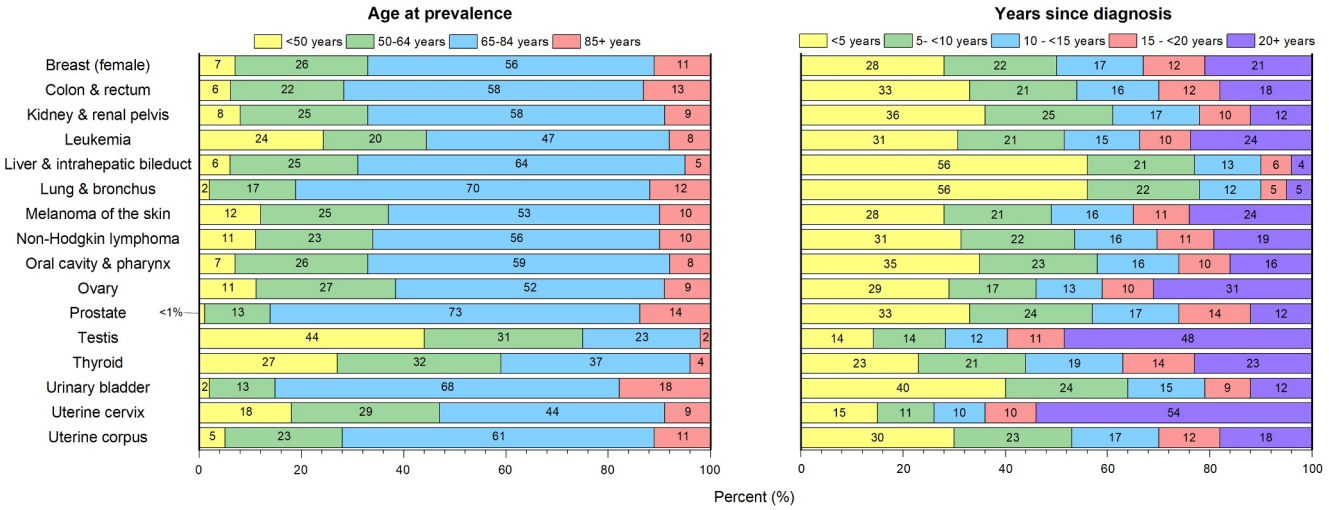

FIGURE 4 Distribution (%) of survivors of selected cancers in the United States as of January 1, 2025 by age at prevalence and years since diagnosis. Percentages may not sum to totals because of rounding. Estimates do not include in situ carcinoma of any site except the urinary bladder and do not include basal cell or squamous cell skin cancers.

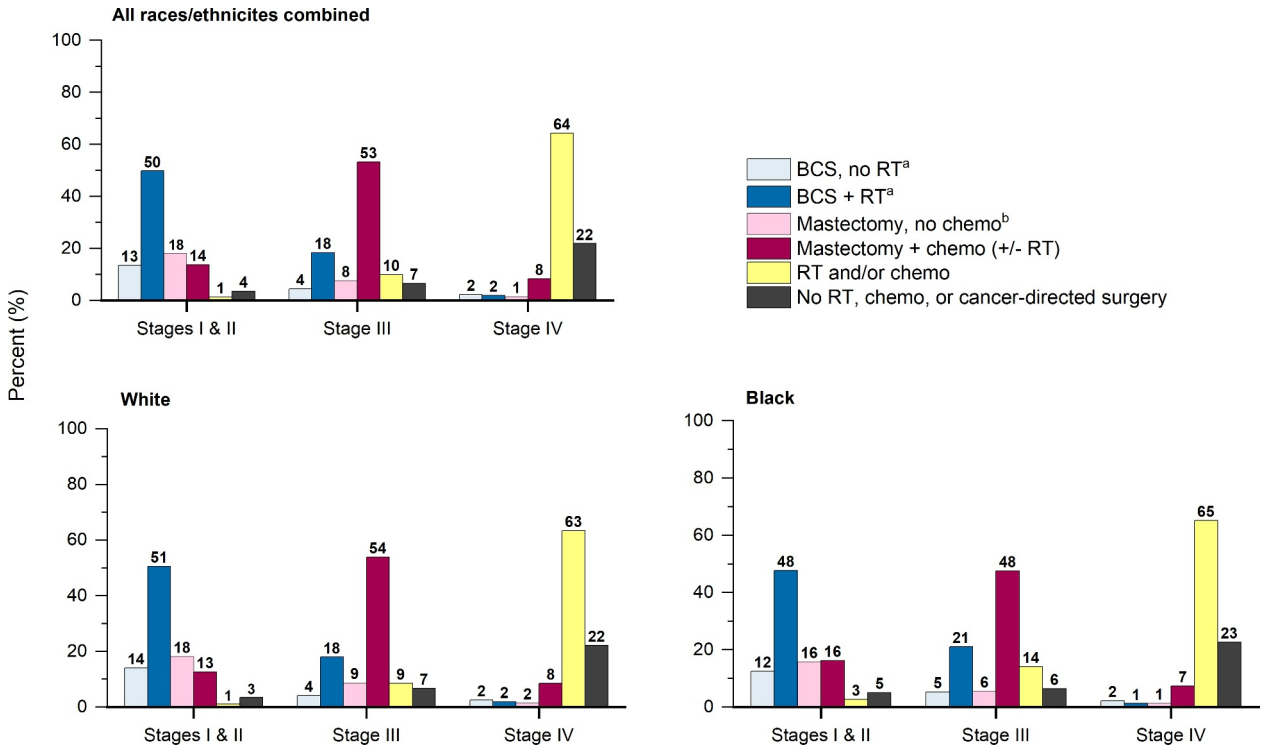

FIGURE 5 Treatment patterns (%) among women with breast cancer by stage, 2021. Percentages may not sum to totals because of rounding. Categories for White and Black race exclude persons of Hispanic ethnicity. [a]A small number of these patients receive chemotherapy. [b]A small number of these patients receive RT. +/− indicates with or without; BCS, breast-conserving surgery; chemo, chemotherapy (includes targeted therapy and immunotherapy); RT, radiation therapy.

screening and breast cancer awareness.[38] When stratified by AJCC stage, the 5-year relative survival rate approaches 100% for patients diagnosed with stage I disease but declines to 31% for those diagnosed with stage IV breast cancer (Figure 7). However, Black women have much lower survival than White women for advanced disease (stage III, 65% vs. 77%; stage IV, 21% vs. 32%; Figure 7).[17] In one study, health insurance coverage status accounted for more than one third of the Black–White disparity in

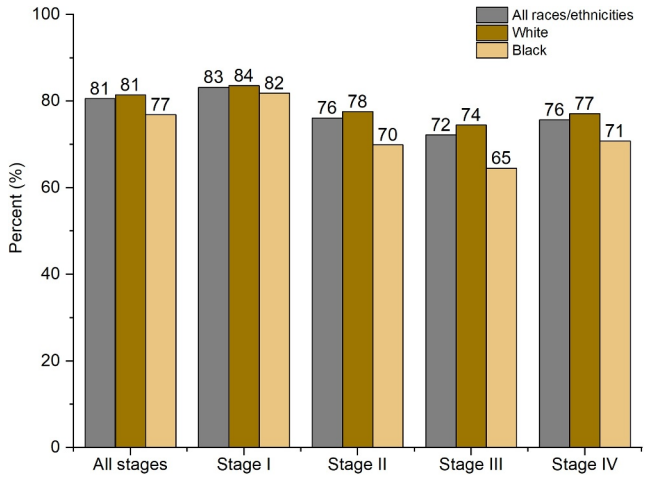

FIGURE 6 Endocrine therapy receipt (%) among women with hormone receptor-positive breast cancer by stage, 2021. Categories for White and Black race exclude persons of Hispanic ethnicity.

breast cancer survival among nonelderly patients after adjusting for patient demographics, treatment differences, and other clinical factors (e.g., tumor characteristics).[39] Systemic inequities in access to social and health care resources contribute to disproportionate health hazards among Black women, which, in turn, are associated with a higher prevalence of comorbidities. Unfavorable tumor characteristics (e.g., higher incidence of triple-negative tumors) can also contribute to the survival disparity.[39,40] Notably, Black women have lower survival for every molecular subtype.[41,42]

Short-term and long-term health effects

The precise incidence of breast cancer-related lymphedema (BCRL) is unknown, partly due to its long latency period, which typically peaks between 12 and 30 months after initial treatment.[43] It affects at least 20% of patients after axillary lymph node dissection (ALND) and approximately 6% of patients after sentinel lymph node biopsy (SLNB).[43] Prospective surveillance and early management of BCRL have been shown to slow its progression and reduce the risk of chronic arm lymphedema, with a cumulative incidence of only 6% after ALND.[44] Although cancer rehabilitation can reduce the risk and lessen the severity of this condition,[45,46] it remains less accessible to women of lower socioeconomic status, who are disproportionately affected by BCRL.[47]

Additional long-term effects of breast cancer surgery and radiation therapy may include numbness, tingling, or tightness in the chest wall, arms, or shoulders. Approximately one third of women develop persistent pain after breast cancer surgery or radiation therapy,[48] with younger women and those who undergo ALND having the highest risk.[49] Several chemotherapeutic agents, including taxanes, are linked to peripheral neuropathy, which may have a persistent impact on quality of life.[50] Emotional and functional well-being after diagnosis may vary over time, with younger age, Black race, lower socioeconomic status, and more intensive treatment associated with a greater likelihood of persistently lower self-reported well-being.[51]

Sexual dysfunction and fertility concerns are common among survivors of breast cancer,[52,53] especially given the rising incidence in women younger than 50 years.[41] Poor body image following surgery may also lower sexual health.[53] In particular, endocrine therapy can often induce menopausal symptoms, such as hot flashes, night sweats, and atrophic vaginitis, which can lead to dyspareunia.[54] Ovarian function suppression therapy, involving a gonadotropin-releasing hormone (GnRH) agonist and an aromatase inhibitor, increasingly used in high-risk premenopausal patients, can exacerbate these symptoms and increase the risk of osteoporosis.[55] In addition, some chemotherapeutic agents are gonadotoxic and can also lead to premature menopause, which increases the risk of osteoporosis and impaired fertility.[56,57] Given these challenges, fertility counseling is recommended for all premenopausal patients with breast cancer.[56] Studies have suggested that modest delays in breast cancer treatment for fertility preservation do not significantly increase all-cause mortality, breast-cancer-specific mortality, or recurrence.[58–60] Importantly, discussions around sexuality are critical, and more work is needed to ensure that survivors can access resources to address them.

Survivors may also experience cognitive impairment and fatigue, which may become chronic.[61] One study reported that survivors of breast cancer receiving endocrine therapy, chemotherapy, or both experienced greater physical health decline within 2 years compared to women without cancer.[62] Ovarian suppression therapy in premenopausal women may cause an elevated risk of cardiovascular diseases.[63] Importantly, some chemotherapeutic agents (e.g., anthracyclines) and *HER2*-targeted drugs (e.g., trastuzumab) can lead to cardiotoxicity, including cardiomyopathy and congestive heart failure.[64] The American Society for Clinical Oncology has issued guidelines for preventing and monitoring cardiomyopathies and other cardiovascular irregularities related to these treatments.[65]

Colon and rectum

It is estimated that more than 1.4 million people are living in the United States with a previous colorectal cancer (CRC; including appendix) diagnosis as of January 1, 2025, and an additional 154,270 new cases are expected to be diagnosed in 2025.[16] About three quarters (72%) of survivors of CRC—more than 1 million people—are aged 65 years and older, whereas 87,010 CRC survivors are younger than 50 years (Figure 4). The median age at diagnosis of CRC is 65 years for men and 68 years for women.[22] This patient population is rapidly shifting younger as incidence rises

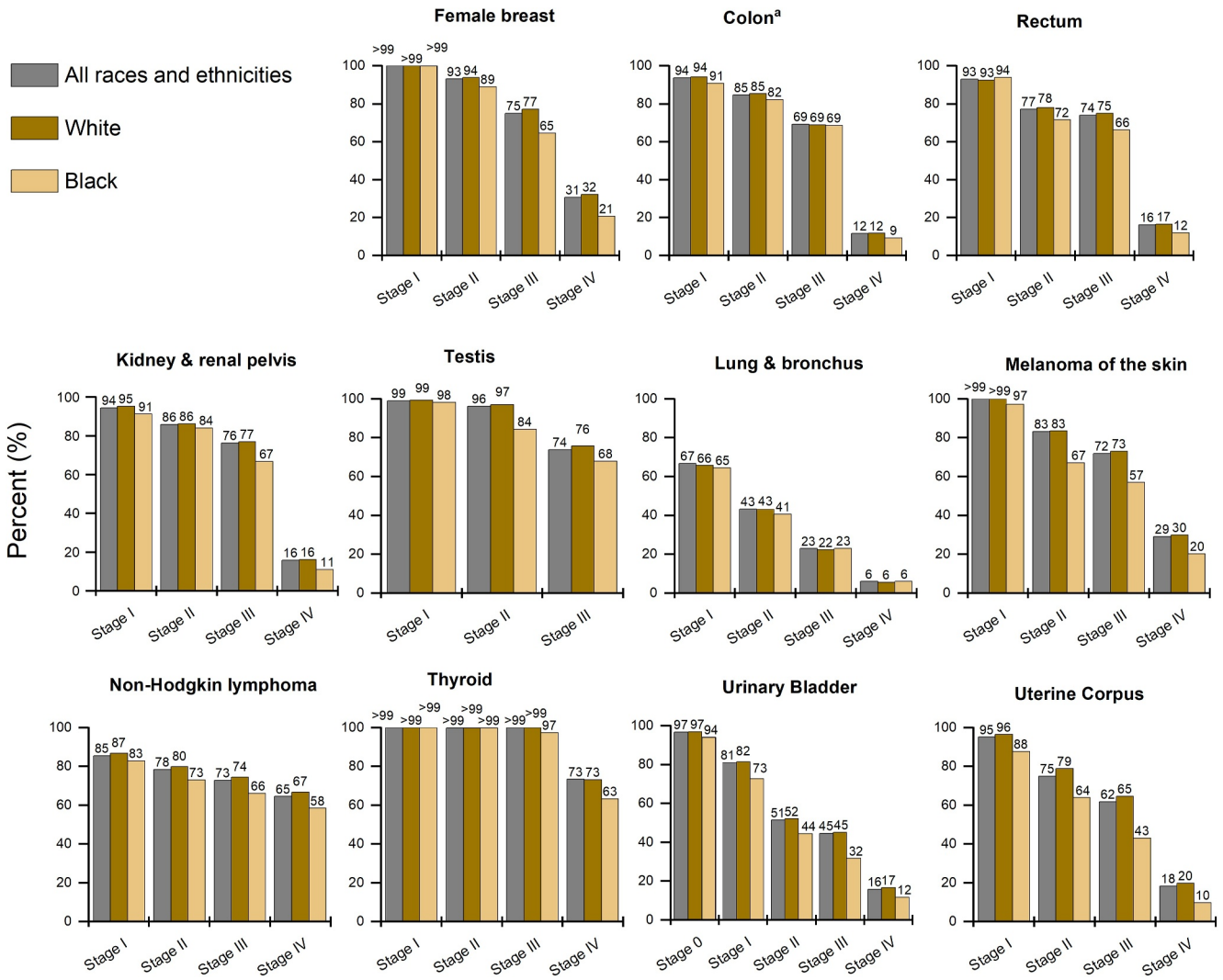

FIGURE 7 Five-year relative survival rates (%) for selected cancers by race and stage at diagnosis, 2013–2017. Categories for White and Black race exclude persons of Hispanic ethnicity. [a]Excludes appendix.

in adults younger than 65 years, while rates continue to decline rapidly in older adults.[66] Incidence has risen with every generation born since the 1950s because of risk factor exposures that remain largely unknown but may be related to changes in diet and a more sedentary lifestyle.

Treatment and survival

The majority of patients with stage I–II colon cancer undergo colectomy alone (83%), whereas patients with stage III colon cancer (as well as some patients with high-risk stage II disease)[67,68] are more likely to also receive adjuvant chemotherapy (Figure 8). For patients with stage I rectal cancer, proctectomy or proctocolectomy is the most common treatment (60%), with about one half also receiving neoadjuvant radiation or chemotherapy (Figure 9). Stage II and III rectal cancers are typically treated with neoadjuvant chemoradiotherapy and surgery. About one half (45%) of patients with stage IV colon cancer receive surgical treatment, usually with chemotherapy, whereas most patients with stage IV rectal cancer receive chemotherapy alone or with radiotherapy. For unresectable stage IV CRC, treatment may include an initial induction chemotherapy regimen followed by observation, maintenance, or continuation of the induction regimen.[69] More than one half of patients who have metastatic CRC have tumors with specific molecular profiles (e.g., *KRAS*/*NRAS*/*BRAF* wild-type tumors, those with *BRAF* V600E sequence variations, microsatellite instability),[70–72] for which several targeted drugs or immunotherapy are also available.[73] In addition to molecular profiles, tumor sidedness can be used to guide treatment selection, but the evidence is less robust for treatments beyond the first line.[74]

Black patients with rectal cancer experience substantial disparities in treatment compared with their White counterparts. For

example, among patients with stage I rectal cancer, only 39% of Black patients undergo proctectomy or proctocolectomy compared with 64% of White patients (Figure 9). In addition, sphincter-preserving surgery, which is associated with improved outcomes and quality of life, is less frequently performed in Black patients, men, those aged 70 years and older, and uninsured people.[75,76] These disparities are more pronounced for rectal cancer than for colon cancer, likely reflecting the greater complexity of rectal cancer management. Studies consistently demonstrate that Black patients are less likely than White patients to receive surgery for early stage colon and rectal cancers, with a larger treatment gap for rectal cancer.[77,78] Insurance coverage plays a vital role in shaping these disparities. Patients with private insurance are twice as likely to receive recommended treatment for stage I–III colon cancer compared with patients who are uninsured.[77] Consequently, patients with stage I CRC who are uninsured have lower 5-year observed survival than those with stage II disease who have private insurance (87% vs. 89%; Figure 10). Disparities in access to health insurance coverage have been estimated to account for about one half of the Black–White survival disparity for patients with CRC aged 18–64 years.[79]

The 5-year relative survival for CRC has improved from 50% during the mid-1970s to 64% in contemporary population-based data,[16] reflecting both earlier diagnosis through screening and advances in surgical techniques and novel systemic therapies, with survival higher for rectal cancer (67%) than for colon cancer (63%) due to a greater proportion of localized disease.[16] When stratified by AJCC staging, the 5-year survival rate is >90% for stage I colon and rectal cancers but declines to 12% and 16%, respectively, for stage IV disease (Figure 7).

Short-term and long-term health effects

Gastrointestinal dysfunction is a common side effect among patients who undergo surgical treatment and includes, but is not limited to, abdominal pain, distension, and changes in bowel movements.[80] Bowel dysfunction is more common among patients with rectal cancer who are treated with pelvic radiation.[81] Survivors of CRC experience higher rates of sexual dysfunction and negative body image compared with many other cancers,[82,83] particularly those with a permanent ostomy,[84] who may require specialized care from an ostomy therapist or nurse.[85] Ostomy-related changes can affect physical and emotional intimacy—areas that are often underrecognized in survivorship care but are critically important to the overall quality of life. Findings from the

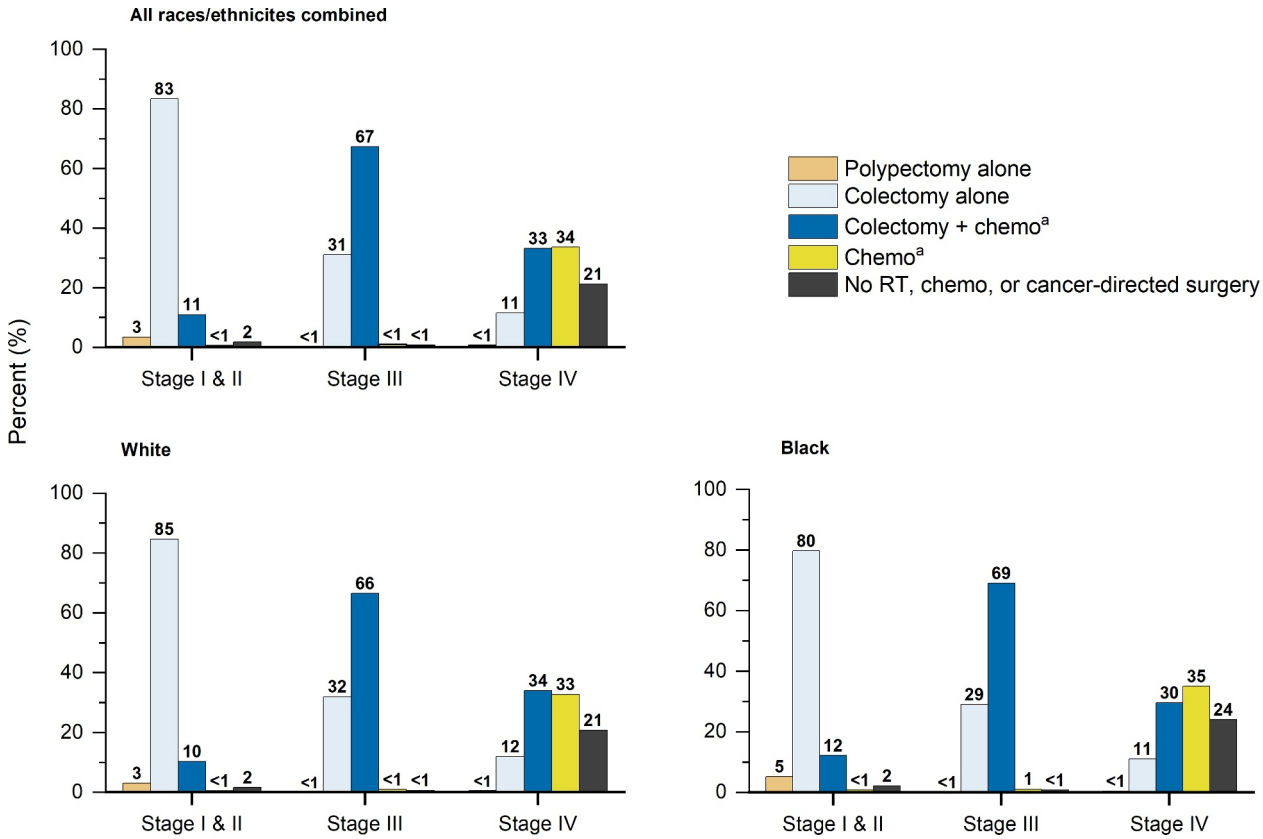

FIGURE 8 Colon cancer treatment patterns (%) by stage, 2021. Percentages may not sum to totals because of rounding. Colon cancer excludes appendiceal cancer. Categories for White and Black race exclude persons of Hispanic ethnicity. [a]A small number of these patients also receive RT. + indicates with; Chemo, chemotherapy (includes targeted therapy and immunotherapy); RT, radiation therapy.

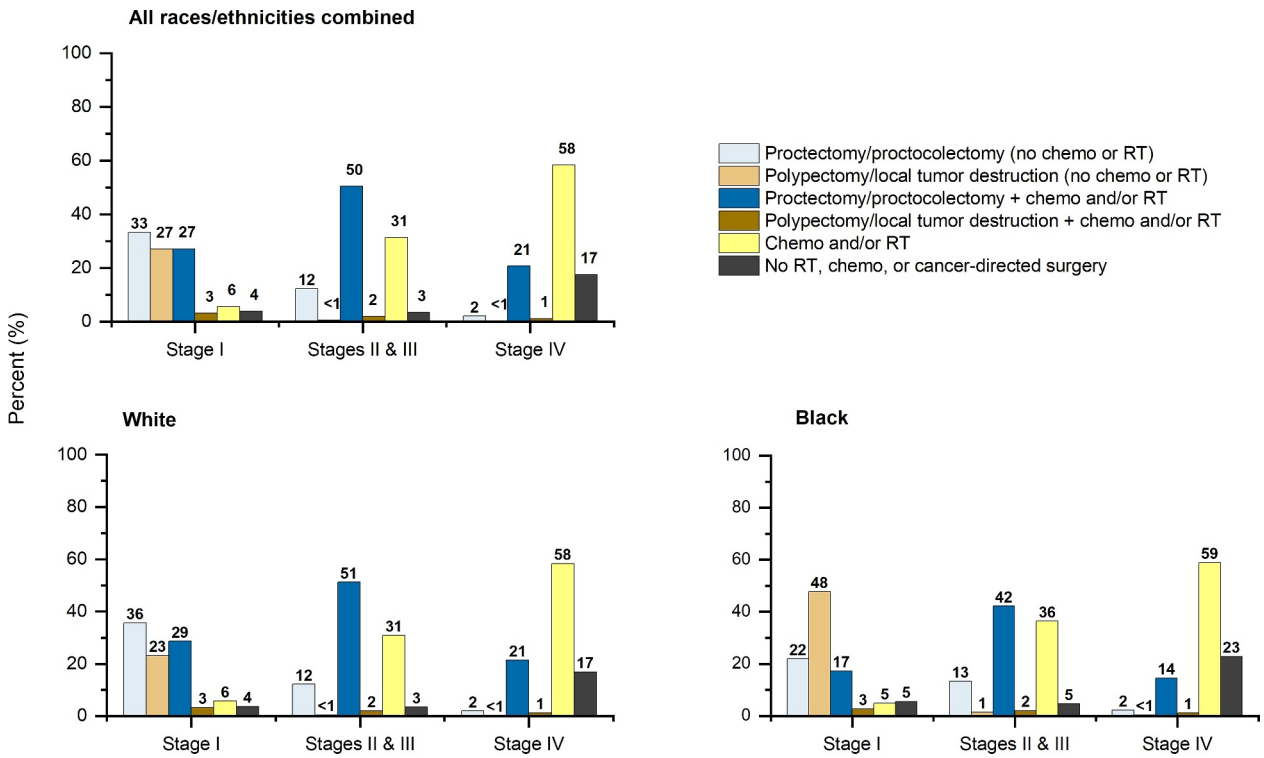

FIGURE 9 Rectal cancer treatment patterns (%) by stage, 2021. Percentages may not sum to totals because of rounding. Categories for White and Black race exclude persons of Hispanic ethnicity. + indicates with; Chemo, chemotherapy (includes targeted therapy and immunotherapy); RT, radiation therapy.

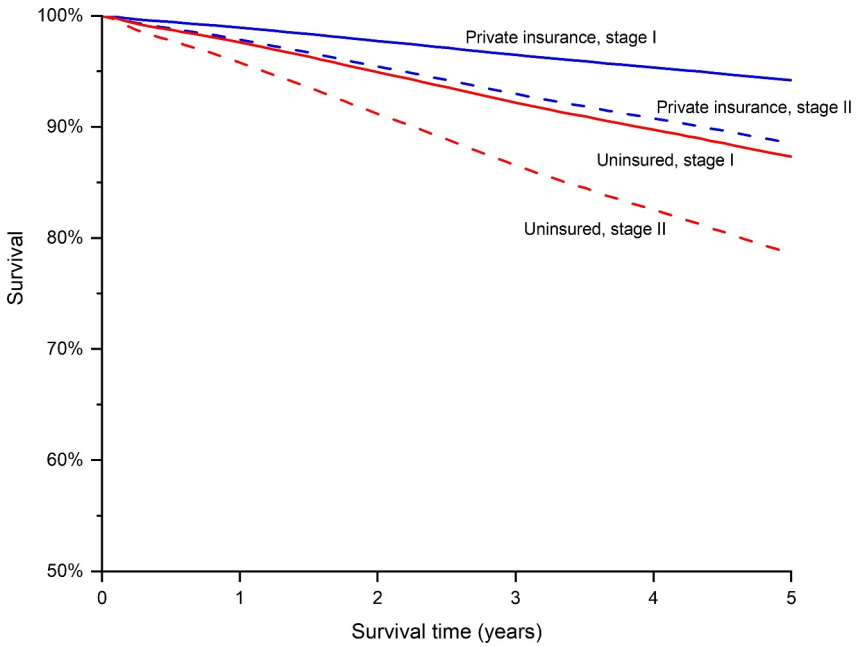

FIGURE 10 Disparities in observed colorectal cancer survival by health insurance coverage and stage, ages 45–64 years. Patients were diagnosed from 2017 to 2021 and all followed through 2021.

Ostomy Self-management Training (OSMT) trial (ClinicalTrials.gov identifier NCT02974634) demonstrate that structured, telehealth-delivered group education may help address intimacy-related concerns, indicating a potential role for integrating sexual health support into survivorship care for individuals with ostomies.[86] Pooled data from multiple clinical trials have demonstrated the

safety of reducing the duration of oxaliplatin-based regimens to lower the risk of persistent neurotoxicity among appropriately selected patients.[87,88] Patients treated with pelvic radiation, especially those of reproductive age, may experience ovarian or testicular impairment, with options like ovarian transposition or egg cryopreservation available for women seeking fertility preservation.[56,89] As the incidence of early onset CRC continues to rise, better understanding and addressing the unique survivorship needs of younger patients remain critical.

Kidney and renal pelvis

It is estimated that 734,530 people are living in the United States with a previous kidney cancer diagnosis as of January 1, 2025, and an additional 80,980 new cases are expected to be diagnosed in 2025.[16] The majority (90%) of kidney cancers are renal cell carcinomas.[90] About two thirds (67%) of the survivors of kidney cancers are aged 65 years and older (Figure 4). The probability of developing kidney cancer among men is twice as high as that among women.[16]

Treatment and survival

Among patients with stage I kidney cancer, almost three fourths (73%) undergo partial or radical nephrectomy. However, only 70% of Black patients undergo surgery compared with their White counterparts (73%; Figure 11). A select subset of patients with significant comorbidities and small tumors (≤3 cm) may undergo ablation (e.g., cryoablation, radiofrequency ablation, microwave ablation), whereas older adults with smaller tumors and limited life expectancy may opt for active surveillance based on tumor growth rate.[91]

For patients with metastatic renal cell carcinoma, immunotherapy and/or targeted therapy with vascular endothelial growth factor receptor tyrosine kinase inhibitors (TKIs) that target angiogenesis are usually recommended,[92] although some patients with limited metastases may be treated with local therapies like stereotactic body radiation therapy, stereotactic radiosurgery, or metastasectomy.[91,93] Many newer systemic therapies have been approved as first-line or subsequent line treatments for advanced renal cancer.[94,95] However, among patients with stage IV kidney cancer, 29% of Black patients received no systemic therapy, radiation therapy, or cancer-directed surgery compared with 21% of White patients, suggesting potential differences in treatment patterns that merit further investigation (Figure 11).

Overall, the 5-year survival rate for kidney cancers has increased from 20% in the mid-1970s to 78% in contemporary population-based data,[16] partly reflecting lead-time bias from increased incidental detection through imaging as well as advances in management.[92] When stratified by stage, overall survival declines from 94% for stage I to 16% for stage IV kidney cancer (Figure 7).[17]

Short-term and long-term health effects

Acute kidney injury is a common side effect after partial or radical nephrectomy.[96] Radical nephrectomy can increase the risk of chronic kidney disease, cardiovascular morbidity, and mortality.[97] Patients treated with immunotherapy may experience immune-related adverse events that include, but are not limited to, skin rashes, diarrhea, and hematologic, cardiovascular, endocrine, and renal adverse effects.[98] The potential impact of immunotherapy on fertility and sexual health in survivors of kidney cancer is not well characterized and would benefit from further investigation. The most common adverse event associated with vascular endothelial growth factor receptor TKIs is hypertension, which occurs in one half of patients.[99]

Leukemias and lymphomas

It is estimated that 558,660 people are living in the United States with a previous leukemia diagnosis as of January 1, 2025, and an additional 66,890 new cases are expected to be diagnosed in 2025.[16] Although leukemia is the most common childhood cancer, the majority (93%) of patients are diagnosed at age 20 years and older.[20] Acute lymphoblastic leukemia (ALL) is most common among children and adolescents, whereas acute myeloid leukemia (AML), chronic lymphocytic leukemia (CLL)/small lymphocytic lymphoma (hereinafter CLL), and chronic myeloid leukemia (CML) are most common among older adults. The median age at diagnosis is 17 years for ALL, 65 years for CML, 68 years for AML, and 70 years for CLL.[22]

There are two major types of lymphoma: Hodgkin lymphoma (HL) and non-Hodgkin lymphoma (NHL). It is estimated that, as of January 1, 2025, there were 235,110 survivors of HL and 879,290 survivors of NHL living in the United States. In addition, approximately 8,720 new cases of HL and 80,350 new cases of NHL are expected to be diagnosed in 2025.[16] Nearly one half (49%) of HL cases occur in individuals younger than 40 years, whereas the vast majority of NHL cases (87%) are in adults aged 50 years or older,[20] with a median age at diagnosis of 39 vs. 67 years, respectively.[22]

Treatment and survival for the most common types of leukemia and lymphoma

Acute myeloid leukemia

AML is often classified into acute promyelocytic leukemia (APL) and non-APL for treatment purposes. APL, a rare subtype accounting for approximately 15% of cases, has a more favorable prognosis and is treated with all-*trans* retinoic acid and arsenic trioxide with or without chemotherapy.[100,101] Most non-APL cases are treated with the standard *7 + 3* regimen, combining cytarabine and an anthracycline, although many older adults (older than 60 years) are unable to tolerate intensive chemotherapy regimens.[102] Non-APL treatment options also include hematopoietic stem cell transplantation,

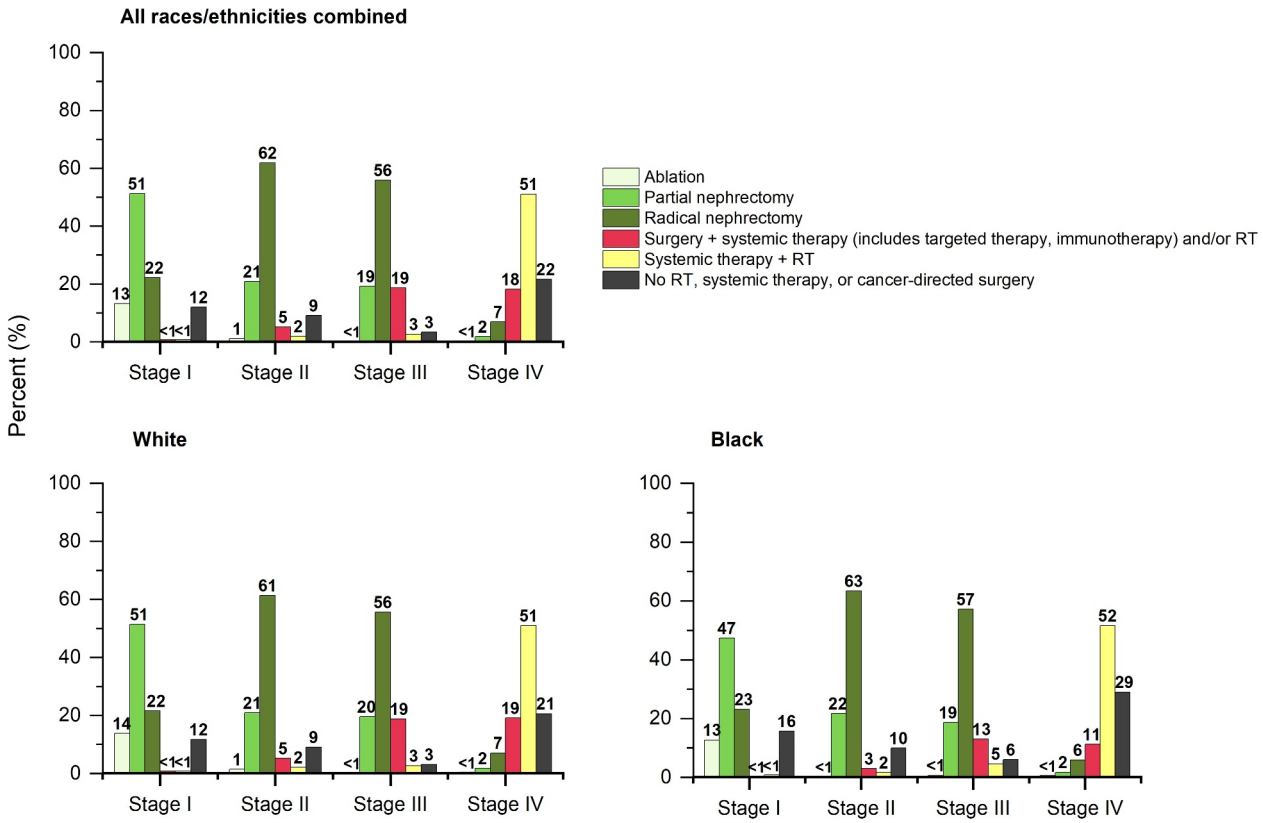

FIGURE 11 Kidney cancer treatment patterns (%) by stage, 2021. Percentages may not sum to totals because of rounding. Categories for White and Black race exclude persons of Hispanic ethnicity. Surgery of an unspecified type was not included in these treatment patterns. + indicates with; RT, radiation therapy.

antibody–drug conjugates,[103] and targeted therapy drugs.[104] Although complete remission is achieved in many patients (60%–85% of adults aged 60 years or younger and 40%–60% of those older than 60 years), approximately one half of these patients relapse.[102,105] The contemporary 5-year relative survival rate is 70% for children and adolescents[18] but declines to 62%, 39%, and 11% for patients aged 20–49, 50–64, and 65 years and older, respectively.[18]

Chronic myeloid leukemia

CML is classified as being in chronic, accelerated, or blastic phase to guide treatment. TKIs that target the *BCR::ABL1* fusion gene (on the Philadelphia chromosome) are standard across all phases.[106] In selected patients, these drugs can be safely discontinued after the initial course,[107,108] which can substantially improve quality of life.[109] Allogenic hematopoietic stem cell transplantation may be an option for those who become resistant to TKIs and younger patients, whereas chemotherapy is only used in TKI-resistant patients.[106] Because of the widespread use of the *BCR::ABL1* TKIs, the 5-year survival rate for CML has doubled from 34% for patients diagnosed during 1994–1996[22] to 70% in contemporary population-based data.[18]

Acute lymphoblastic leukemia

Chemotherapy is the standard treatment for ALL, with typically more intensive regimens used in children than in adults, including more intensive central nervous system therapy.[110] Treatment is typically given in phases, including induction, consolidation (intensification), and long-term maintenance. More than 95% of children and 78%–92% of adults with ALL attain remission.[111] Patients with Philadelphia-chromosome positive ALL, which accounts for up to 30% of adult cases but is relatively rare (<5%) in children,[110] may benefit from adding a TKI to chemotherapy.[110] Allogeneic stem cell transplantation is recommended for some patients with high-risk disease and for those who relapse after remission or who do not experience remission after successive courses of induction chemotherapy.[110] Chimeric antigen receptor (CAR) T-cell therapy and monoclonal antibodies are also options for patients with specific subtypes of ALL who have relapsed or have not responded to other treatments.[110,112]

Survival rates for ALL have increased steadily since the mid-1970s, from 7% to 47% among adults aged 20 years and older and from 59% to 90% in adolescents and children in contemporary population-based data,[16,18] mainly reflecting the optimization of chemotherapeutic regimens.[16] Although there is some evidence that adults younger than 50 years may benefit from a more aggressive regimen akin to pediatric protocols with limited toxicity,[113] research is ongoing.

Chronic lymphocytic leukemia/small lymphocytic lymphoma

CLL is the most common type of leukemia in adults, accounting for 38% of all leukemia in adults aged 20 years and older.[20] Given its

typically indolent course, treatment is generally reserved for patients who are symptomatic, or those experiencing cytopenias or other disease-related complications, and therapeutic interventions may rarely result in a cure or prolong survival.[114] Targeted therapies, including Bruton tyrosine kinase inhibitors and B-cell leukemia/lymphoma 2 inhibitors, are typically available for initial treatment.[114] Other options might include immunotherapy, chemotherapy, or other targeted therapies. The contemporary 5-year relative survival rate for CLL is 89%,[18] with large variations ranging from several months to normal life expectancy. Richter transformation can occur in about 5%–10% of patients with CLL who develop an aggressive lymphoma.[114]

Hodgkin lymphoma

HL will account for approximately 10% of all lymphoma cases diagnosed in 2025.[16] Classical HL (CHL) comprises 91% of cases, and nodular lymphocyte-predominant HL (NLPHL) comprises the remaining 9%.[20] CHL is characterized by Reed–Sternberg cells, whereas NLPHL is more indolent and has a generally favorable prognosis.[115]

Treatment for early stage CHL typically involves ABVD chemotherapy (doxorubicin, bleomycin, vinblastine, dacarbazine) or similar regimens, with positron emission tomography (PET)–computed tomography response guiding treatment intensity and duration.[116] Although historical approaches included radiation therapy, its use has significantly declined in favor of PET-adapted chemotherapy strategies, and it is now rarely used in many clinical settings.[116] Approximately 30% of patients with CHL experience refractory disease or relapse after first-line therapy, requiring other treatments, such as high-dose chemotherapy with autologous stem cell transplantation or treatment with brentuximab vedotin and anti–PD-1 immune checkpoint inhibitors.[116,117] For NLPHL, adults with early stage disease and without clinical risk factors (limited lymph nodes, no B symptoms, bulky disease, or extranodal spread) may be treated with limited-field radiation alone, whereas more advanced cases are treated with chemotherapy plus radiation, as well as the monoclonal antibody rituximab.[118] The contemporary 5-year relative survival rates for HL are 89% overall, 88% for CHL, and 98% for NLPHL.[18]

Non-Hodgkin lymphoma

The most common types of NHL are diffuse large B-cell lymphoma (DLBCL), which accounts for about two in five cases, and follicular lymphoma (FL), which accounts for about one in five cases.[20] First-line treatment for DLBCL typically includes chemoimmunotherapy, most commonly R-CHOP (rituximab, cyclophosphamide, doxorubicin, vincristine, and prednisone), with PET–computed tomography response guiding treatment intensity and duration.[119] In 2021, nearly three fourths (72%) of patients with DLBCL received chemoimmunotherapy with or without radiation (Figure 12), although the receipt of radiation was lower among Black patients (66%) compared with White patients (74%).

FL is indolent and often does not require treatment until symptoms develop.[119] For patients with localized low tumor burden, radiation therapy and/or rituximab can be considered.[119] Chemoimmunotherapy can be considered in patients with advanced-stage disease.[119] Stem cell transplantation or CAR T-cell therapy may be an option for refractory FL.[119] The contemporary 5-year relative survival is 90% for FL and 65% for DLBCL; although 5-year survival for DLBCL is lower in Black individuals (62%) than in White individuals (66%), it is similar for FL.[18]

Short-term and long-term health effects

Patients who undergo allogeneic hematopoietic stem cell transplantation, which is used most commonly for acute leukemias (ALL, AML) and sometimes for CML, frequently suffer from recurrent infections and anemia, sometimes necessitating blood transfusions. Allogeneic transplantation can also lead to chronic graft-versus-host disease, which may cause skin changes, dry mucous membranes, joint pain, weight loss, shortness of breath, and fatigue.[120] For CML, TKIs have transformed treatment outcomes but are associated with cardiovascular complications, including hypertension, arterial occlusive events, and heart failure.[121] Patients with HL, NHL, and ALL are commonly treated with anthracyclines, which also can be cardiotoxic.[64] In addition, the use of radiation therapy increases the risk of many late effects, including, but not limited to, cardiac dysfunction and secondary cancers.[122]

While CAR T-cell therapy has demonstrated clinical efficacy, it is associated with both short-term and long-term health effects. Common short-term toxicities include cytokine release syndrome, which can lead to hypotension, fever, and multiorgan dysfunction, as well as neurologic complications, such as immune effector cell-associated neurotoxicity syndrome.[123] Long-term toxicities of CAR T-cell therapy are still being studied but may include secondary malignancies, particularly T-cell neoplasms.[124] Available evidence suggests that the overall risk remains low[125] and is comparable to that of standard therapies; however, long-term monitoring may be needed.

Lung and bronchus

It is estimated that 680,450 people are living in the United States with a previous lung cancer diagnosis as of January 1, 2025, and an additional 226,650 new cases are expected to be diagnosed in 2025.[16] Approximately four fifths (82%) of survivors of lung cancer were aged 65 years and older as of January 1, 2025 (Figure 4), reflecting the older median age at diagnosis (71 years) compared with all cancers combined (median age at diagnosis, 66 years).[22] In part because of the low overall 5-year relative survival for the disease, more than one half of survivors (56%) were diagnosed within the past 5 years (Figure 4).

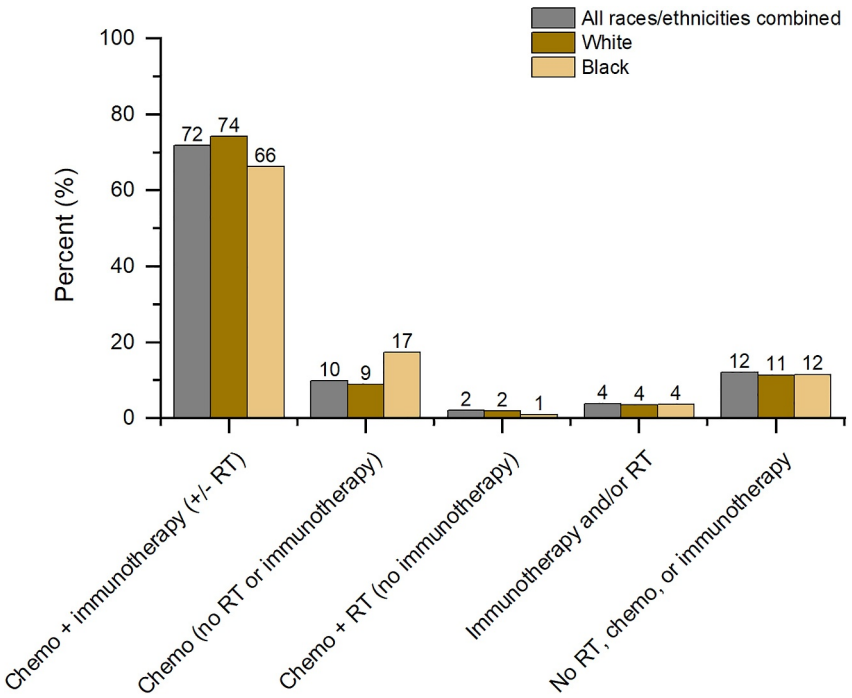

FIGURE 12 Diffuse large B-cell lymphoma treatment patterns (%), 2017–2021. Percentages may not sum to totals because of rounding. Categories for White and Black race exclude persons of Hispanic ethnicity. +/− indicates with or without; chemo, chemotherapy (includes targeted therapy); RT, radiation therapy.

Treatment and survival

Lung cancer is classified as small cell lung cancer (13% of cases) or nonsmall cell lung cancer (NSCLC; 83% of cases), with about 4% of cases lacking information on histology.[20] The most common subtypes of NSCLC are squamous cell carcinoma, adenocarcinoma, and large cell carcinoma. Surgery is the primary treatment for early stage lung cancer, and approximately one half of patients (52%) who have stage I-II NSCLC undergoing surgery with either wedge resection, sleeve resection, lobectomy, or pneumonectomy (Figure 13). In contrast, only 20% of patients with stage III NSCLC undergo surgery, whereas most (59%) are treated with chemotherapy and/or radiation. Black individuals are less likely to receive surgery than White individuals (47% vs. 52% for stage I-II disease; Figure 13). Black patients who receive treatment at academic centers and from surgeons who specialize in thoracic care are more likely to undergo surgery and have higher survival than those who receive care at community centers, although large disparities remain in the receipt of surgery compared with White individuals.[126,127]

The identification of common genetic mutations—including, but not limited to, *EGFR*, *KRAS*, and *ALK*—has led to the development of targeted therapies essential to the treatment of NSCLC. Approvals of immune checkpoint inhibitors targeting programmed death-ligand 1 and PD-1 have further expanded treatment options for specific NSCLC subtypes.[128] The uptake of immunotherapy has been rapid; in 2021, about 40% of patients with stage IV NSCLC received immunotherapy, up from 12% in 2016.[11,129]

Advances in early detection and treatment have nearly doubled 5-year relative survival since the mid-1990s, from 15% for patients diagnosed during 1995–1997 to 27% (White patients, 27%; Black patients, 24%) in contemporary population-based data.[16] When stratified by AJCC staging, the 5-year relative survival rate is 67% for stage I lung cancer, although this represents only about 19% of cases because early disease is typically asymptomatic.[17] For stage IV lung cancer, the 5-year survival rate declines to 6% (Figure 7), representing 50% of cases.

Short-term and long-term health effects

Many survivors of lung cancer have impaired pulmonary function before treatment, which can be exacerbated by surgery and/or radiation and may be a contraindication to treatment.[130] Postoperative pulmonary adverse effects (pneumonia, air leakage, atelectasis, bronchial fistula, emphysema, noncardiogenic pulmonary edema, and pulmonary embolism) may prolong hospital stay and shorten survival, especially for older adults.[131,132] The Enhanced Recovery After Surgery program is a multiprong rehabilitative approach designed to minimize postoperative morbidity and mortality after surgical treatment and is increasingly used for lung cancer surgery. Its adoption is growing globally but remains more common in high-volume centers and varies across institutions.[133] Treatment with *EGFR* and *ALK* inhibitors can lead to common side effects like nausea, diarrhea, and rash.[134] Immune checkpoint inhibitors used in lung cancer treatment

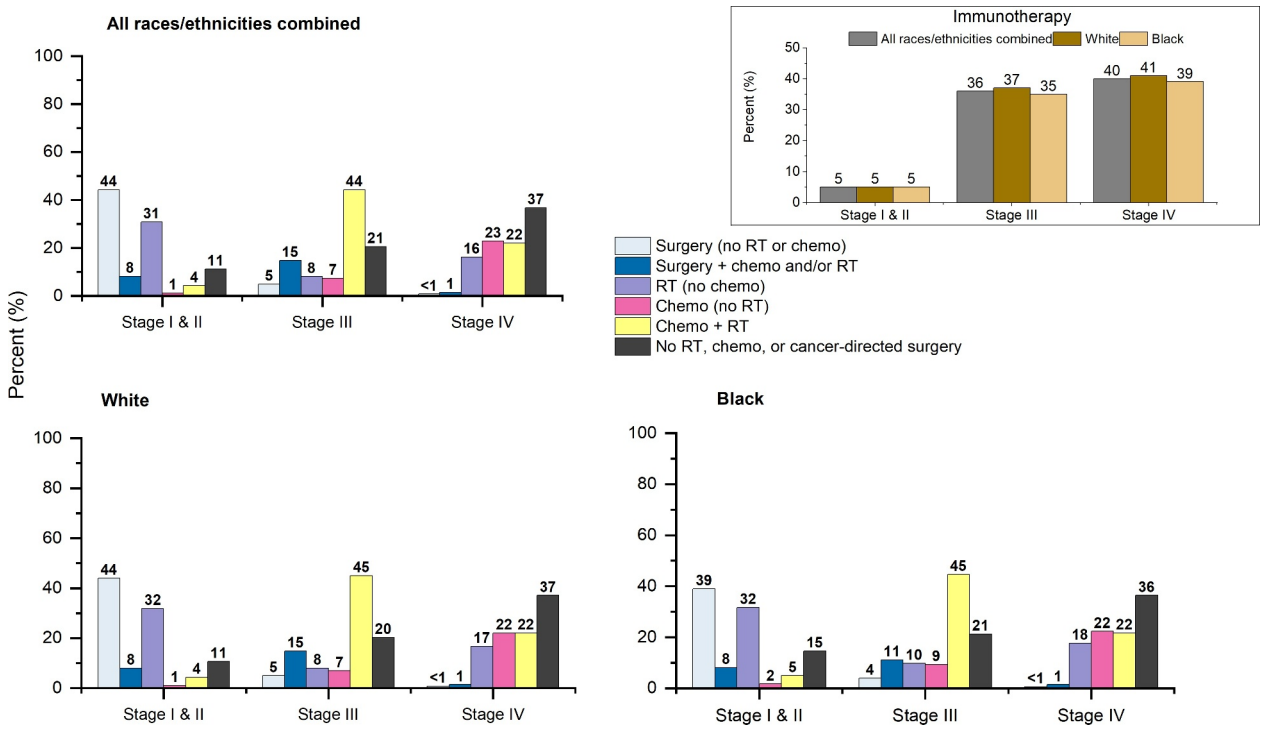

FIGURE 13 Nonsmall cell lung cancer treatment patterns (%) by stage, 2021. Percentages may not sum to totals because of rounding. Categories for White and Black race exclude persons of Hispanic ethnicity. + indicates with; Chemo, chemotherapy (includes targeted therapy but does not include immunotherapy, which is shown in the *inset*); RT, radiation therapy.

can lead to immune-mediated toxicities, including pneumonitis, colitis, nephritis, and endocrinopathy.[135]

Survivors of lung cancer who currently smoke or have smoked in the past are at increased risk for second primary lung cancers[136] as well as additional smoking-related cancers, including, but not limited to, head and neck and bladder cancers.[137] Data suggest that, for those who did smoke, smoking cessation after lung cancer diagnosis reduces the risk of subsequent cancer and improves prognosis,[138] highlighting the importance of patient and clinician discussions about smoking status and improving access to cessation resources.[139] Importantly, survivors may feel stigmatized because of the social perception that lung cancer is a self-inflicted disease, which can be particularly difficult for those who have never smoked.[140] In addition to these challenges, sexual dysfunction is an often overlooked concern among survivors of lung cancer. Findings from the Sexual Health Assessment in Women with Lung Cancer (SHAWL) study demonstrated that many women with lung cancer reported little to no interest in sexual activity and reduced sexual satisfaction, highlighting the need to incorporate sexual health assessment into survivorship care.[141]

Melanoma of the skin

As of January 1, 2025, it is estimated that nearly 1.6 million people are living in the United States with a previous diagnosis of melanoma of the skin, and an additional 104,960 new cases are expected to be diagnosed in 2025.[16] Nearly two in five survivors of melanoma (593,570 people) are younger than 65 years, including 189,880 survivors who are younger than 50 years (Figure 4). Women tend to be diagnosed at a younger age than men (median age, 61 vs. 67 years, respectively),[22] partly reflecting age-related differences in recreational exposure to ultraviolet radiation.

Treatment and survival

Primary cutaneous melanoma is generally treated with wide excision.[142] Recurrence is common in patients with high-risk, resectable melanoma, and adjuvant anti–PD-1 checkpoint immunotherapy or BRAF-targeted therapy has been shown to improve survival.[142] Neoadjuvant immunotherapy is being actively studied in clinical trials and has shown potential for improving long-term outcomes compared to adjuvant therapy in resectable stage III melanoma.[143]

Immunotherapy has been a significant breakthrough for patients with advanced-stage melanoma, substantially improving survival.[98] In early 2024, the US Food and Drug Administration approved lifileucel, a tumor-derived autologous T-cell immunotherapy for unresectable or metastatic melanoma previously treated with immune checkpoint inhibitors.[144] This is the first tumor-infiltrating lymphocyte therapy approved for a solid tumor.

The contemporary 5-year relative survival rate for melanoma is 94%,[16] which is up from 82% for patients diagnosed in the mid-

1970s, largely because of increased detection of early stage disease throughout the 1980s and 1990s.[16,22,145] More than one half of melanomas are diagnosed at stage I,[17] for which the 5-year relative survival approaches 100% (Figure 7). For the small proportion of patients diagnosed with stage IV melanoma, relative survival has improved over time, which is attributable to previously described advances in therapy,[146] with 3-year relative survival rising from 23% for patients diagnosed during 2010–2012 to 35% for those diagnosed during 2015–2017.[17]

Short-term and long-term health effects

Depending on the size and location of the melanoma, removal of these cancers can be disfiguring. Surgical complications may arise after SLNB, including, but not limited to, wound infection, seroma, lymphedema, hematoma, and nerve injury.[147] Patients receiving combination immune checkpoint blockade with a CTLA-4 inhibitor (e.g., ipilimumab) and an anti–PD-1 immune checkpoint inhibitor (e.g., nivolumab) may experience significant immune-related side effects, such as colitis; whereas these immune-related side effects are less frequent in patients treated with single-agent anti–PD-1 immune checkpoint inhibitors, such as nivolumab or pembrolizumab.[98,148] Patients treated with single-agent *BRAF* inhibitors have an increased risk of developing squamous cell skin cancers compared with those who also receive a *MEK* inhibitor.[149,150] Survivors of melanoma remain at risk for developing second primary melanoma, highlighting the relevance of routine skin surveillance in follow-up care.[151] The potential impacts of immunotherapy and targeted therapies like *BRAF/MEK* inhibitors on fertility and sexual health in survivors of melanoma remain insufficiently understood and may have implications for long-term survivorship care.

Prostate

As of January 1, 2025, it is estimated that more than 3.5 million men are living in the United States with a previous prostate cancer diagnosis, and an additional 313,780 new cases are expected to be diagnosed in 2025.[16] By January 1, 2035, this number is projected to reach about 4.2 million (Figure 2). The majority (87%) of survivors of prostate cancer are aged 65 years and older, whereas less than 1% (18,420) are younger than 50 years (Figure 4). The median age at diagnosis is 67 years.[22]

Treatment and survival

The optimal treatment strategy for prostate cancer involves conducting a risk assessment that takes into account the stage at diagnosis, histologic grading, patient's age and general health, and serum prostate-specific antigen (PSA) levels.[152] For early stage disease that is generally confined to the prostate, treatment options include active surveillance, surgery (prostatectomy), and radiation. For patients with low-risk localized disease or those who are older and/or have other severe comorbid conditions, active surveillance is often recommended instead of immediate treatment.[152] The use of active surveillance (which includes watchful waiting in SEER) appears to have increased substantially over the past decade, rising from 14% in 2010 to 51% in 2020 among men with low-risk prostate cancer,[153] with limited evidence suggesting a similar trend among men with intermediate-risk disease.[154] Similarly, findings indicate that radical prostatectomy is increasingly being reserved for men with high-risk disease, reflecting a shift toward more selective utilization among those most likely to benefit.[155,156] For men with advanced disease, androgen-deprivation therapy, chemotherapy, bone-directed therapy (such as zoledronic acid or denosumab), radiation, or a combination of these treatments may be used. Newer hormone therapies, such as abiraterone and enzalutamide, are now used in both castration-resistant and castration-sensitive disease.[157–159] In early 2022, radioligand therapy (lutetium-177–PSMA-617) was approved for metastatic castration-resistant prostate cancer in combination with standard regimens.[160] Immunotherapy has limited efficacy in prostate cancer, possibly because of its immunologically *cold* tumor microenvironment. PARP inhibitors have shown improved progression-free and overall survival in men who have metastatic castration-resistant prostate cancer harboring *BRCA1/BRCA2* mutations, particularly after disease progression on next-generation hormonal therapy.[161,162] Despite having higher incidence and mortality rates,[16] Black men face treatment disparities across the disease spectrum, including lower rates of definitive therapy for advanced disease compared with White men.[163,164]

The 5-year relative survival rate for all stages combined increased from 68% in the mid-1970s to approaching 100% in contemporary population-based data,[16] primarily reflecting lead time bias and overdiagnosis associated with PSA screening uptake in the late 1980s and 1990s. Most (83%) prostate cancers are discovered at a local or regional stage, for which the 5-year relative survival rate approaches 100%.[16] However, it declines to 37% for distant-stage disease.[16] (Survival is presented by SEER summary stage because TNM (tumor, lymph node, metastasis) stage IV disease also includes high-risk patients without metastasis.)

Short-term and long-term health effects

Surgery or radiotherapy for prostate cancer carries a substantial risk of urinary incontinence and bowel complications.[165] Advances in personalized medicine may further improve survivorship outcomes; for example, one study explored the use of polygenic risk scores to identify patients at elevated risk of late bladder toxicity after radiotherapy, with potential implications for individualized treatment planning.[166] Sexual dysfunction remains a prevalent and underaddressed concern among survivors of prostate cancer. Emerging evidence suggests that targeted interventions may help address these adverse effects; for example, a supervised exercise program

combined with psychosexual education was associated with improvements in sexual function among patients with prostate cancer.[167]

Long-term use of androgen-deprivation therapy has been associated with an increased risk of coronary heart disease, osteoporosis, obesity, diabetes, dementia, and sexual dysfunction, necessitating careful monitoring.[168] Certain bone-targeted therapies can reduce skeletal morbidity, including bone pain, in patients with metastatic castration-resistant disease.[169] Cardiovascular monitoring is essential for patients receiving androgen receptor–signaling inhibitors alongside androgen-deprivation therapy, with guidelines recommending baseline cardiovascular risk assessment and ongoing evaluation and risk mitigation throughout treatment and survivorship.[170,171]

Testis

As of January 1, 2025, it is estimated that 317,930 men are living in the United States with a previous diagnosis of testicular cancer, and an additional 9720 new cases are expected to be diagnosed in 2025.[16] Forty-four percent of survivors of testicular cancer in the United States are younger than 50 years (Figure 4), and the median age at diagnosis is 33 years.[22] Testicular germ cell tumors account for approximately 96% of all testicular cancers.[20] The two main types of testicular germ cell tumors are seminomas (54%) and nonseminomas (12%), with an additional 30% of mixed histology.[20] Nonseminomas generally occur in men in their late teens to early 40s and tend to be more aggressive, whereas seminomas are generally diagnosed in men in their late 30s to early 50s and tend to be slow-growing.[172]

Treatment and survival

The most common treatment for stage I seminomas is inguinal orchiectomy without chemotherapy or radiation (83%), whereas most patients with stage II disease undergo surgery followed by chemotherapy (67%), radiation (13%), or both (<1%; Figure 14). Over the last decade, postsurgical active surveillance has become an increasingly preferred management option (over further treatment) for patients with stage I seminomas, as supported by long-term studies.[173,174] Advanced-stage seminomas are generally treated with surgery and chemotherapy (70%; Figure 14). Among men with stage I nonseminomas, more than one half (55%) are treated with orchiectomy alone, whereas the majority of patients with stage II disease receive additional treatment after the initial surgical procedure, including chemotherapy (49%), retroperitoneal lymph node dissection (RPLND; 11%), or both (30%; Figure 14). Men with metastatic nonseminomas are usually treated with chemotherapy in addition to orchiectomy with or without RPLND.

Testicular cancer survival has increased from 83% for patients diagnosed during the mid-1970s to 95% in contemporary population-based data,[16] largely attributable to the success of chemotherapy regimens for advanced disease. The 5-year relative survival rate is lower for nonseminomas (89%) than for mixed testicular germ cell tumors (94%) and seminomas (98%), regardless of age.[18] The prognosis for stage III testicular cancer is favorable compared with that for most other cancers, with a 5-year survival rate of 74% (Figure 7); however, disparities still exist (76% in White people vs. 68% in Black people).[17]

Short-term and long-term health effects

Testicular cancer and its treatment can affect fertility, hence consultation about fertility status, referral for sperm banking, and other potential side effects should occur before treatment, as appropriate, for fertility preservation and to promote quality-of-life outcomes.[175] RPLND can lead to disordered ejaculation, making unassisted reproduction impossible.[176] Because bleomycin can damage the lungs, bleomycin-free regimens are often suggested for older adults, especially those who smoke or those with a history of chronic obstructive pulmonary disease or disease with reduced pulmonary function.[173] Cisplatin-based chemotherapy causes ototoxicity in about 20% of patients and neuropathy in 20%–40% of cases.[176] Patients treated with cisplatin are also at risk for developing renal and cardiovascular toxicity as well as secondary cancers.[176] Hypogonadism is a common treatment-related side effect among survivors—particularly those who have undergone bilateral orchiectomy; it may necessitate lifelong testosterone-replacement therapy and has been linked to increased risks of metabolic syndrome and cardiovascular disease as well as potential adverse effects on mood, energy, fertility, sexual function, bone health, and muscle strength.[176]

Thyroid

As of January 1, 2025, it is estimated that about 1.1 million people are living in the United States with a previous diagnosis of thyroid cancer, and an additional 44,020 new cases are expected to be diagnosed in 2025.[16] The majority of survivors of thyroid cancer are women (77%), mirroring higher incidence rates in women, which are almost triple those in men.[16] The median age at diagnosis (55 years for men and 50 years for women) is lower than for all cancers combined (median age at diagnosis, 66 years).[22] Thyroid is the third most common malignant cancer diagnosis in adolescents (aged 15–19 years) after lymphoma and leukemia,[16] likely in large part because of overdiagnosis.

Treatment and survival

Papillary (88%) and follicular (7%) thyroid cancers, collectively known as *differentiated thyroid cancers*, make up the majority of thyroid cancers.[20] These are highly curable and typically respond well to radioactive iodine treatment,[177] unlike medullary or anaplastic

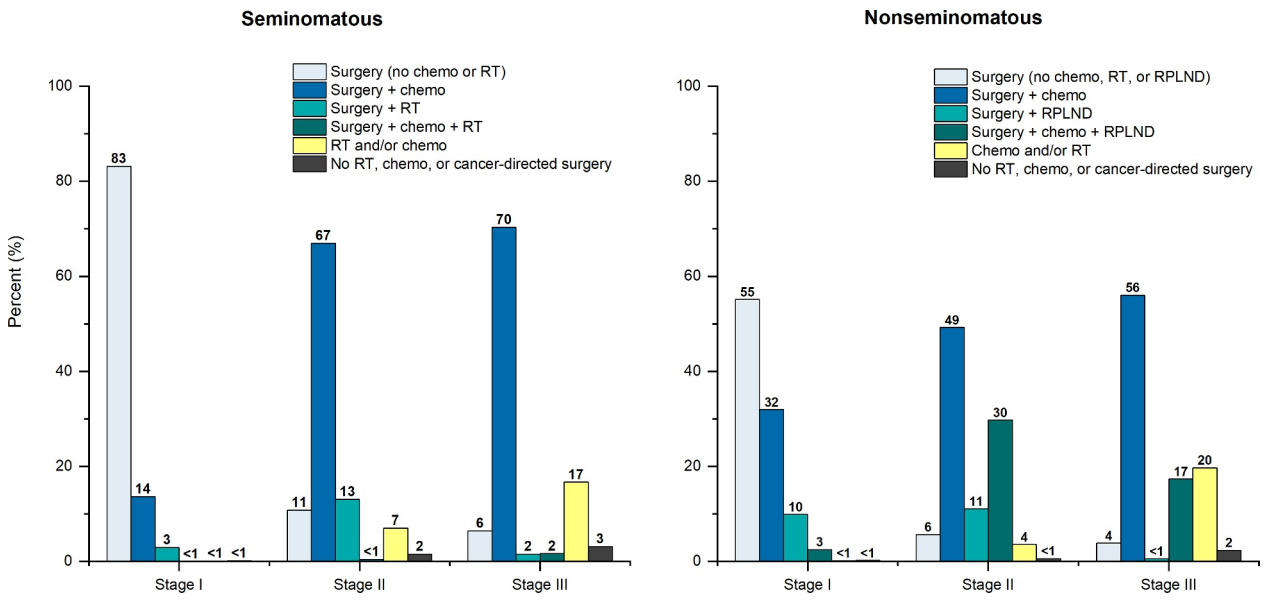

FIGURE 14 Treatment patterns (%) for testicular germ cell tumors by stage, 2017–2021. Percentages may not sum to totals because of rounding. Treatment patterns by race are not presented due to sparse data. The tumors did not include mixed cell types. Surgery includes orchiectomy and other local excision and tumor-destruction procedures but does not include RPNLD. + indicates with; Chemo, chemotherapy (includes targeted therapy and immunotherapy); RPNLD, retroperitoneal lymph node dissection; RT, radiation therapy.

thyroid cancers (3%),[20] which often present at a more advanced stage and do not respond to radioactive iodine treatment.[178,179]

Most patients with thyroid cancer undergo total or partial thyroidectomy. Postoperative management might include radioactive iodine (iodine-131 [I-131]) for differentiated thyroid cancers. I-131 is especially beneficial in patients with high-risk disease because it can destroy remaining thyroid tissue and cancer,[177] although its use in low-risk and intermediate-risk disease remains contested.[177] Thyrotropin suppression using levothyroxine is used to reduce disease recurrence in patients with high-risk disease.[180] For advanced thyroid cancers resistant to radioactive iodine therapy, several systemic therapies have been approved by the US Food and Drug Administration, including multikinase inhibitors and *BRAF/MEK* inhibitors.[181]

The 5-year relative survival rate for thyroid cancer rose from 92% in the mid-1970s to 98% in contemporary population-based data, partly due to increased incidental detection.[16] However, the 5-year survival rate for medullary and anaplastic carcinoma is 93% and 10%, respectively.[16]

Short-term and long-term health effects

Postoperative complications include damage to underlying parathyroid glands, leading to issues with calcium metabolism.[177] Surgery can also damage the laryngeal nerve, leading to vocal changes.[177] For those treated with I-131, there is a low risk of temporary loss of or change in taste as well as damage to the salivary glands, which can lead to issues such as dry mouth, dental caries, and dysphagia, which may have delayed onset.[182] Treatment with I-131 has also been found to increase the risk of subsequent cancers in young adults, especially leukemia.[183] Furthermore, one study reported that approximately 40% of women who received I-131 experienced early menopause.[184] In this context, fertility preservation and counseling regarding potential reproductive and sexual health effects may be appropriate, particularly for younger patients. About 25% of medullary thyroid cancers occur as part of a genetic syndrome called *multiple endocrine neoplasia* type 2.[185] Hence, patients and family members could be referred to genetic counseling and possible testing.[185]

Urinary bladder

As of January 1, 2025, it is estimated that 782,430 people are living in the United States with a previous diagnosis of bladder cancer, and an additional 84,870 new cases are expected to be diagnosed in 2025.[16] The vast majority of survivors of bladder cancer are men (76%), mirroring the four-fold higher incidence than in women. The median age at diagnosis is 72 years.[22] Nearly 70% of patients with bladder cancer are diagnosed with non-muscle invasive cancers (NMIBCs; i.e., AJCC stage 0–I), although the risk of both progression and recurrence is high.[17]

Treatment and survival

Bladder cancer prognosis and treatment depend on whether the disease is muscle-invasive or not. After diagnostic transurethral resection of a bladder tumor (TURBT), patients with NMIBC are typically classified into low-risk, intermediate-risk, or high-risk

groups based on factors such as tumor size, the number of tumors, new tumor vs. recurrent, stage, grade, the presence of carcinoma in situ, and involvement of the prostatic urethra, which help guide treatment decisions. Low-risk NMIBC is often managed with TURBT alone, whereas patients with intermediate-risk NMIBC typically receive TURBT followed by intravesical bacillus Calmette–Guérin (BCG) or chemotherapy in some cases.[186] In 2021, the majority of patients with stage I disease (92%) and nearly two thirds (64%) of those with stage II disease underwent TURBT with or without chemotherapy and/or radiation (Figure 15). (Note that the NCDB does not distinguish between systemic and intravesical chemotherapy; however, based on treatment guidelines, it is likely that virtually all chemotherapy for early stage bladder cancer is intravesical.) In patients who are unresponsive to BCG or are unable to access BCG,[187] radical cystectomy can be an option.[188] In 2020, the US Food and Drug Administration approved pembrolizumab for patients with BCG-unresponsive NMIBC who are ineligible for or decline radical cystectomy.[189]

Muscle-invasive bladder cancer (MIBC) is generally considered high-grade. Neoadjuvant chemotherapy followed by radical cystectomy and pelvic lymph node dissection are the mainstay treatments, with counseling on urinary diversion options (urostomy, continent diversion, or neobladder) recommended.[188,190] In a subset of patients, bladder-sparing treatments, such as chemoradiation or partial cystectomy, may be used.[186,191] For patients with metastatic disease, the antibody–drug conjugate enfortumab vedotin, in combination with the anti–PD-1 immune checkpoint inhibitor pembrolizumab, has replaced platinum-based chemotherapy as the primary treatment.[186]

Studies have documented substantial disparities in the receipt of guideline-concordant care among Black patients who have MIBC and NMIBC, with only 35% of Black patients receiving guideline-concordant care for nonmetastatic MIBC compared with 43% of White patients ($p < .001$).[192–194] The contemporary 5-year relative survival rate for bladder cancer is 77%, up from 72% for patients diagnosed in the mid-1970s.[16] When stratified by AJCC staging, stage 0 urinary bladder cancer is diagnosed in 49% of patients, with a 5-year relative survival rate of 97%[17] (Figure 7). For patients diagnosed with stage I bladder cancer, the 5-year relative survival rate is 81% overall, with observed differences by race (82% for White patients and 73% for Black patients).[17]

Short-term and long-term health effects

Posttreatment surveillance is crucial given the high rate of recurrence[188] and typically includes urine biomarker assays, urine cytology, and/or cystoscopy. TURBT has relatively low morbidity, with urinary tract infections and hematuria relatively common, whereas bladder perforation and obturator nerve reflex are rare.[195] Patients may experience common local side effects like chemical cystitis, bacterial cystitis, frequency of urination, and hematuria following BCG treatment, but these usually resolve within 72

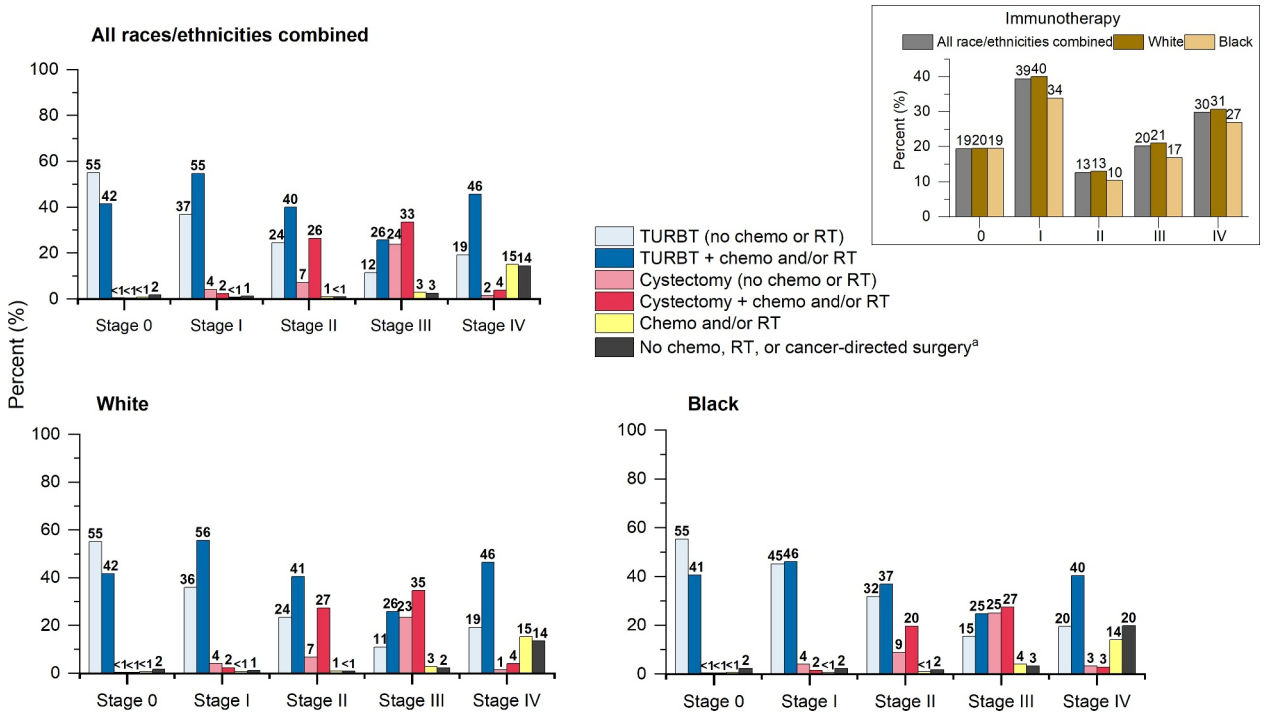

FIGURE 15 Urinary bladder cancer treatment patterns (%) by stage, 2021. Percentages may not sum to totals because of rounding. Categories for White and Black race exclude persons of Hispanic ethnicity. [a]These patients may have received a surgical diagnostic procedure to determine staging. + indicates with; Chemo, chemotherapy (includes targeted therapy but does not include immunotherapy, which is shown in the top right *inset*); RT, radiation therapy; TURBT, transurethral resection of the bladder tumor.

hours[196]; whereas systemic side effects, such as malaise, fever, and infections (including sepsis), may occur in <1% to 9% of patients.[196] Radical cystectomy involves the removal of the bladder, prostate, and seminal vesicles in men and removal of the bladder, uterus, fallopian tubes, and anterior vagina in women, often resulting in sexual side effects that are frequently overlooked, particularly in women.[197,198] The Enhanced Recovery After Surgery protocols have been shown to reduce hospital length of stay after radical cystectomy.[186] Most patients with a neobladder reconstruction after radical cystectomy regain urinary continence with appropriate rehabilitation,[199] although neobladder reconstruction remains much less common than urostomy (9% vs. 91%, respectively), largely because of the complexity of the procedure; its use is substantially higher at larger, higher volume hospitals.[200]

Uterine corpus (endometrium)

As of January 1, 2025, it is estimated that 945,540 women are living in the United States with a previous diagnosis of uterine corpus cancer, and an additional 69,120 new cases are expected to be diagnosed in 2025.[16] By January 1, 2035, the prevalence is projected to reach nearly 1.2 million (Figure 2). Cancer of the uterine corpus is often referred to as *endometrial cancer* because more than 90% of cases arise in the endometrium.[20] It is the second most prevalent cancer among women after breast cancer and has a median age at diagnosis of 63 years.[22]

Treatment and survival

Among patients with early stage (stage I) uterine corpus cancer, 69% undergo hysterectomy and bilateral salpingo-oophorectomy without chemotherapy or radiation (Figure 16), with ovarian preservation possible for a select group of premenopausal women who have early disease (i.e., stage IA).[201] Most patients with stage II disease (64%) undergo surgery alone or with radiation, whereas the majority of patients with stage III disease (71%) undergo surgery and receive chemotherapy with or without radiation (Figure 16). Black women are more likely to receive chemotherapy after surgery, with or without radiation, for both stage I and stage II disease (Figure 16), likely reflecting the higher proportion of nonendometrioid disease, which is generally more aggressive than endometrioid disease.[202] When stratified by disease subtype, receipt of guideline-concordant therapy in hospital-based studies was lower among Black women than among White women for endometrioid subtypes[203] but was similar for nonendometrioid cancers.[204,205] However, population-based studies of patients aged 65 years and older have reported that Black patients are more likely than White patients to experience treatment delays and less likely to receive adjuvant therapy regardless of histology.[206,207]

For patients with advanced disease who are not candidates for surgery, conventional treatment options have included external-beam radiation therapy, brachytherapy, hormone therapy, and chemotherapy with carboplatin or paclitaxel.[208] Immunotherapy now represents a standard component of first-line therapy based on contemporary clinical trials demonstrating that the addition of an anti–PD-1 immune checkpoint inhibitor to platinum-based chemotherapy improves outcomes in patients with advanced or recurrent endometrial cancer.[209,210] For patients with metastatic disease who are not candidates for first-line chemoimmunotherapy or who experience disease progression, mismatch repair status can guide further treatment selection. Immune checkpoint inhibitor monotherapy may be considered for tumors with deficient mismatch repair; whereas the combination of lenvatinib, a multikinase inhibitor, and pembrolizumab is recommended for tumors with proficient mismatch repair.[208]

Despite modest improvements in survival for uterine corpus cancer overall, profound racial disparities persist, with Black women experiencing substantially worse outcomes than White women. The contemporary 5-year relative survival rate is 81% but ranges from 84% for White women to 63% for Black women.[16] Although Black women have a higher burden of aggressive tumor subtypes,[211] survival in Black women is lower regardless of histology or stage,[17,212] pointing to pervasive disparities in access to treatment.

Short-term and long-term health effects

Because of the anatomic location of the uterus, surgery may cause pelvic floor dysfunction and urinary and gastrointestinal complications.[213] Younger women with low-risk disease may elect to receive fertility-sparing treatment.[56,214] Bilateral oophorectomy induces menopause in premenopausal women, which can lead to symptoms such as hot flashes, night sweats, atrophic vaginitis, and osteoporosis.[213] Long-term side effects of radiation therapy for uterine cancer can include bladder and bowel dysfunction as well as atrophic vaginitis and vaginal stenosis.[208] Because most treatments for uterine corpus cancer cause infertility, sexual dysfunction, and early menopause, referral to specialty care and assessing psychological implications is often needed.[208]

Cancers in children and adolescents

As of January 1, 2025, it is estimated that 40,260 children (aged 14 years and older) and 44,290 adolescents (aged 15–19 years) are living in the United States with a previous cancer diagnosis. In addition, 9550 children and 5140 adolescents are expected to be newly diagnosed with cancer in 2025.[16] Survivors of leukemia account for about one third of all cancer survivors younger than 20 years.[22]

Treatment and survival

Pediatric cancers are treated with a combination of therapies tailored to the type and stage of cancer, often by a coordinated

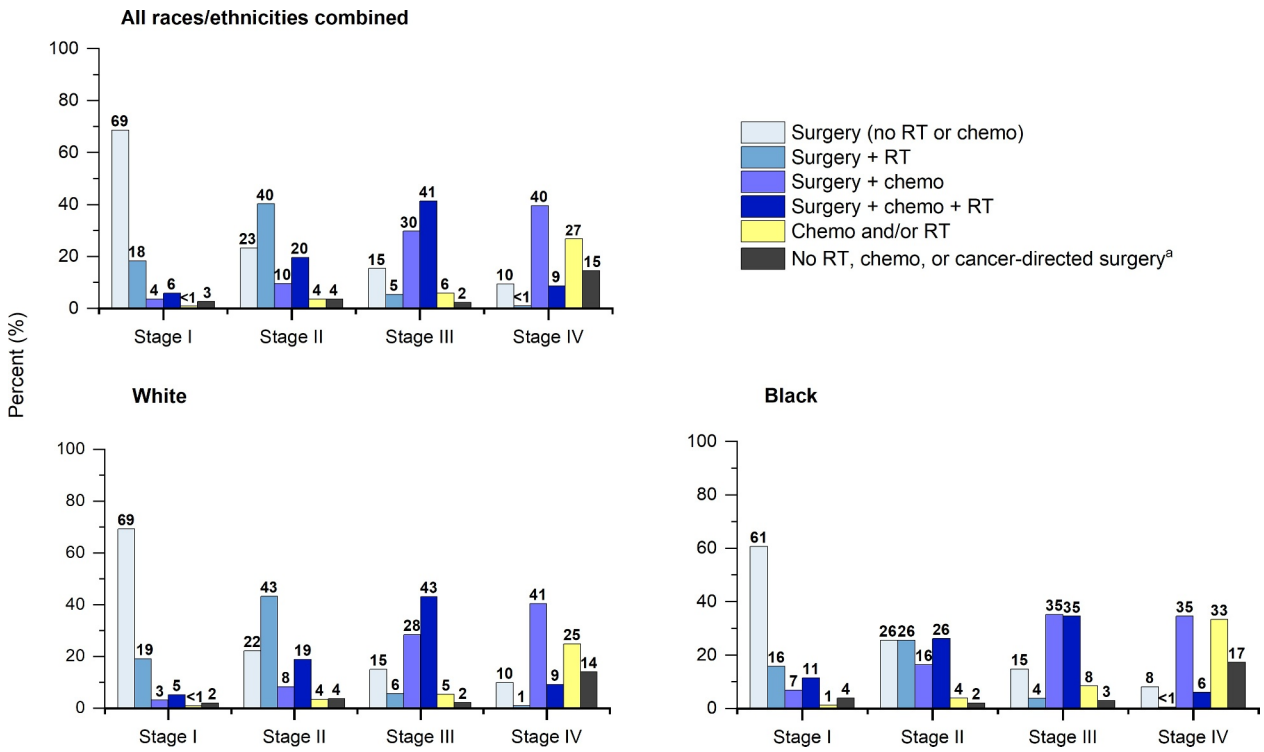

FIGURE 16 Endometrial cancer treatment patterns (%) by stage, 2021. Percentages may not sum to totals because of rounding. Categories for White and Black race exclude persons of Hispanic ethnicity. [a]Some of these patients may have received hormonal therapy. + indicates with; Chemo, chemotherapy (includes targeted therapy and immunotherapy); RT, radiation therapy.

multidisciplinary team that includes pediatric oncologists, surgeons, nurses, social workers, child life specialists, psychologists, and other professionals in specialized centers. Adolescents diagnosed with pediatric cancers are usually treated at pediatric facilities or by pediatric specialists rather than by adult-care specialists, partly because they may be more likely to offer the opportunity for participation in clinical trials.[215] Studies have demonstrated that adolescent patients diagnosed with ALL have better outcomes on pediatric protocols, particularly when treated in pediatric oncology settings[216]; whereas cancers more prevalent in adults, such as melanoma, testicular cancer, and thyroid cancer, are generally more appropriately treated by adult-care specialists.[217]

For all childhood and adolescent cancers combined (excluding benign and borderline brain tumors), the 5-year relative survival rate increased from 58% during mid-1970s to 85% among children and from 68% to 87% among adolescents in contemporary population-based data,[16] largely because of the optimization of treatment regimens. However, survival varies considerably, depending on cancer type, patient age, and other characteristics. The overall survival rate among adolescents is heavily influenced by high survival rates for thyroid cancer (>99%) and HL (99%), masking lower survival rates compared with several cancers in children, including ALL (76% vs. 92%) and Ewing sarcoma (68% vs. 81%).[16]

Short-term and long-term health effects

The aggressive treatments used for childhood cancers, especially in the 1970s and 1980s, resulted in several late adverse effects, including an increased risk of subsequent neoplasms and cardiovascular disease.[218] For example, one longitudinal study indicated that 18% of survivors of childhood cancer had experienced a major cardiovascular event by age 50 years compared with 0.9% of community controls.[219] Another study indicated that even survivors exposed to low-to-moderate doses of radiation treatment to the chest had a 1.6-fold risk of developing cardiac disease over the next 30 years if the area of exposure included more than one half of the heart.[220]

Declines in late effects of treatment among survivors of childhood cancer are in part due to the reduced use of toxic treatments, such as cranial radiation for ALL and abdominal radiation for Wilms tumor.[221] However, even newer therapies can increase the risk of serious health conditions. Cognitive impairment affects up to one third of survivors.[222] Some treatments may result in developmental delays and negatively impact mental health and achievement of social and professional goals.[223,224] For example, 12.5% of adult long-term survivors of childhood cancers have posttraumatic stress symptoms/disorders, with more distress symptoms reported by women and those with lower levels of education.[225] Adolescents may have

negative body image issues, more so in women, often exacerbated by culture and social media.[226] In addition, some chemotherapies, surgery, and radiation affecting the reproductive organs may cause infertility.[227,228] Compared with women who have no history of cancer, survivors of childhood cancer are also more likely to experience serious cardiac problems during pregnancy as well as preterm birth.[229] The Children's Oncology Group, a National Cancer Institute-supported clinical trials group that cares for more than 90% of US children and adolescents diagnosed with cancer, has developed long-term follow-up guidelines for managing late effects in survivors of childhood cancer (survivorshipguidelines.org, Accessed February 20, 2025).

ACCESS TO CARE IN TREATMENT AND SURVIVORSHIP

Barriers to equitable cancer care and survivorship

Longstanding social and economic advantages have limited access to education, employment opportunities, intergenerational transfer of wealth, and economic mobility for historically underrepresented groups in the United States, including Black and American Indian/Alaska Native individuals.[230] Consequently, many important social determinants of health continue to be closely associated with race.[231] The Social Security Act of 1935 created a system of employment-based health insurance coverage that has interacted with longstanding differences in employment opportunities, contributing to racial variation in health insurance coverage. American Indian/Alaska Native populations experience the highest overall cancer mortality rates of any racial or ethnic group in the United States,[16] which have been linked to limited access to cancer screening, delayed diagnosis, and lower access to quality care. Even after adjusting for differences in stage at diagnosis, 5-year relative survival is lower for Black patients compared with White patients for most cancers,[16] largely driven by differences in access to care and quality of care.[39] Research also suggests that hospitals serving a higher proportion of racially and ethnically diverse populations may be less likely to offer comprehensive cancer treatment and support services typically available in CoC-accredited programs, which may contribute to observed disparities in outcomes.[232] Barriers to education access, challenges in recruitment and career advancement, and limited inclusion in professional networks have contributed to the underrepresentation of these population groups in the medical workforce, especially in leadership positions. This gap may limit the cultural responsiveness of health care delivery and contribute to the inability of the health care system to demonstrate trustworthiness. In addition, gaps in representation across population groups in large clinical trials have also been identified as a major barrier to health equity in cancer treatment.[233] For example, even when enrolled in the same clinical trials, Black pediatric patients with cancer are less likely to be treated with potentially superior cancer treatment modalities than White pediatric patients.[234] In the posttreatment phase, Black survivors report poorer physical functioning and less access to culturally appropriate support services compared with White survivors and also receive inadequate disease surveillance.[235–237]

COVID-19 pandemic

The COVID-19 pandemic has disrupted health care and worsened access to cancer screening and early evaluation of signs and symptoms, leading to fewer cancer diagnoses and challenges for the long-term care of survivors.[238] Although many delays are related to radiotherapy or chemotherapy, one study of Medicare recipients reported that surgical procedures likewise declined in the first few months of the pandemic, likely because of fewer diagnoses.[239] Organizations have provided recommendations for triaging and prioritized treatment of patients with cancer during the pandemic, and telehealth has expanded as a socially distanced care option.[240,241] However, the effectiveness of telehealth for cancer surveillance is still limited, and some people—including, but not limited to, those with limited broadband use, uninsured, and East and South East Asians—were less likely to use telehealth.[242,243]

Extreme weather events

Extreme weather events impact cancer treatment and survivorship in various ways.[244] The frequency and behavior of these events are being altered by the changing climate, making it more difficult for communities to prepare for and respond to unpredictable circumstances and increasing the chances of disruptions in access to cancer care.[245] Extreme weather events can damage medical infrastructure, impede transportation, disrupt supply chains, and ultimately interrupt access to potentially life-saving cancer care.[246] For instance, patients undergoing radiation therapy for lung cancer during a hurricane have worse mortality compared with similar patients who complete treatment at the same facilities in the absence of disasters.[247] There are no disaster preparedness and response guidelines specific to cancer care, although the effects of climate-driven disasters have affected all top cancer centers in the United States in the past decade.[248]

Cancer diagnosis and treatment can increase an individual's susceptibility to the effects of extreme weather events. For example, certain chemotherapy agents can interfere with the body's ability to regulate temperature, increasing health risks during heatwaves,[249] which are becoming more frequent and intense.[250] Similarly, wildfire activity is increasing in the United States because of changes in temperature and drought.[251] Patients recovering from lung cancer surgery who are exposed to a wildfire have worse mortality than unexposed patients.[252] Therefore, there is an urgent need to better understand and address the specific needs and vulnerabilities of patients and survivors of cancer during extreme weather events.

Quality of life and other concerns in survivorship

Supportive care, including psychosocial support, palliative care, and cancer rehabilitation, plays a critical role in improving pain management, functional well-being, and overall quality of life throughout cancer survivorship.[253,254] Although many treatment-related side effects are acute, some may become chronic or emerge months or even years after the completion of primary cancer treatment, such as subsequent cancers, neurologic sequelae, cardiomyopathies, sexual dysfunction, and impaired fertility. Many late and long-term effects can be mitigated through early access to cancer rehabilitation.[253,254] Similarly, palliative care has been shown to enhance both quality of life and survival when incorporated early.[255] Despite longstanding recommendations for early palliative care in metastatic disease, uptake remains low. Over the past decade, early palliative care use among patients with metastatic disease remained suboptimal,[256] and contemporary patterns of end-of-life care indicated gaps in palliative care utilization.[257] Limited training in cancer survivorship for primary care providers, unclear provider roles, and poor information transfer between care settings further exacerbate these challenges.[258,259]

Healthy behaviors, including diet, physical activity, and smoking cessation, play a critical role in survivorship, reducing the risk of cancer progression and recurrence as well as the development of subsequent cancers. The American Cancer Society has developed guidelines for survivors of cancer on healthy behaviors related to diet and physical activity.[260] Younger survivors of cancer, in particular, have been shown to have a higher prevalence of smoking after diagnosis than the general population. For example, in 2020, survivors of childhood cancer smoked at almost twice the rate of the individuals who did not have cancer at the same age (27% vs. 14%).[261] Addressing these behaviors within integrated care models can enhance long-term health outcomes.

Quality-of-life issues also encompass the concerns of informal caregivers (i.e., family members or friends), who provide substantial emotional and physical support to survivors. Caregivers frequently report having unmet psychosocial and medical needs and are vulnerable to depression, anxiety, and psychological distress. In one study, about 40% of caregivers reported that they found caregiving emotionally challenging, and 12% reported experiencing depression.[262] Social support programs for caregivers that teach coping skills have been shown to diminish the negative impact of caregiver stress.[263–265]

The national patient economic burden associated with cancer care was estimated to be over $21 billion in 2019.[266] Survivors are vulnerable to medical financial hardship, which may manifest as material (e.g., problems paying medical bills, medical debt, and bankruptcy), psychological (e.g., stress or worry about paying medical bills), or behavioral (e.g., delaying or forgoing necessary medical care because of cost) hardships. Survivors who are younger, underinsured or uninsured, and/or have lower income, as well as long-term survivors of childhood cancer, are more likely to experience financial hardship.[267,268] Even when cancer treatment is covered, employment disruptions and loss of household income can contribute to lasting financial hardship, particularly for working-age adults.[269] Expanding Medicaid coverage, enhancing Affordable Care Act subsidies, and improving patient navigation programs may help mitigate financial hardship and ensure sustained health insurance coverage for younger survivors.[269]

Comprehensive population-based surveillance of survivorship outcomes remains limited. To address this, NCI-funded cancer epidemiology survivor cohorts have been established that follow survivors over time, capturing data on treatment exposures, long-term health outcomes, and social determinants of health to inform future guidelines and interventions.[270] Expanding these initiatives can improve our understanding of survivorship needs and help shape evidence-based interventions.

LIMITATIONS

Cancer prevalence estimates cannot be compared with previously published estimates because they are model-based projections based on population-based incidence and mortality through 2021 and survival data up to 2020 and may reflect the impact of diagnostic and treatment delays related to the COVID-19 pandemic. In addition, these estimates are based on SEER-12, whereas prior estimates used a combination of SEER-9 and SEER-18, and they incorporate updated population projections based on the 2020 census rather than the 2010 census. Furthermore, the prevalence estimates do not distinguish disease status and thus include individuals living disease-free and those undergoing active treatment.

The NCDB is a hospital-based cancer registry and may lack comprehensive data for treatments commonly administered in outpatient settings. Furthermore, the data are collected for patients diagnosed or treated at CoC–accredited facilities, which are more likely to be located in larger urban areas than non-CoC–accredited facilities and may not be representative of all patients in the United States.[271] Nevertheless, the NCDB includes more than 70% of newly diagnosed patients with cancer and facilities in all states and the District of Columbia.[12]

Five-year relative survival rates by AJCC stage are based on patients diagnosed during 2013–2017 and do not reflect the impact of newer treatment advances. Contemporary data (2014–2020) for estimating five-year survival rates could not be stratified by AJCC stage due to changes in staging criteria following the adoption of the eighth edition in 2018.

CONCLUSION

Despite increasing awareness of survivorship issues and the resilience of survivors of cancer, considerable challenges persist. The number of people living with a history of cancer diagnosis is projected to exceed 22 million by 2035, highlighting the ongoing need to address their long-term health and supportive care needs. As more individuals live longer after a cancer diagnosis, the most prevalent

malignancies include those of the prostate and the breast. However, survivorship experiences and outcomes are not equitable across populations. Access to treatment and supportive care differs across racial and ethnic groups, influencing cancer-related outcomes. These differences are influenced by longstanding societal and health care system factors, including fragmentation in health care delivery, inadequate survivorship care coordination, clinician shortages, lack of workforce diversity, gaps in survivor-focused research, and insufficient evidence-based guidelines for posttreatment care. Barriers related to cost, transportation, and insurance coverage further limit access to high-quality survivorship care. Addressing these disparities will require sustained, coordinated action across multiple levels—individual, provider, health system, and policy. Expanding access to affordable, high-quality insurance coverage through both private and public programs; identifying best practices for the equitable delivery of quality cancer care; and consistent implementation of evidence-based survivorship guidelines will be essential to reducing disparities and supporting long-term health of all survivors.

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CONFLICT OF INTEREST STATEMENT

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