

Racial and Ethnic Disparities in Colorectal Cancer Screening and Outcomes



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KEYWORDS

• Health equity • Social determinants of health • Prevention

KEY POINTS

- Colorectal Cancer (CRC) outcomes and screening utilization vary by sociodemographic and environmental factors, including race and ethnicity.
- CRC incidence and mortality are highest in Black individuals, followed by American Indian/Alaskan Native (AI/AN), White, Hispanic/Latino, and Asian/Pacific Islander (API) individuals.
- Participation in CRC screening is highest among White individuals, followed by Black, API, AI/AN, and Hispanic/Latino individuals.
- Many racial and ethnic disparities in CRC screening and outcomes are the result of social determinants of health—nonmedical aspects and conditions of the living and working environment that affect health outcomes.
- Efforts aimed at reducing racial and ethnic disparities in CRC have largely focused on increasing screening uptake; however, interventions that address disparities along the entire cancer care continuum are needed.

INTRODUCTION

Colorectal cancer (CRC) incidence and mortality have decreased during the last several decades, yet CRC remains the second leading cause of cancer-related deaths

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Hematol Oncol Clin N Am 36 (2022) 415–428

<https://doi.org/10.1016/j.hoc.2022.02.003>

0889-8588/22/Published by Elsevier Inc.

hemonc.theclinics.com

among men and women in the United States (US).¹ In addition, there are measurable differences in CRC screening utilization and CRC outcomes by population subgroup.^{1,2} Research and public health efforts in recent decades have aimed to reduce these differences by increasing access to high-quality evidence-based prevention, screening and treatment.

Health equity is the attainment of the highest level of health for all, and health disparities occur when health conditions are unequal across populations.³ Health equity research contextualizes health disparities through a lens of historical, political, and social discourse and motivates institutions to address how their infrastructure reinforces or negates social and economic inequities affecting health and society.^{3,4} This science examines differences in health and health outcomes based on age, sex, race, ethnicity, sexual orientation, gender identity, education, socioeconomic status (SES), insurance type, urban/rural status, and geography, among other factors.⁵

Current health equity research has identified notable disparities in CRC screening and outcomes based on many of these modifiable and nonmodifiable factors.^{2,6} We aim to provide an overview of racial and ethnic (racial/ethnic) disparities in CRC screening, incidence, mortality, treatment, and survival through the lens of the social determinants of health (SDOH) that influence these outcomes. We also briefly discuss factors beyond race/ethnicity that are commonly associated with CRC screening and outcomes, as well as evidence-based interventions that address CRC disparities.

SOCIAL DETERMINANTS OF HEALTH AS PRECURSORS TO HEALTH DISPARITIES

Many health disparities are rooted in differences in SDOH, which are defined as the “non-medical factors that influence health outcomes,” including the “conditions in which people are born, grow, work, live, and age, and the wider set of forces and systems shaping the conditions of daily life.”⁷ The US Department of Health and Human Services categorizes SDOH into 5 main groups: economic stability, education access and quality, health-care access and quality, neighborhood and built environment, and social and community context.⁷

SDOH are often conceptualized as upstream, midstream, and downstream factors.⁸ Upstream SDOH are rooted in historical, social, and political influences and are the furthest removed from health-care systems.⁸ They include government policies as well as economic, social, and environmental factors that collectively drive disparities in health outcomes to a greater extent than factors more immediately related to health care.⁸ Midstream SDOH result from upstream factors and mediate the impact of upstream factors on downstream health outcomes. Examples of midstream SDOH include neighborhood walkability, access to healthful foods, housing proximity to environmental toxins, and access to high-quality education. Downstream SDOH are the health-related outcomes that result from upstream and midstream factors, including disease incidence (eg, heart disease or cancers such as CRC) and utilization of health-care services (eg, cancer screening; **Fig. 1**).⁹

Adverse SDOH cumulatively contribute to inequities along the entire cancer care continuum (**Fig. 2**), from disease risk factors to screening, diagnosis/early detection, treatment, surveillance, and disease survival.⁴ Evidence-based interventions that aim to eliminate disparities along the CRC care continuum often directly address modifiable SDOH through culturally tailored approaches in medically underserved populations.¹⁰ Although major strides have been made toward increasing recognition of and addressing CRC disparities, inequities persist for each racial/ethnic minority group in the US.¹⁰

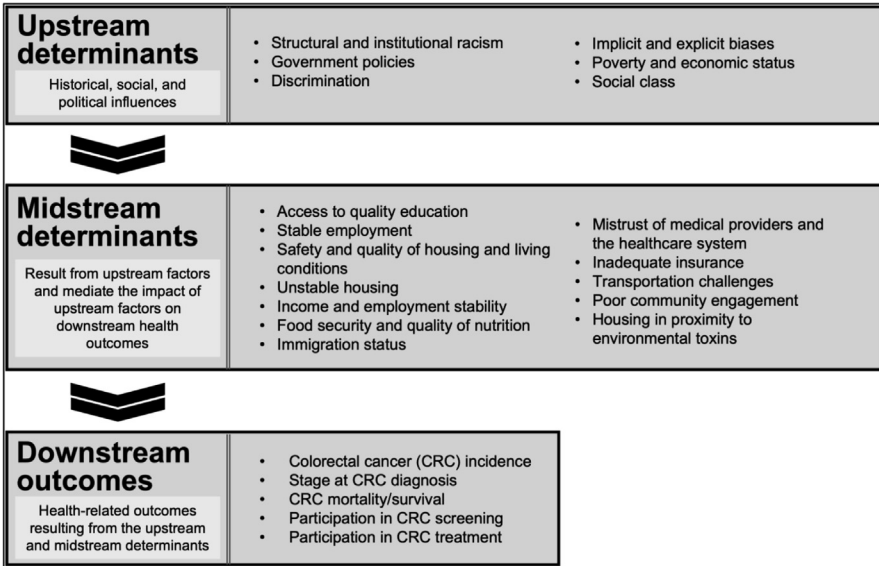


Fig. 1. SDOH related to colorectal cancer screening utilization and colorectal cancer outcomes.^{3,7}

COLORECTAL CANCER IN BLACK INDIVIDUALS

Before the mid-1980s, CRC incidence and mortality among White men exceeded incidence and mortality among Black men.¹¹ White and Black women had similar incidence patterns to men, although mortality was always higher for Black women than for White women.¹¹ Incidence and mortality rates decreased in all White individuals from 1975 to 1990, eventually dropping below that of Black individuals in 1990.¹¹ Today, Black individuals (14.2% US 2020 population)¹² have the highest incidence and mortality from CRC compared with all racial/ethnic groups in the US (Fig. 3).¹³ Among Black men and women, respectively, there are an additional 7.4 and 4.5 CRC diagnoses per 100,000 people (age-adjusted to the 2000 US standard population) compared with White men and women.¹⁴ Black men have 5.3 additional CRC deaths and Black women have 2.9 additional CRC deaths per 100,000 people than their White counterparts.¹⁴

Black–White differences in CRC are not limited to incidence and mortality but rather exist across the entire cancer care continuum (see Fig. 2),^{13,15} including inequities in risk factors for CRC, screening utilization, diagnosis, and treatment. Many highly

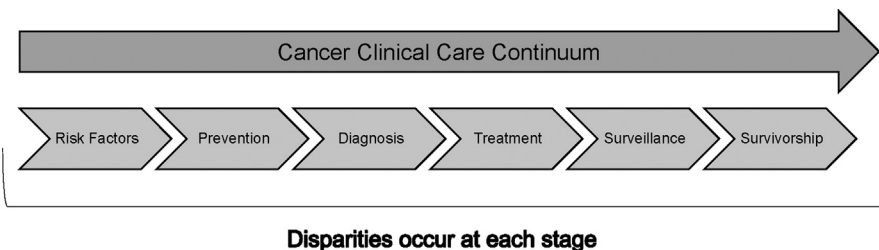


Fig. 2. Cancer clinical care continuum.

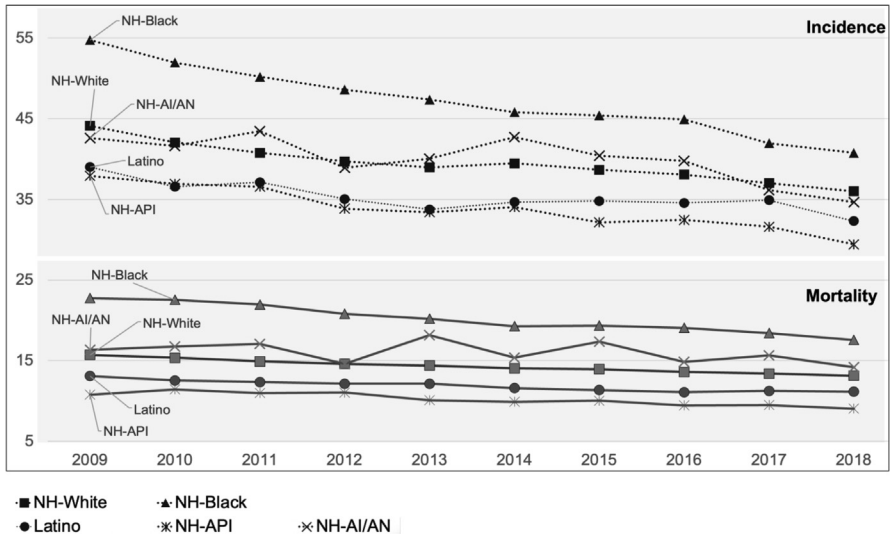


Fig. 3. US trends in colorectal cancer incidence and mortality rates per 100,000 individuals by race/ethnicity; 2009 to 2018. Data are from SEER Cancer Statistics.¹⁴ For incidence and mortality rates: SEER 21, 2014 to 2018. Rates are per 100,000 people and age-adjusted to 2000 US standard population. Hispanic is not mutually exclusive from Whites, Blacks, API, AI/AN. The SEER 21 areas are San Francisco, Connecticut, Detroit, Hawaii, Iowa, New Mexico, Seattle, Utah, Atlanta, San Jose-Monterey, Los Angeles, Alaska Native Registry, Rural Georgia, California excluding SF/SJM/LA, Kentucky, Louisiana, New Jersey, Georgia excluding ATL/RG, Idaho, New York, and Massachusetts. AI/AN, American Indian/Alaska Native; API, Asian American/Pacific Islander; NH, non-Hispanic. Dashed lines: Incidence, Solid lines: Mortality.

prevalent CRC risk factors among Black individuals result from adverse SDOH such as suboptimal diet, obesity, physical inactivity, and tobacco use.⁶ In addition, CRC screening rates among Black individuals have been lower than rates among White individuals (Fig. 4), albeit this gap has narrowed over time.¹⁶ In 2000, the CRC screening rate among Black Americans was 41.9% compared to 49.6% in White Americans.¹⁷ In more recent national data from 2018, screening rates were 70.0% and 71.0% in Black and White individuals, respectively (Fig. 5).¹⁸ Low screening rates in this group have been attributed to many patient-level, provider-level, system-level, and policy-level factors, including hesitancy about participating in health services and invasive procedures, distrust of the health-care system, lack of provider recommendation for screening, discrimination, and poor access to screening tests.^{19–21} Modeling studies have estimated that 42% of the Black–White disparity in CRC incidence and 19% of the mortality disparity are a result of screening differences.²²

There are also Black–White differences in patient and clinical features at the time of CRC diagnosis. The mean age at diagnosis is lower for Black individuals than for White individuals,^{23,24} and right-sided colonic neoplasia is more common among Black individuals than White individuals.²³ Because right-sided polyps and cancers are more difficult to detect during colonoscopy and have distinct molecular characteristics, the higher incidence of proximal lesions may contribute to a higher incidence of late-stage CRC diagnoses and lower survival among Black individuals.^{13,25} Survival from CRC also declines when tumors are diagnosed at late stages due to a decrease in available treatment options.²⁶ Beyond these differences in CRC diagnosis, delays in

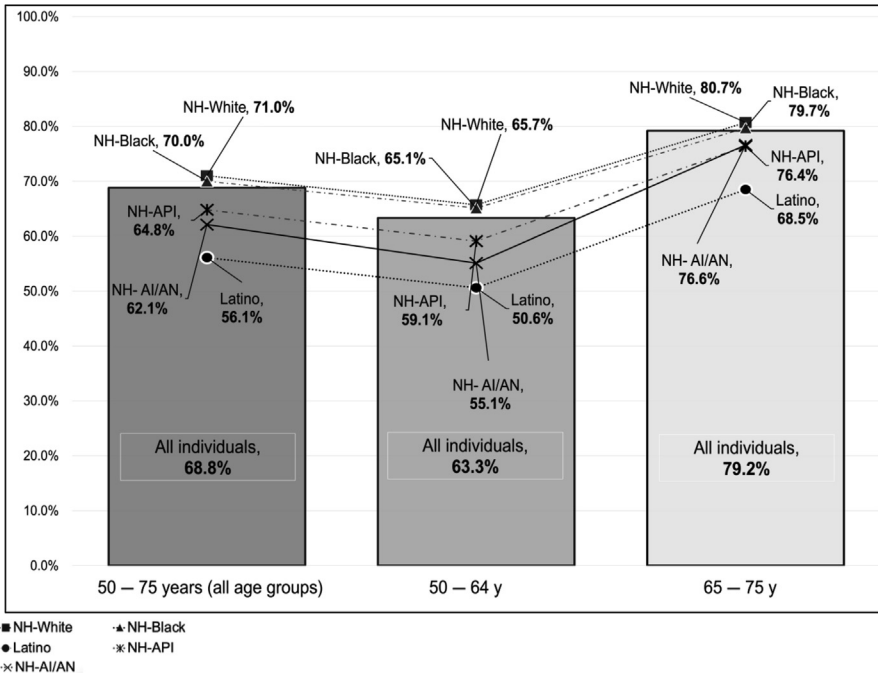


Fig. 4. US colorectal cancer screening test utilization by race/ethnicity and age; 2018.¹⁸ Bars represent screening rates for all individuals in the specified age group.

treatment and disparities in the receipt of treatment among Black individuals diagnosed with CRC also promote Black-White disparities in CRC survivorship.^{27,28}

Efforts to improve Black-White CRC disparities have focused on improving access to high-quality CRC screening in settings in which Black individuals seek health care. These interventions have been somewhat successful, as Black-White inequities in screening, incidence, stage at presentation, and mortality have decreased since the early 2000s.^{16,23} However, there is a substantial need to address how our built environments increase CRC risk factors among Black individuals and how health-care systems perpetuate race-based inequities in CRC screening and treatment.

COLORECTAL CANCER IN AMERICAN INDIAN/ALASKAN NATIVE INDIVIDUALS

American Indian and Alaskan Native (AI/AN) individuals have heritage in the original populations of North, South, or Central America and maintain tribal affiliation or community attachment (2.9% of 2020 US population).¹² In this group, CRC incidence and mortality are elevated (see Fig. 3).^{2,19} Although AI/AN men have 2.9 fewer CRC diagnoses per 100,000 people than White men, AI/AN women have 4.5 additional diagnoses per 100,000 people than White women.¹⁴ Deaths are higher for both AI/AN men and women: AI/AN men have 0.7 greater deaths and AI/AN women have 1.5 additional deaths per 100,000 people than White men and women.¹⁴ Incidence for all AI/AN individuals has begun to decrease,²⁹ although incidence has plateaued for AI/AN women in recent years.²⁹ Strikingly, AI/AN individuals represent the only racial/ethnic group for whom CRC mortality rates are not declining.¹³

As for Black individuals, many of the root causes of AI/AN CRC disparities are SDOH (see Fig. 1). Modifiable risk factors for CRC among AI/AN individuals include diets high

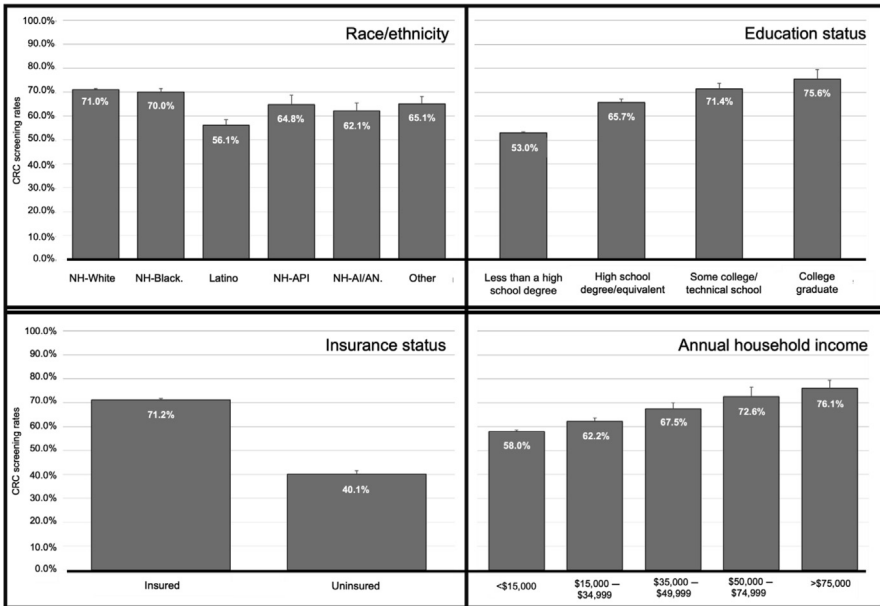


Fig. 5. US colorectal cancer screening test utilization by race/ethnicity, annual income, education status, and insurance status; 2018.¹⁸ Blood stool test within the past 1 year, sigmoidoscopy within the past 5 years, and/or colonoscopy within the past 10 years. Data were weighted to the age, sex, and racial/ethnic distribution of each state's adult population using intercensal estimates and were age-standardized to the 2018 BRFSS population.

in animal fat and low in fruits and vegetables, vitamin D deficiency, tobacco use, alcohol use, obesity, and diabetes.³⁰ Many of these circumstances are the result of socioeconomic disadvantage, poor access to care, unfavorable living conditions, and other upstream and midstream SDOH.

Screening utilization among AI/AN individuals is low compared with both White and Black individuals (see Fig. 4), particularly among AI/AN individuals living in rural areas and receiving care through the Indian Health Service or other underresourced health-care settings.³¹ Nationally, the screening rate for AI/AN individuals was 62.1% in 2018 compared with 71.0% in White individuals (see Fig. 5).¹⁸ Direct mailing of fecal immunochemical test kits to members of tribal communities has reduced structural barriers to screening and increased screening participation.³² However, even when stool-based screening does occur, access to follow-up specialty care for colonoscopy, surgery, and oncologic treatment when indicated is limited in rural regions and tribal nations.³³

Unfortunately, research to address low screening rates in AI/AN communities is scarce. Moreover, despite high CRC incidence and mortality in this group, research to understand the role of cultural factors on CRC screening utilization, disparities in treatment, and other potential contributors to AI/AN-White CRC disparities has been minimal.³¹ This research, along with efforts to improve access to and uptake of screening tests, follow-up colonoscopy, and treatment in rural and tribal areas, will be essential to improve CRC outcomes in this population and overall.

COLORECTAL CANCER IN LATINO INDIVIDUALS

Latino (Latino/a/x, Hispanic) individuals in the US (18.7% US 2020 population) have lower incidence and mortality from CRC compared to White individuals (see

Fig. 3).^{12,14} Latino men have 3.0 fewer CRC diagnoses and Latina women have 3.7 fewer CRC diagnoses per 100,000 people than their White counterparts.¹⁴ There are 2.1 and 2.6 fewer deaths per 100,000 people among Latino men and Latina women, respectively, compared with White men and women.¹⁴ Nonetheless, CRC remains the second most common malignancy among Latinos,³⁴ and Latinos are more likely to be diagnosed with late-stage disease than White individuals.³⁴

Long-term US trends in CRC incidence and mortality among Latinos are unknown due to lack of documentation of Latino/Hispanic ethnicity in national datasets until recently.³⁵ The available data (early 1990s onward) demonstrate rising incidence in the early 1990s, with a peak in incidence in the late 1990s.² The decline in incidence among Latino individuals has lagged behind the decline witnessed among Black and White individuals (see **Fig. 3**).² Immigration status, generational duration in the US, Latino subgroup (ie, Mexican Latino vs Puerto Rican Latino), and acculturation are additional factors that may contribute to risk, incidence, and mortality.³⁴

Despite lower CRC incidence among Latino compared with White individuals, modifiable risk factors for CRC are common among Latinos (see **Fig. 1**).² Highly prevalent risk factors include unfavorable diet, diabetes, and obesity and stem from environmental, social, and economic determinants of health.³⁴ Screening rates among Latinos are also the lowest the country (see **Figs. 4** and **5**).¹⁸ SDOH that have impacted screening participation include SES, language barriers, health literacy, education, undocumented status, lack of insurance, and limited access to health-care services (see **Fig. 1**).^{36,37} Hesitancy about health care and cancer fatalism are also common among Latinos in the US and are associated with low participation in screening.³⁸ As with other racial/ethnic groups, barriers to screening are not limited to patient factors. Latino individuals are less likely to receive a recommendation for CRC screening from a primary care provider³⁹ and are more likely to receive primary care in settings with low-screening rates than non-Latino individuals.³⁶ Evidence-based efforts to improve screening uptake among Latino individuals have included culturally tailored interventions, patient navigation, patient education by community health workers (eg, *promotoras*), and increased access to noninvasive screening modalities.^{40,41}

COLORECTAL CANCER IN ASIAN AND PACIFIC ISLANDER INDIVIDUALS

CRC incidence and mortality are lowest among Asian and Pacific Islanders (API) in the US (7.2% US 2020 population) (see **Fig. 3**).^{12,14} API men have 5.4 fewer CRC diagnoses and API women have 6.5 fewer CRC diagnoses per 100,000 people than their White counterparts.¹⁴ There are 3.4 fewer deaths among API men and 3.0 fewer among API women per 100,000 people compared with White men and women.¹⁴ However, there is a high degree of intergroup heterogeneity among API individuals that masks more granular differences in incidence and mortality between API subgroups. For instance, higher rates of CRC have been observed in Japanese and Korean individuals in the US than in other Asian subgroups.^{2,42,43}

API individuals collectively have the second lowest CRC screening rates after Latinos (see **Figs. 4** and **5**).¹⁸ Screening rates also vary by API subgroup, with lower rates among South Asian individuals in some published studies.⁴⁴ Studies that include API individuals have identified several factors—both modifiable and nonmodifiable—that predict the lack of CRC screening, including recent immigration, language, poor knowledge about CRC risk, and cancer fatalism.⁴² Effective interventions to increase screening participation include culturally tailored patient-directed interventions, interventions in faith-based settings, and multilingual educational media.⁴⁵

Within the API population, there is also variability in CRC outcomes following diagnosis. For example, API individuals born outside the US are more likely to be diagnosed with late-stage disease than White individuals and to have worse survival than American-born API individuals (adjusting for stage at diagnosis).⁴⁶ Despite these differences, API individuals tend to have lower overall CRC-related mortality than White individuals.⁴⁷

OTHER SOURCES OF DISPARITIES IN COLORECTAL CANCER SCREENING AND OUTCOMES

Although there has been much attention to racial/ethnic inequities in CRC, disparities also occur across other sociodemographic factors, including age, sex, sexual orientation, income or SES, educational attainment, insurance type, urban/rural status, geography, and physical ability. An exhaustive review of each of these factors and their relationship to CRC screening and outcomes is beyond the scope of this article. However, we would like to provide a brief overview of some additional inequities that have been characterized in the literature.

Sex and sexual orientation: Sex-based differences in CRC incidence and mortality have long been recognized.² Compared with women, men had 9.9 additional cases per 100,000 people between 2014 and 2018 (33.3 vs 43.2 cases, respectively).¹⁴ Mortality is also higher in men than women for all racial/ethnic groups.¹⁴ These sex-based differences extend to CRC screening as screening rates have been historically lower in men than women.² Although the relationships between sexual orientation and CRC screening and outcomes has been less studied, bisexual population density was associated with incidence of CRC in one study.⁴⁸

SES and educational attainment: The role of SES has been studied extensively and consistently emerges as a predictor of outcomes in the CRC care continuum. Typically measured as a combination of education, income, and occupation, SES is defined by the American Psychological Association as “the social standing or class of an individual or group” and is a useful tool when examining “inequities in access to resources, plus issues related to privilege, power and control.”⁴⁹

The relationship between SES and CRC incidence is complex. CRC incidence is highest in high-SES countries such as the US, yet data from several studies are conflicting as to whether SES is significantly related to CRC risk at the person level in the US.⁵⁰ Higher individual educational attainment, a component of SES, is consistently associated with lower CRC incidence.⁵¹

SES has major implications for dietary and lifestyle habits and, thus, CRC risk. Diets high in refined carbohydrates, processed sugar, and red or processed meats are more common in low-SES populations and also increase the risk of developing CRC.⁵² In addition, diets rich in vitamin D, calcium, and fiber, which are associated with lower CRC risk, are less common in low-SES communities.⁵² Finally, tobacco use, heavy alcohol use, physical inactivity, overweight/obesity, and diabetes—lifestyle conditions that are endemic to low-SES settings that lack health-promoting infrastructure such as grocery stores with fresh produce and walkable neighborhoods—are associated with higher CRC incidence.¹⁰

Several studies have highlighted the impact of SES on CRC screening utilization, treatment, and survival. Screening participation is highest among individuals with high income, high educational attainment, and health insurance (see [Fig. 5](#)).¹⁸ Low SES is associated with lack of screening, treatment delays, and lower receipt of both standard and experimental therapies.⁵³ These disparities contribute to inequities in mortality and survival among individuals diagnosed with CRC.

Geography and Living environment: CRC incidence and mortality are highest in parts of the South, Midwest, and Appalachia and lowest in the West and Northeast regions of the US.² Screening rates also vary by geography and are lowest in the South and Appalachia regions.² In rural areas, screening rates are lower, CRC is diagnosed at later stages, and CRC-related mortality is higher compared to urban settings.⁵⁴

Many of these sociodemographic factors are highly interrelated with race and ethnicity. For example, controlling for SES in studies may account for some of the observed differences by race/ethnicity. Despite this confounding, there is often an independent role of race/ethnicity and other sociodemographic factors on screening utilization, treatment, and outcomes.^{27,28}

EVIDENCE-BASED INTERVENTIONS TO REDUCE COLORECTAL CANCER DISPARITIES

The key to eliminating CRC disparities is the development, evaluation, and dissemination of evidence-based interventions in diverse populations. Because CRC inequities exist across the entire cancer care continuum and vary in extent by race/ethnicity, SES, and other factors, various interventions are needed. Efforts to improve CRC disparities have increasingly turned to multicomponent, multilevel interventions that are tailored and targeted for specific patient populations.¹⁰ Most of these interventions have focused on improving equity in CRC screening by addressing modifiable barriers at the patient, provider, health system, and health-care policy levels. This work involves a broad range of stakeholders and unique approaches including patient education, promotion of noninvasive screening modalities, engagement with faith-based organizations, mailed patient outreach, patient navigation, provider education and incentives, and large-scale health system interventions.¹⁰ Multilingual written and oral patient outreach has been particularly beneficial in Latino, Asian, and immigrant populations.⁵⁵ Policy changes such as the Affordable Care Act and the Removing Barriers to Colorectal Cancer Screening Act (S. 688; HR 1570) have also increased access to CRC screening among medically underserved populations.^{56,57}

Because interventions to date have primarily focused on CRC screening, future efforts must address disparities in other aspects of the cancer care continuum (see [Fig. 2](#)). Minimizing morbidity and mortality from CRC in the US will be impossible without reducing the prevalence of modifiable risk factors for CRC in medically underserved groups and addressing treatment disparities rooted in adverse SDOH among medically underserved and historically marginalized populations.

SUMMARY

Although CRC incidence and mortality have improved since the 1980s, marked inequities persist. CRC incidence and mortality are highest for Black individuals, followed by AI/AN, White, Latino, and API populations.² Participation in screening, which drives down both CRC incidence and mortality, is lowest among Latino individuals, followed by AI/AN, API, Black, and White individuals.¹⁸ In addition to race/ethnicity, there are disparities in screening and outcomes by sex, SES, living environment, and many other interrelated sociodemographic factors.

The reasons for racial/ethnic disparities in CRC screening and outcomes are varied but stem from SDOH. Factors that increase CRC risk, including dietary intake of processed foods, tobacco use, heavy alcohol use, physical inactivity, and obesity, are more prevalent in medically underserved communities, including Black, AI/AN, and Latino communities. Inequities in CRC outcomes are also directly related to low

participation in screening and delayed or suboptimal treatment.^{10,22} These inequities, particularly in screening, worsened as a result of the COVID-19 pandemic, magnifying the pervasive impact of SDOH on health outcomes.⁵⁸

The existing implementation science literature has demonstrated the positive impact of evidence-based and culturally tailored interventions with elements that address patient, provider, health system, and policy barriers to screening. Effective interventions have included direct patient outreach, promotion of multiple screening modalities, provider interventions, and health system screening programs, which, in concert with critical policies such as the Affordable Care Act, have improved screening uptake in low-SES and racially/ethnically diverse populations. However, existing interventions are primarily focused on increasing CRC screening participation, and there is need for interventions that address disparities in modifiable risk factors for CRC and treatment disparities.

To minimize the impact of CRC in the US, there must be a national focus on eliminating CRC disparities. By the year 2045, most individuals in the US will be non-White.⁵⁹ Thus, poor health outcomes in Black, Latino, API, and AI/AN populations will have an increasing impact on the overall health of the nation. The National Colorectal Cancer Roundtable, American Cancer Society, and Centers for Disease Control and Prevention's "80% in Every Community" campaign embraces the changing demographic profile of the country by emphasizing that we must focus on screening at least 80% of individuals in all population subsets and locations.⁶⁰ Ultimately, eliminating CRC as a major public health problem will rely on a national commitment to health equity and research for the most marginalized populations who suffer most.

CLINICS CARE POINTS

- Colorectal cancer (CRC) is the second leading cause of cancer-related deaths among men and women in the United States.
- Health-care providers must be aware that CRC incidence and mortality are highest in Black and AI/AN individuals and that many contributors to these disparities are modifiable.
- CRC screening reduces both incidence and mortality but is underutilized, especially in non-White and low-income populations.
- Provider recommendation is a major predictor of screening uptake, yet providers are less likely to recommend screening to racial/ethnic minorities. Providers must recommend CRC screening to all patients, regardless of background.
- Health-care systems must assess CRC screening rates and outcomes by sociodemographic factors to recognize underserved populations that may benefit from targeted interventions.
- Patient education about CRC risk and screening and culturally competent care are effective at increasing screening and treatment participation in medically underserved populations.
- Although there have been major strides toward addressing CRC disparities, more interventions are needed to achieve equitable CRC prevention and control.

ACKNOWLEDGMENTS

F.P. May is supported by the UCLA Jonsson Comprehensive Cancer Center and the Eli and Edythe Broad Center of Regenerative Medicine and Stem Cell Research Ablon Scholars Program.

DISCLOSURES

The authors have nothing to disclose.

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