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Decrease in Incidence of Colorectal Cancer Among Individuals 50 Years or Older After Recommendations for Population-based Screening

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BACKGROUND & AIMS: **The incidence of colorectal cancer (CRC) in the United States is increasing among adults younger than 50 years, but incidence has decreased among older populations after population-based screening was recommended in the late 1980s. Blacks have higher incidence than whites. These patterns have prompted suggestions to lower the screening age for average-risk populations or in blacks. At the same time, there has been controversy over whether reductions in CRC incidence can be attributed to screening. We examined age-related and race-related differences in CRC incidence during a 40-year time period.**

METHODS: **We determined the age-standardized incidence of CRC from 1975 through 2013 by using the population-based Surveillance, Epidemiology, and End Results (SEER) program of cancer registries. We calculated incidence for 5-year age categories (20–24 years through 80–84 years and 85 years or older) for different time periods (1975–1979, 1980–1984, 1985–1989, 1990–1994, 1995–1999, 2000–2004, 2005–2009, and 2010–2013), tumor subsite (proximal colon, descending colon, and rectum), and stages at diagnosis (localized, regional, and distant). Analyses were stratified by race (white vs black).**

RESULTS: **There were 450,682 incident cases of CRC reported to the SEER registries during the entire period (1975–2013). Overall incidence was 75.5/100,000 white persons and 83.6/100,000 black persons. CRC incidence peaked during 1980 through 1989 and began to decrease in 1990. In whites and blacks, the decreases in incidence between the time periods of 1980–1984 and 2010–2013 were limited to the screening-age population (ages 50 years or older). Between these time periods, there was 40% decrease in incidence among whites compared with 26% decrease in incidence among blacks. Decreases in incidence were greater for cancers of the distal colon and rectum, and reductions in these cancers were greater among whites than blacks. CRC incidence among persons younger than 50 years decreased slightly between 1975–1979 and 1990. However, among persons 20–49 years old, CRC incidence increased from 8.3/100,000 persons in 1990–1994 to 11.4/100,000 persons in 2010–2013; incidence rates in younger adults were similar for whites and blacks.**

CONCLUSIONS: **On the basis of an analysis of the SEER cancer registries from 1975 through 2013, CRC incidence decreased only among individuals 50 years or older between the time periods of 1980–1984 and 2010–2013. Incidence increased modestly among individuals 20–49 years old between the time periods of 1990–1994 and 2010–2013. The decision of whether to recommend screening for younger populations requires a formal analysis of risks and benefits. Our observed trends provide compelling evidence that screening has had an important role in reducing CRC incidence.**

Keywords: Colon Cancer; Epidemiology; Endoscopy; Tumor; Early Detection.

Abbreviations used in this paper: CRC, colorectal cancer; FOBT, fecal occult blood testing; SEER, Surveillance, Epidemiology, and End Results.

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Most current article

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Colorectal cancer (CRC) incidence and mortality in the United States have changed strikingly in recent decades.[1] Overall CRC incidence declined by more than 30% from 1975 (59.5 per 100,000) to 2013 (37.9 per 100,000),[2] with particularly steep declines among those older than the age of 65. Mortality rates have similarly declined during the same period.[1]

The declines in CRC incidence have not occurred equally in all populations. In sharp contrast to the decline in CRC incidence and mortality among older individuals, incidence is actually rising in adults younger than age 50.[3–11] These findings have led to recommendations to extend screening among average-risk individuals to ages younger than 50 years.[12–14] Because blacks have higher CRC incidence than whites and the age-related acceleration in incidence starts at a younger age, calls have also been made to lower the screening age for blacks.[15–18]

At the same time, there has been controversy regarding the role of screening in the reductions in CRC incidence. Unlike screening for other cancers (eg, breast, prostate), CRC screening reduces incidence via excision of premalignant lesions. The use of CRC screening has become increasingly common in the United States since it was first formally recommended in the late 1980s (largely driven by the use of colonoscopy),[19–22] but the extent to which it explains declines in CRC incidence has been debated. Some have argued that screening accounts for much of the improvement in incidence and mortality, as observed in clinical trials of fecal occult blood testing (FOBT) and sigmoidoscopy.[23–25] However, others have suggested that screening has had only a modest impact, and changes in the prevalence of risk factors may be more important.[26,27]

The trends in CRC incidence raise 2 related questions: what is the role of screening in explaining the declining rates? Which populations should be screened? To clarify these questions and better understand the clinical and public health implications of CRC incidence trends, we examined age-related and race-related differences in incidence during a 40-year time period.

Methods

Incidence of invasive CRC was derived from the National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) program during 1973–2013. SEER routinely collects data on patient demographics, primary tumor site, tumor morphology, and stage for all cancers diagnosed in defined geographic regions. The SEER 9 registries cover approximately 10% of the U.S. population and include Atlanta, Connecticut, Detroit, Hawaii, Iowa, New Mexico, San Francisco-Oakland, Seattle-Puget Sound, and Utah. Age-adjusted incidence (by using the 2000 U.S. standard population) was obtained by using SEER*Stat version 8.2.1 as incidence rates per 100,000 persons.

To account for differences in incidence by age, we estimated incidence rates across 5-year age categories (20–24 to 80–84 and 85+) by time period, tumor subsite, and stage at diagnosis. We divided the study period into 8 approximate 5-year time periods (1975–1979, 1980–1984, 1985–1989, 1990–1994, 1995–1999, 2000–2004, 2005–2009, and 2010–2013). Tumor subsites included proximal colon (cecum, ascending colon, hepatic flexure, transverse colon), descending colon (splenic flexure, descending colon, sigmoid colon), and rectum (rectosigmoid junction, rectum) according to the International Classification of Disease for Oncology, 3rd edition. Stage at diagnosis was based on SEER summary staging. Localized disease was defined as being limited to the large bowel, regional as limited to nearby lymph nodes or other organs, and distant disease as systemic metastasis.

To illustrate trends, we plotted incidence rates by age, contrasting time periods, tumor subsites, and stages at diagnosis. All analyses were stratified by race (white vs black). Corresponding 95% confidence intervals were calculated as modified gamma intervals.[18]

This study was approved by the Institutional Review Board at the University of North Carolina at Chapel Hill (#15-1957).

Results

There were 450,682 incident cases of CRC diagnosed during the entire period 1975–2013. Overall incidence was 75.5 per 100,000 and 83.6 per 100,000 among whites and blacks, respectively. Detailed incidence rates by age, time period, tumor subsite, and stage at diagnosis are available in Supplementary Table 1 (whites) and Supplementary Table 2 (blacks).

Incidence peaked during 1980–1989, with a subsequent decline beginning around 1990. In both whites (Figure 1*A*) and blacks (Figure 1*C*), the declines in incidence between 1980–1984 and 2010–2013 were limited to the screening-age population. Incidence curves diverged sharply from previous years, but only at ages 50 years and older. However, whites experienced a greater decline, 40% decrease (from 90.4 to 54.0 per 100,000) versus only 26% (from 90.7 to 67.2 per 100,000) among blacks. For persons aged 65–69 years, CRC incidence in whites decreased by 51% (from 228.7 to 113.2 per 100,000) from 1980–1984 to 2010–2013 compared with 19% decrease (from 214.2 to 173.2 per 100,000) for blacks.

In younger populations (<50 years), there were hints of decreases in incidence between 1975–1979 and about 1990, differing by 5-year age group and time period. Subsequently, in marked contrast to populations older than age 50, there were continued increases through to

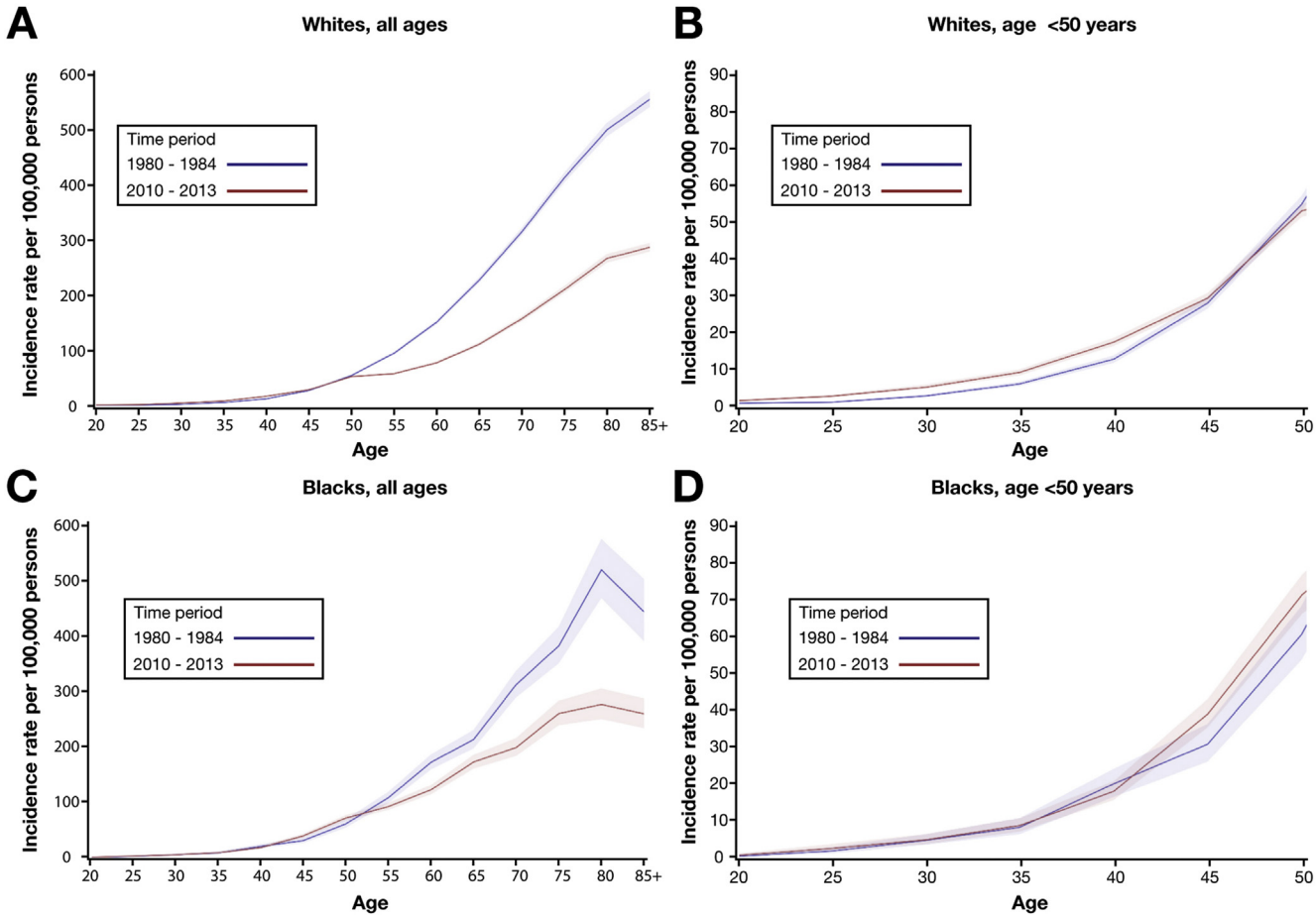

Figure 1. Age-adjusted (2000 U.S. standard population) incidence of colorectal cancer by age group and time period (1980–1984 vs 2010–2013[a]) for (*A*) whites, all ages; (*B*) whites, age <50; (*C*) blacks, all ages; and (*D*) blacks, age <50, SEER 9, 1975-2013. [a]We chose to compare incidence rates from the most recent time period (2010–2013) with 1980–1984 in the figure because incidence peaked in 1980–1984 and subsequently declined through to 2013. *Shaded regions* in figure denote 95% confidence intervals.

2010–2013. In the whole population aged 20–49 years, rates increased from 8.3 per 100,000 in 1990–1994 to 11.4 per 100,000 in 2010–2013. This difference of 3.1 per 100,000 was a 37% increase, similar in whites (Figure 1*B*) and blacks (Figure 1*D*).

Declines in CRC incidence by tumor subsite were also limited to screening-age populations. At ages older than 50, the incidence of distal colon and rectal cancers decreased substantially from 1980–1984 to 2010–2013 for both whites and blacks (Figure 2). Declines in the incidence of proximal colon cancer were smaller, and for blacks, incidence differed little over time. Although blacks consistently had higher overall (and age-specific) CRC rates than whites, they had lower rectal cancer rates overall (19.8 per 100,000 in blacks vs 21.5 per 100,000 in whites) and in older age groups (Supplementary Tables 3 and 4).

Among whites, incidence of local, regional, and distant disease each decreased from 1980–1984 to 2010–2013 (Supplementary Figure 1), only at ages 50 and older. There was very little decrease in incidence of local disease among blacks (and limited to the oldest ages). For the screening-age population, the absolute difference in incidence of distant disease between whites and blacks was generally about 15 per 100,000. The higher incidence of metastatic disease among blacks accounted for essentially all of the differences in overall CRC rates between whites and blacks (Supplementary Tables 5 and 6).

Discussion

Trends in incidence across age, race, subsite, and stage provide compelling evidence of the impact of screening on CRC incidence in the United States. Specifically, the dramatic decline in CRC incidence from its peak in the 1980s to 2010–2013 occurred exclusively among individuals older than age 50, the recommended age for the initiation of CRC screening in average-risk populations. Moreover, incidence rates have fallen most prominently in the distal colorectum, where screening most reduces cancer incidence.[28–31]

The differences in CRC incidence by race offer additional support for the impact of screening. As noted by others,[32–37] blacks have experienced smaller declines in incidence over time (particularly for localized disease), as would be expected in a population that historically has

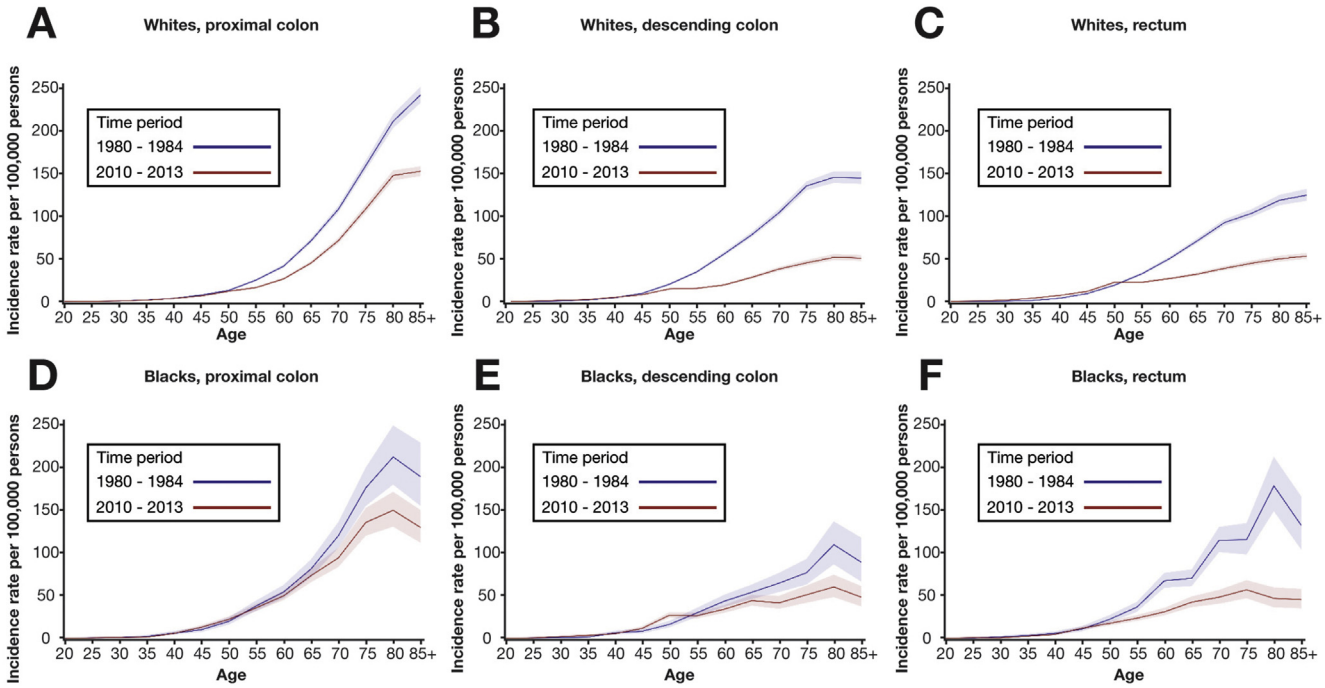

Figure 2. Age-adjusted (2000 US standard population) incidence of (*A*) proximal colon cancer in whites; (*B*) descending colon cancer in whites; (*C*) rectal cancer in whites; (*D*) proximal colon cancer in blacks; (*E*) descending colon cancer in blacks; (*F*) rectal cancer in blacks, by age group and time period (1980-1984 vs. 2010-2013), SEER 9, 1975-2013. Proximal colon includes the cecum, ascending colon, hepatic flexure, and transverse colon; descending colon includes the splenic flexure, descending colon, and sigmoid colon; rectum includes the rectosigmoid junction and rectum. *Shaded regions* in figure denote 95% confidence intervals.

had lower screening rates than whites.[19–22,38,39] The fact that blacks presented more frequently with metastatic disease, a difference that accounted for much of the differences in the overall rates with whites, may also be related to lower use of screening. In addition, there is evidence that blacks have been screened less effectively than whites, more frequently with FOBT and less frequently with colonoscopy.[19] The effectiveness of FOBT may be reduced when patients do not adhere to a regular schedule.[40–43] Evidence is limited concerning differences in adherence by race, but the prevalence of repeat FOBT remains low, between 14% and 54%.[44–47] FOBT or sigmoidoscopy screening alone may also miss proximal cancers, which are more common in blacks.[15,48–52] Our findings support efforts to target screening programs in the underserved and the need for tailored interventions that address minority populations.[53]

There were no continued declines in CRC incidence among younger adults, a population that is not regularly screened. The relative increases in incidence summarized above, combined with the benefits of screening observed in older populations, have led some to promote changing screening guidelines to begin average-risk screening at a younger age, such as age 40,[13,14] or in blacks.[15–18] Indeed, the relative increases in incidence rates in younger populations are dramatic, and the temptation is to believe the clinical implications are equally important. However, these relative increases are based on an absolute increase of only a few additional cases per 100,000 persons during a 20-year time period. For example, at age 45–49, the relative increase in incidence from 1990 to 2013 is nearly 30%, but the absolute difference during the same time period is a modest 6.4 cases per 100,000. The differences are even smaller for younger ages. Consequently, it is not clear whether it is appropriate to lower the recommended age at screening. To ensure a net benefit, such a recommendation should assess all benefits and harms in absolute terms, not solely on relative changes in one outcome, CRC incidence.[54] These considerations also pertain to the question of whether blacks should be recommended to start CRC screening at an earlier age.

There are factors other than screening that could account for some of the reductions in CRC incidence. The large declines in certain CRC risk factors (eg, smoking,[55] red and processed meat consumption[56]) have likely contributed to lower incidence rates. Yet obesity, a clear risk factor for CRC,[57] has been increasing in prevalence,[58] whereas CRC incidence continues to decline in adults of screening age. These temporal trends in risk factors are not biologically consistent with the divergent incidence trends in younger and older populations. It is unlikely that risk factor trends would parallel the declines in incidence among older populations but be inversely related to incidence rates in younger adults (age <50). Changes in the prevalence of risk factors across the U.S. population may play only a minor role in CRC incidence patterns.

Concerns have also been raised regarding the timing of the decline in CRC incidence relative to

recommendations for population-based screening.[27] In the early 1980s, scientific evidence began supporting the effectiveness of population-based screening with FOBT or sigmoidoscopy, which was based on findings from feasibility studies in the United States[59] and European trials.[60] Screening targets were subsequently included in the National Cancer Institute's 1987 working guidelines on the early detection of cancer.[61] Uptake of CRC screening has been slow compared with other cancer screenings (eg, breast, cervical). However, national surveys[62] as early as 1982 showed nearly half (44%) of men and women had ever received FOBT. Our finding that the incidence of distal colon and rectal cancer started to decline around 1985–1989 is consistent with this early adoption of stool-based screening tests. The decline in the incidence of proximal cancer did not start until the early 2000s (and in 2005–2009 for blacks; Supplementary Tables 3 and 4), which may correspond to more recent trends favoring colonoscopy as the preferred screening modality.[29]

Others[27] describing declines in CRC *mortality* (vs incidence) during a similar time period have commented that screening does not fully explain recent trends. We have discussed the effects of CRC "screening," but it is important to keep in mind the distinction between early cancer detection and the removal of premalignant lesions through polypectomy. An integral component of the CRC screening program in the United States, polypectomy affects incidence to a greater extent than it does mortality. On the other hand, CRC mortality has a broader set of influences than incidence, such as treatment advances or earlier evaluation of symptomatic cancers. We focused exclusively on patterns of CRC incidence to provide a clear picture of the impact of screening.

There are some limitations of cancer incidence data, which may not be uniformly accurate for all populations (including racial/ethnic minorities) and geographic regions. We did not have the ability to examine incidence rates in populations other than white and black race. Although CRC incidence is generally lower in Asian and Hispanic populations, some evidence shows rates are increasing among them.[63,64] We also had incomplete data on stage and anatomic subsite. In addition, cancer registries do not provide information about the prevalence of risk factors or screening in the population, limiting the ability to study incidence patterns in conjunction with secular trends.

In summary, patterns of CRC incidence point to screening as an important underlying explanation for the large declines in incidence. It is unlikely that the declining incidence rates are due to changes in the prevalence of risk factors over time. Reductions in incidence begin around age 50, are more prominent in the distal colorectum, and are less marked in blacks. These trends suggest screening has played a dominant role in declines in CRC incidence. As incidence in older adults has declined, the proportion of cancers diagnosed under age 50 has increased, apparently alarmingly. The absolute increase in incidence before age 50 is modest, and the question of screening in younger populations requires a formal analysis of risks and benefits. However, it is clear that achieving the public health goal of 80% screening adherence in age-eligible populations[65,66] could avert more than 200,000 new cancer cases and deaths in the next 20 years.[67] Continued work to improve the uptake of CRC screening in older and minority populations may result in further improvements in CRC outcomes.

Supplementary Material

Note: To access the supplementary material accompanying this article, visit the online version of *Clinical Gastroenterology and Hepatology* at www.cghjournal.org, and at http://dx.doi.org/10.1016/j.cgh.2016.08.037.

References

1. Siegel R, Desantis C, Jemal A. Colorectal cancer statistics, 2014. CA Cancer J Clin 2014;64:104–117.
2. Surveillance, Epidemiology, and End Results (SEER) program (www.seer.cancer.gov) SEER*Stat Database: incidence - SEER 9 Regs Research Data, Nov 2015 Sub (1973–2013) <Katrina/Rita Population Adjustment> - Linked To County Attributes - Total U.S., 1969–2014 Counties, National Cancer Institute, DCCPS, Surveillance Research Program, Surveillance Systems Branch, released April 2016, based on the November 2015 submission.
3. You YN, Xing Y, Feig BW, et al. Young-onset colorectal cancer: is it time to pay attention? Arch Intern Med 2012;172:287–289.
4. O'Connell JB, Maggard MA, Liu JH, et al. Rates of colon and rectal cancers are increasing in young adults. Am Surg 2003;69:866–872.
5. Cress RD, Morris C, Ellison GL, et al. Secular changes in colorectal cancer incidence by subsite, stage at diagnosis, and race/ethnicity, 1992–2001. Cancer 2006;107:1142–1152.
6. Fairley TL, Cardinez CJ, Martin J, et al. Colorectal cancer in U.S. adults younger than 50 years of age, 1998–2001. Cancer 2006;107:1153–1161.
7. Siegel RL, Jemal A, Ward EM. Increase in incidence of colorectal cancer among young men and women in the United States. Cancer Epidemiol Biomarkers Prev 2009;18:1695–1698.
8. Bailey CE, Hu CY, You YN, et al. Increasing disparities in the age-related incidences of colon and rectal cancers in the United States, 1975–2010. JAMA Surg 2015;150:17–22.
9. Meyer JE, Narang T, Schnoll-Sussman FH, et al. Increasing incidence of rectal cancer in patients aged younger than 40 years: an analysis of the Surveillance, Epidemiology, and End Results database. Cancer 2010;116:4354–4359.
10. Abdelsattar ZM, Wong SL, Regenbogen SE, et al. Colorectal cancer outcomes and treatment patterns in patients too young for average-risk screening. Cancer 2016;122:929–934.
11. Sutton E, Bellini G, Lee D, et al. Tu1812 An update on young-onset colorectal cancer, an NCDB analysis. Gastroenterology 2016;150:S1260.
12. Schellerer VS, Hohenberger W, Croner RS. Is it time to lower the recommended screening age for colorectal cancer? J Am Coll Surg 2012;214:377–378, author reply 378–379.

13. Savas N, Dagli U, Akbulut S, et al. Colorectal cancer localization in young patients: should we expand the screening program? Dig Dis Sci 2007;52:798–802.
14. Davis DM, Marcet JE, Frattini JC, et al. Is it time to lower the recommended screening age for colorectal cancer? J Am Coll Surg 2011;213:352–361.
15. Agrawal S, Bhupinderjit A, Bhutani MS, et al. Colorectal cancer in African Americans. Am J Gastroenterol 2005;100:515–523, discussion 514.
16. Kupfer SS, Carr RM, Carethers JM. Reducing colorectal cancer risk among African Americans. Gastroenterology 2015; 149:1302–1304.
17. Paquette IM, Ying J, Shah SA, et al. African Americans should be screened at an earlier age for colorectal cancer. Gastrointest Endosc 2015;82:878–883.
18. Lansdorp-Vogelaar I, van Ballegooijen M, Zauber AG, et al. Individualizing colonoscopy screening by sex and race. Gastrointest Endosc 2009;70:96–108, 108.e1–e24.
19. Klabunde CN, Cronin KA, Breen N, et al. Trends in colorectal cancer test use among vulnerable populations in the United States. Cancer Epidemiol Biomarkers Prev 2011;20:1611–1621.
20. Shapiro JA, Seeff LC, Thompson TD, et al. Colorectal cancer test use from the 2005 National Health Interview Survey. Cancer Epidemiol Biomarkers Prev 2008;17:1623–1630.
21. Seeff LC, Nadel MR, Klabunde CN, et al. Patterns and predictors of colorectal cancer test use in the adult U.S. population. Cancer 2004;100:2093–2103.
22. Shapiro JA, Klabunde CN, Thompson TD, et al. Patterns of colorectal cancer test use, including CT colonography, in the 2010 National Health Interview Survey. Cancer Epidemiol Biomarkers Prev 2012;21:895–904.
23. Edwards BK, Ward E, Kohler BA, et al. Annual report to the nation on the status of cancer, 1975–2006, featuring colorectal cancer trends and impact of interventions (risk factors, screening, and treatment) to reduce future rates. Cancer 2010; 116:544–573.
24. Vogelaar I, van Ballegooijen M, Schrag D, et al. How much can current interventions reduce colorectal cancer mortality in the U.S.? mortality projections for scenarios of risk-factor modification, screening, and treatment. Cancer 2006; 107:1624–1633.
25. Zauber AG, Winawer SJ, O'Brien MJ, et al. Colonoscopic polypectomy and long-term prevention of colorectal-cancer deaths. N Engl J Med 2012;366:687–696.
26. Cronin KA, Krebs-Smith SM, Feuer EJ, et al. Evaluating the impact of population changes in diet, physical activity, and weight status on population risk for colon cancer (United States). Cancer Causes Control 2001;12:305–316.
27. Welch HG, Robertson DJ. Colorectal cancer on the decline: why screening can't explain it all. N Engl J Med 2016; 374:1605–1607.
28. Singh H, Nugent Z, Demers AA, et al. The reduction in colorectal cancer mortality after colonoscopy varies by site of the cancer. Gastroenterology 2010;139:1128–1137.
29. Rex DK, Johnson DA, Anderson JC, et al. American College of Gastroenterology guidelines for colorectal cancer screening 2009 [corrected]. Am J Gastroenterol 2009;104:739–750.
30. Brenner H, Hoffmeister M, Arndt V, et al. Protection from right- and left-sided colorectal neoplasms after colonoscopy: population-based study. J Natl Cancer Inst 2010;102:89–95.
31. Baxter NN, Warren JL, Barrett MJ, et al. Association between colonoscopy and colorectal cancer mortality in a US cohort according to site of cancer and colonoscopist specialty. J Clin Oncol 2012;30:2664–2669.
32. Lansdorp-Vogelaar I, Kuntz KM, Knudsen AB, et al. Contribution of screening and survival differences to racial disparities in colorectal cancer rates. Cancer Epidemiol Biomarkers Prev 2012;21:728–736.
33. Doubeni CA, Field TS, Buist DS, et al. Racial differences in tumor stage and survival for colorectal cancer in an insured population. Cancer 2007;109:612–620.
34. Laiyemo AO, Doubeni C, Pinsky PF, et al. Race and colorectal cancer disparities: health-care utilization vs different cancer susceptibilities. J Natl Cancer Inst 2010;102:538–546.
35. Doubeni CA, Major JM, Laiyemo AO, et al. Contribution of behavioral risk factors and obesity to socioeconomic differences in colorectal cancer incidence. J Natl Cancer Inst 2012; 104:1353–1362.
36. Robbins AS, Siegel RL, Jemal A. Racial disparities in stage-specific colorectal cancer mortality rates from 1985 to 2008. J Clin Oncol 2012;30:401–405.
37. Siegel RL, Jemal A, Thun MJ, et al. Trends in the incidence of colorectal cancer in relation to county-level poverty among blacks and whites. J Natl Med Assoc 2008;100:1441–1444.
38. Meissner HI, Breen N, Klabunde CN, et al. Patterns of colorectal cancer screening uptake among men and women in the United States. Cancer Epidemiol Biomarkers Prev 2006; 15:389–394.
39. Sabatino SA, White MC, Thompson TD, et al. Cancer screening test use: United States, 2013. MMWR Morb Mortal Wkly Rep 2015;64:464–468.
40. Mandel JS, Church TR, Ederer F, et al. Colorectal cancer mortality: effectiveness of biennial screening for fecal occult blood. J Natl Cancer Inst 1999;91:434–437.
41. Hardcastle JD, Armitage NC, Chamberlain J, et al. Fecal occult blood screening for colorectal cancer in the general population: results of a controlled trial. Cancer 1986;58:397–403.
42. Hardcastle JD, Thomas WM, Chamberlain J, et al. Randomised, controlled trial of faecal occult blood screening for colorectal cancer: results for first 107,349 subjects. Lancet 1989; 1:1160–1164.
43. Hardcastle JD, Chamberlain JO, Robinson MH, et al. Randomised controlled trial of faecal-occult-blood screening for colorectal cancer. Lancet 1996;348:1472–1477.
44. Fenton JJ, Elmore JG, Buist DS, et al. Longitudinal adherence with fecal occult blood test screening in community practice. Ann Fam Med 2010;8:397–401.
45. Gellad ZF, Stechuchak KM, Fisher DA, et al. Longitudinal adherence to fecal occult blood testing impacts colorectal cancer screening quality. Am J Gastroenterol 2011; 106:1125–1134.
46. Liss DT, Petit-Homme A, Feinglass J, et al. Adherence to repeat fecal occult blood testing in an urban community health center network. J Community Health 2013;38:829–833.
47. Myers RE, Balshem AM, Wolf TA, et al. Adherence to continuous screening for colorectal neoplasia. Med Care 1993; 31:508–519.
48. Rex DK, Khan AM, Shah P, et al. Screening colonoscopy in asymptomatic average-risk African Americans. Gastrointest Endosc 2000;51:524–527.

49. Thomas CR Jr, Jarosz R, Evans N. Racial differences in the anatomical distribution of colon cancer. Arch Surg 1992; 127:1241–1245.
50. Theuer CP, Taylor TH, Brewster WR, et al. The topography of colorectal cancer varies by race/ethnicity and affects the utility of flexible sigmoidoscopy. Am Surg 2001;67:1157.
51. Chu KC, Tarone RE, Chow WH, et al. Colorectal cancer trends by race and anatomic subsites, 1975 to 1991. Arch Fam Med 1995;4:849–856.
52. Cordice JW Jr, Johnson H Jr. Anatomic distribution of colonic cancers in middle-class black Americans. J Natl Med Assoc 1991;83:730–732.
53. Naylor K, Ward J, Polite BN. Interventions to improve care related to colorectal cancer among racial and ethnic minorities: a systematic review. J Gen Intern Med 2012;27:1033–1046.
54. Knudsen AB, Zauber AG, Rutter CM, et al. Estimation of benefits, burden, and harms of colorectal cancer screening strategies: modeling study for the U.S. Preventive Services Task Force. JAMA 2016;36:604–614.
55. Jamal A, Homa DM, O'Connor E, et al. Current cigarette smoking among adults: United States, 2005–2014. MMWR Morb Mortal Wkly Rep 2015;64:1233–1240.
56. Daniel CR, Cross AJ, Koebnick C, et al. Trends in meat consumption in the USA. Public Health Nutr 2011;14:575–583.
57. Larsson SC, Wolk A. Obesity and colon and rectal cancer risk: a meta-analysis of prospective studies. Am J Clin Nutr 2007; 86:556–565.
58. Flegal KM, Carroll MD, Ogden CL, et al. Prevalence and trends in obesity among US adults, 1999–2008. JAMA 2010; 303:235–241.
59. Winawer SJ, Miller DG, Schottenfeld D, et al. Feasibility of fecal occult-blood testing for detection of colorectal neoplasia: debits and credits. Cancer 1977;40:2616–2619.
60. Hardcastle JD, Farrands PA, Balfour TW, et al. Controlled trial of faecal occult blood testing in the detection of colorectal cancer. Lancet 1983;2:1–4.
61. National Cancer Institute. Working guidelines for early cancer detection: rationale and supporting evidence to decrease mortality. Bethesda, MD: National Cancer Institute, 1987.
62. Cancer of the colon and rectum: summary of a public attitude survey. CA Cancer J Clin 1983;33:359–365.
63. Howe HL, Wu X, Ries LA, et al. Annual report to the nation on the status of cancer, 1975–2003, featuring cancer among US Hispanic/Latino populations. Cancer 2006;107:1711–1742.
64. American Cancer Society. Cancer facts & figures for Hispanics. Atlanta, GA: American Cancer Society, 2009.
65. Paskett ED, Khuri FR. Can we achieve an 80% screening rate for colorectal cancer by 2018 in the United States? Cancer 2015; 121:2127–2128.
66. Fedewa SA, Ma J, Sauer AG, et al. How many individuals will need to be screened to increase colorectal cancer screening prevalence to 80% by 2018? Cancer 2015;121:4258–4265.
67. Meester RG, Doubeni CA, Zauber AG, et al. Public health impact of achieving 80% colorectal cancer screening rates in the United States by 2018. Cancer 2015;121:2281–2285.

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Conflicts of interest
The authors disclose no conflicts.

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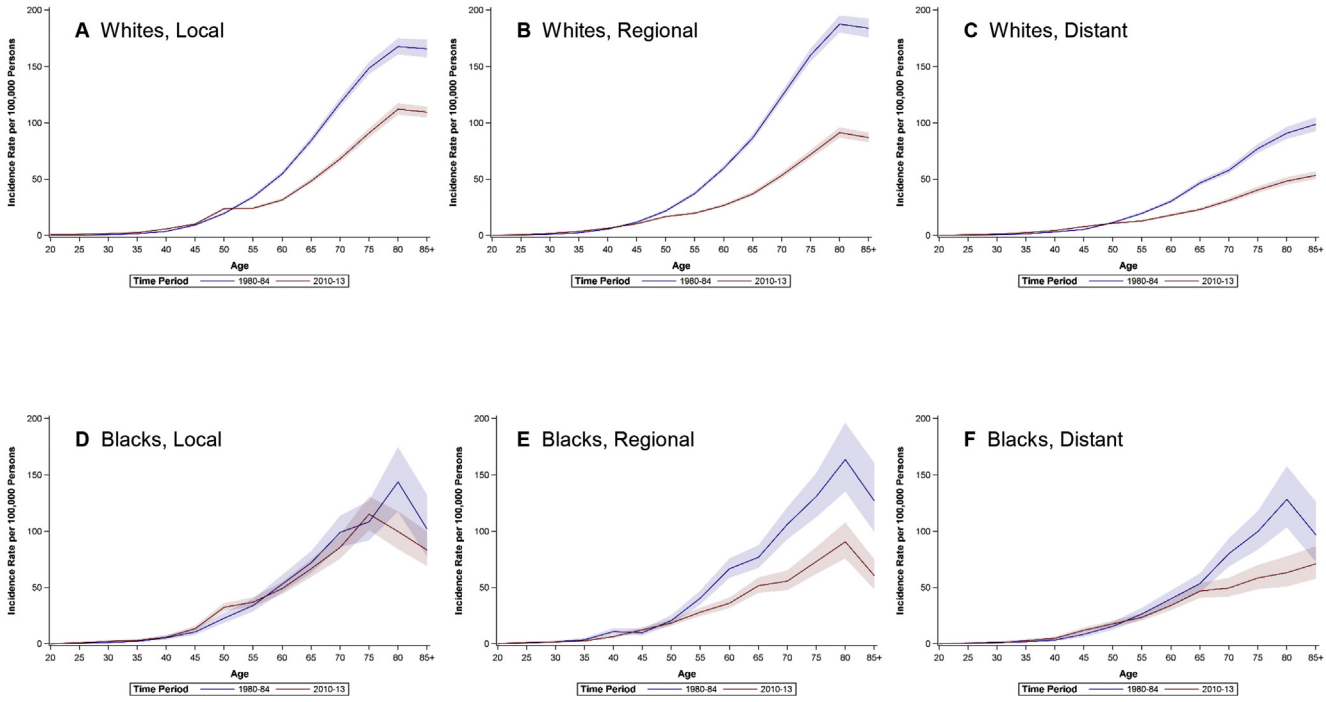

Supplementary Figure 1. Age-adjusted (2000 U.S. standard population) incidence of local, regional, and distant stage colorectal cancer by age group and time period (1980–1984 vs 2010–2013) for whites and blacks, SEER 9, 1975-2013. SEER summary staging describes localized disease as limited to large bowel, regional as limited to nearby lymph nodes or other organs, and distant disease as systemic metastases. *Shaded regions* in figure denote 95% confidence intervals.

Supplementary Table 1. Age-adjusted Incidence (per 100,000 Persons) of CRC by Age, Time Period, Tumor Subsite, and SEER Summary Stage for Whites, SEER 9, 1975–2013

	Age (*y*)														Overall
	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–84	85+	(all ages)
Overall	0.8	1.6	3.5	6.8	13.6	26.4	50.8	79.7	125.0	189.7	263.4	337.8	405.2	433.6	
Time period															
1975–1779	0.6	1.6	3.5	6.8	14.2	29.7	53.9	92.8	148.3	222.6	307.8	390.8	468.9	519.6	87.3
1980–1984	0.7	1.0	2.7	6.0	12.7	28.0	55.0	95.6	152.1	228.7	316.1	414.3	501.2	556.4	90.4
1985–1989	0.4	1.1	2.8	5.3	11.5	25.2	52.0	94.5	154.8	222.0	315.0	416.1	500.6	547.3	89.2
1990–1994	0.4	1.3	3.0	5.7	12.0	22.9	46.3	86.5	140.2	209.6	282.3	370.4	461.4	482.5	81.1
1995–1999	0.6	1.7	3.3	6.3	12.3	24.1	44.9	82.7	132.3	200.8	274.8	343.0	427.7	466.7	77.6
2000–2004	1.1	1.8	3.8	7.3	13.6	25.6	50.2	75.5	120.0	183.9	247.1	319.7	378.1	424.4	72.3
2005–2009	1.1	2.4	4.7	8.4	15.7	27.6	51.8	67.2	96.2	150.2	209.8	263.8	325.6	353.3	63.1
2010–2013	1.4	2.6	5.1	9.1	17.4	29.3	53.1	58.6	78.4	112.0	158.3	211.2	267.5	287.6	53.2
Tumor subsite															
Proximal	0.2	0.4	0.9	1.8	3.6	6.7	12.9	22.5	38.6	65.6	103.0	145.6	190.3	209.4	28.8
Descending	0.2	0.4	1.0	1.9	4.1	8.3	16.5	25.7	40.4	60.2	79.1	96.6	104.1	97.8	21.9
Rectum	0.2	0.5	1.2	2.4	5.0	10.0	19.4	28.3	41.3	57.1	71.6	82.1	89.9	88.1	21.1
Unspecified	0	0.1	0.2	0.2	0.4	0.7	1.1	2.0	3.4	5.4	8.0	12.0	19.2	36.8	2.9
Summary stage															
Localized	0.3	0.6	1.2	2.2	4.6	9.5	20.4	31.1	48.8	77.3	106.8	135.9	157.2	149.1	29.3
Regional	0.3	0.6	1.3	2.7	5.3	10.0	18.3	29.2	46.1	68.5	96.1	121.3	144.9	140.0	27.1
Distant	0.2	0.4	0.8	1.7	3.2	6.0	10.3	16.5	25.2	36.4	48.5	58.9	69.9	71.3	14.2
Unstaged	0	0.1	0.2	0.2	0.5	0.8	1.8	2.9	4.8	7.5	12.1	18.3	33.2	73.3	4.8

NOTE. For all rates displayed in the table, the coefficient of variation was less than 5%, with exception of youngest ages (eg, 20–24 years), where rates are near 0.

Supplementary Table 2. Age-adjusted Incidence (per 100,000 Persons) of CRC by Age, Time Period, Tumor Subsite, and SEER Summary Stage for Blacks, SEER 9, 1975–2013

	Age (*y*)														Overall
	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–84	85+	(all ages)
Overall	0.6	1.9	4.1	9.1	18.3	35.7	71.6	105.3	154.2	211.3	278.8	347.4	405.3	393.3	
Time period															
1975–1979	0.8	2.0	3.7	9.3	15.8	34.3	63.4	104.1	137.2	180.8	275.6	358.3	434.3	449.8	82.3
1980–1984	0.3	1.8	4.7	8.2	20.1	30.9	60.9	108.4	173.0	214.2	314.1	384.4	522.2	446.2	90.8
1985–1989	0.4	1.8	3.3	10.4	18.1	34.8	69.8	110.1	175.7	253.9	301.2	379.3	448.4	399.8	90.4
1990–1994	0.5	1.7	4.0	9.9	18.1	36.6	72.0	113.0	169.1	235.0	322.9	377.5	459.2	437.7	91.7
1995–1999	0.9	2.2	4.1	7.8	16.1	35.1	68.9	108.4	166.7	223.3	299.3	369.6	431.3	420.8	87.5
2000–2004	0.5	1.7	4.2	9.6	18.8	35.7	70.8	113.6	171.2	225.5	276.8	377.2	428.7	454.3	88.8
2005–2009	0.8	1.8	4.2	8.9	20.2	35.8	82.5	102.7	142.4	193.1	260.2	299.0	353.7	384.6	79.0
2010–2013	0.6	2.5	4.8	8.7	18.0	39.1	71.5	92.5	122.8	173.2	199.9	261.6	277.9	260.8	66.8
Tumor subsite															
Proximal	0.1	0.5	1.3	2.9	6.1	11.9	24.6	39.4	59.7	85.1	119.5	158.7	191.3	185.5	34.7
Descending	0.2	0.5	1.0	2.4	5.5	10.1	20.8	31.5	48.3	66.6	86.0	99.5	109.9	97.2	24.4
Rectum	0.2	0.7	1.4	3.1	5.5	11.7	23.2	30.0	39.1	49.7	60.3	71.3	76.8	65.8	19.7
Unspecified	0	0.1	0.3	0.5	0.7	1.4	2.2	3.4	5.8	8.2	11.0	15.3	25.0	43.0	4.1
Summary stage															
Localized	0.1	0.5	1.5	3.0	5.7	11.1	28.2	39.4	55.8	77.5	100.8	128.0	140.5	121.4	29.7
Regional	0.2	0.9	1.4	3.0	7.0	13.1	23.6	34.6	53.1	70.0	95.5	112.5	127.0	103.7	27.3
Distant	0.2	0.4	1.1	2.5	4.8	9.8	16.9	26.1	37.7	52.4	64.7	79.9	88.9	86.3	19.8
Unstaged	0	0.2	0.2	0.6	0.8	1.7	2.9	5.2	7.6	11.4	17.8	27.0	48.8	81.8	6.8

NOTE. For all rates displayed in the table, the coefficient of variation was less than 10%, with exception of youngest ages (eg, 20–24 years), where rates are near 0.

Supplementary Table 3. Age-adjusted Incidence (per 100,000 Persons) of CRC by Age, Tumor Subsite, and Time Period for Whites, SEER 9, 1975–2013

	Age (*y*)													
	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–84	85+
Proximal colon														
1975–1979	0.1	0.5	1.0	2.0	4.2	8.0	14.2	24.6	41.1	68.7	107.3	148.4	191.2	203.8
1980–1984	0.1	0.3	0.8	2.0	3.7	7.7	13.8	25.3	41.6	71.5	108.5	159.8	211.7	242.7
1985–1989	0.1	0.3	1.1	1.6	3.3	6.3	14.2	24.6	43.8	70.0	113.9	163.7	213.2	243.7
1990–1994	0.1	0.3	0.8	1.8	3.7	6.7	14.2	25.9	42.8	70.3	106.0	154.2	208.0	230.5
1995–1999	0.2	0.5	0.9	1.6	2.9	5.8	13.7	24.1	43.4	72.0	113.0	151.6	202.9	233.0
2000–2004	0.3	0.5	0.9	1.9	3.6	6.3	14.4	22.2	40.9	69.3	105.2	147.1	191.5	217.0
2005–2009	0.3	0.4	1.1	1.8	3.8	6.5	14.9	20.5	33.9	60.0	96.0	130.9	170.4	187.3
2010–2013	0.2	0.4	0.9	1.9	3.7	6.8	13.6	16.5	26.7	45.4	71.6	109.0	148.1	153.1
Distal colon														
1975–1979	0.2	0.3	1.0	2.2	4.9	11.3	19.3	32.8	51.9	74.4	100.0	119.6	130.7	134.2
1980–1984	0.2	0.2	0.8	1.9	4.6	9.6	20.5	34.9	56.2	78.6	104.7	135.8	146.1	145.3
1985–1989	0.1	0.2	0.7	1.6	3.6	8.3	19.3	34.6	54.6	79.1	102.5	132.3	149.3	143.0
1990–1994	0.1	0.4	0.8	1.6	3.4	7.6	15.4	28.9	47.4	70.4	88.9	109.8	129.6	115.8
1995–1999	0.1	0.5	0.8	1.9	3.5	7.5	13.6	25.6	41.3	60.3	79.0	95.5	107.6	103.1
2000–2004	0.3	0.4	0.9	1.9	3.9	7.4	15.4	22.5	36.0	54.4	70.0	86.6	87.5	87.6
2005–2009	0.3	0.6	1.2	2.3	4.3	7.9	15.8	19.2	26.3	40.9	52.7	62.0	70.8	68.2
2010–2013	0.3	0.7	1.6	2.3	5.0	8.1	15.0	15.5	19.7	28.4	38.3	45.5	52.1	51.2
Rectum														
1975–1979	0.1	0.4	1.0	1.8	4.1	9.2	19.4	33.0	51.0	71.9	89.8	108.1	125.2	137.6
1980–1984	0.2	0.3	0.7	1.5	4.0	9.5	19.5	32.8	50.6	71.3	92.8	103.9	119.0	125.1
1985–1989	0.1	0.3	0.8	1.7	3.9	9.6	18.0	32.1	51.7	66.8	89.4	105.5	115.4	115.7
1990–1994	0.1	0.4	1.0	1.8	4.3	7.5	16.9	28.7	44.7	62.1	78.3	91.4	101.0	92.7
1995–1999	0.3	0.6	1.2	2.3	4.9	9.6	16.8	29.8	43.0	61.4	72.7	82.2	94.3	90.3
2000–2004	0.3	0.6	1.5	2.9	5.1	10.3	19.7	27.2	38.4	52.8	61.6	73.0	79.4	81.0
2005–2009	0.4	1.0	1.9	3.5	6.2	11.4	20.4	24.4	31.1	42.6	52.2	59.2	66.3	65.5
2010–2013	0.4	0.9	1.8	4.0	7.3	12.1	22.7	22.7	27.1	32.3	39.0	45.1	50.3	53.6

NOTE. Proximal colon includes the cecum, ascending colon, hepatic flexure, and transverse colon; descending colon includes the splenic flexure, descending colon, and sigmoid colon; rectum includes the rectosigmoid junction and rectum.

Supplementary Table 4. Age-adjusted Incidence (per 100,000 Persons) of CRC by Age, Tumor Subsite, and Time Period for Blacks, SEER 9, 1975–2013

	Age (*y*)													
	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–84	85+
Proximal colon														
1975–1979	0.1	0.6	1.8	2.9	4.6	11.5	21.0	31.9	50.2	63.2	96.9	139.7	152.5	204.0
1980–1984	0.2	0.7	1.2	2.4	6.2	10.2	20.1	38.1	54.6	81.7	120.7	176.9	213.1	190.0
1985–1989	0.1	0.3	1.1	4.7	6.9	10.4	22.6	42.0	62.3	92.5	120.1	152.4	183.3	151.5
1990–1994	0.2	0.3	1.2	3.6	7.0	12.2	27.2	45.1	65.7	87.7	138.0	169.9	208.0	185.8
1995–1999	0.3	0.9	1.4	2.5	5.8	11.6	23.6	40.4	63.5	92.7	134.3	166.1	205.3	199.6
2000–2004	0.2	0.6	1.5	3.1	5.8	12.2	26.2	43.0	73.7	95.4	125.5	178.2	215.7	230.9
2005–2009	0.2	0.2	1.3	2.1	6.0	12.1	28.4	39.2	59.4	89.9	119.6	145.9	189.7	201.0
2010–2013	0.0	0.6	1.3	1.7	6.0	13.2	22.5	36.0	50.1	73.8	94.7	136.2	150.6	130.4
Distal colon														
1975–1979	0.5	0.6	0.3	3.6	6.2	12.6	22.3	34.7	46.1	67.1	91.1	133.3	147.2	122.9
1980–1984	0.1	0.4	1.9	3.4	5.9	11.0	22.5	36.7	67.8	70.6	115.5	115.8	179.2	132.6
1985–1989	0.0	0.5	1.2	2.5	5.5	11.8	24.8	36.3	62.6	97.3	108.3	128.4	148.0	124.9
1990–1994	0.1	0.2	0.9	2.3	6.0	9.9	20.6	34.5	59.3	83.4	106.8	115.3	145.9	133.4
1995–1999	0.3	0.5	1.0	1.8	4.7	9.9	21.9	32.0	52.2	68.7	87.2	104.1	113.8	97.5
2000–2004	0.1	0.3	0.9	1.9	6.1	9.2	19.6	34.5	45.5	67.4	80.2	102.3	104.9	111.7
2005–2009	0.2	0.8	1.2	2.3	5.5	7.7	21.2	28.5	40.4	48.5	68.7	70.8	78.7	78.5
2010–2013	0.2	0.8	0.7	2.7	4.8	12.0	17.7	23.8	31.2	42.6	48.4	57.1	47.1	45.6
Rectum														
1975–1979	0.1	0.3	1.5	1.8	4.8	8.7	17.9	32.9	35.9	44.2	72.4	62.6	102.3	76.2
1980–1984	0.0	0.6	1.0	1.6	6.6	8.5	16.5	30.1	43.8	54.2	64.9	77.2	110.1	89.6
1985–1989	0.3	0.7	0.7	2.9	4.1	10.9	19.3	29.4	45.0	53.8	64.0	84.0	82.8	84.2
1990–1994	0.2	0.8	1.7	3.1	4.2	12.5	21.1	29.3	37.4	52.1	66.9	76.0	75.6	62.7
1995–1999	0.2	0.8	1.1	2.7	4.7	11.6	20.4	32.4	42.2	51.9	63.2	76.8	78.4	75.9
2000–2004	0.2	0.8	1.4	4.1	5.6	11.4	22.1	29.7	43.1	52.1	58.1	77.3	78.5	61.3
2005–2009	0.3	0.8	1.3	3.7	7.6	14.4	29.5	31.1	35.6	46.1	58.9	65.8	62.6	59.5
2010–2013	0.2	0.6	2.2	3.5	5.6	11.9	27.3	26.7	34.4	44.4	41.9	51.2	60.5	48.4

NOTE. Proximal colon includes the cecum, ascending colon, hepatic flexure, and transverse colon; descending colon includes the splenic flexure, descending colon, and sigmoid colon; rectum includes the rectosigmoid junction and rectum.

Supplementary Table 5. Age-adjusted Incidence (per 100,000 Persons) of CRC by Age, SEER Summary Stage, and Time Period for Whites, SEER 9, 1975–2013

	Age (*y*)													
	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–84	85+
Localized														
1975–1979	0.3	0.6	1.0	2.3	4.9	10.0	18.1	32.4	51.2	78.8	109.8	135.0	153.4	142.2
1980–1984	0.2	0.3	0.7	1.6	3.6	9.3	19.6	34.3	54.8	84.5	117.9	148.6	167.8	165.8
1985–1989	0.2	0.4	0.8	1.6	3.9	8.5	18.4	36.3	61.9	93.9	125.8	168.6	190.1	177.4
1990–1994	0.1	0.3	1.1	1.7	3.8	8.6	16.9	31.8	53.8	85.9	113.6	147.4	174.4	159.9
1995–1999	0.3	0.5	1.0	2.3	4.4	8.7	17.6	32.1	52.1	82.5	114.2	137.6	171.9	165.2
2000–2004	0.5	0.6	1.3	2.6	4.9	10.2	21.5	32.5	51.7	80.1	107.2	139.9	158.5	158.4
2005–2009	0.4	1.0	1.8	2.8	5.5	10.2	24.0	28.7	40.5	66.9	95.0	118.6	139.9	135.2
2010–2013	0.8	1.2	1.8	2.6	5.9	10.3	23.9	24.2	31.6	48.4	68.1	91.0	112.2	109.6
Regional														
1975–1979	0.2	0.5	1.4	2.7	5.4	11.5	20.6	35.3	56.9	81.6	110.0	139.5	161.4	155.1
1980–1984	0.2	0.3	1.1	2.4	5.7	11.8	21.9	37.3	59.8	86.8	123.5	160.3	187.7	184.1
1985–1989	0.1	0.4	1.1	2.1	4.5	10.2	21.3	35.2	57.0	79.4	117.3	152.1	181.3	180.8
1990–1994	0.2	0.5	1.1	2.1	4.9	8.7	17.6	33.0	52.4	77.9	103.5	136.0	168.1	159.5
1995–1999	0.2	0.7	1.3	2.3	4.5	9.6	17.1	31.3	49.3	72.8	102.1	128.6	153.6	158.6
2000–2004	0.4	0.7	1.4	3.1	5.6	8.9	17.8	26.8	43.3	66.4	90.5	114.6	135.2	138.3
2005–2009	0.5	0.8	1.6	3.4	5.9	10.3	16.3	22.6	33.3	51.4	69.7	90.6	114.1	110.3
2010–2013	0.4	0.7	1.9	3.7	6.5	10.4	16.8	19.8	26.7	36.9	53.4	72.1	91.4	87.0
Distant														
1975–1979	0.1	0.3	0.7	1.6	3.1	6.8	12.6	20.6	31.6	49.4	65.0	80.8	92.4	89.2
1980–1984	0.2	0.3	0.6	1.5	3.1	5.4	11.5	19.7	30.3	46.6	57.9	77.2	90.9	98.7
1985–1989	0.1	0.2	0.7	1.3	2.6	5.5	10.2	18.5	29.3	39.0	56.5	70.3	85.3	87.3
1990–1994	0.1	0.3	0.6	1.6	2.6	5.0	9.9	18.3	28.4	38.0	52.7	65.2	80.3	78.8
1995–1999	0.1	0.3	0.8	1.5	2.9	5.2	8.7	16.5	26.5	37.7	47.1	58.3	68.5	68.8
2000–2004	0.2	0.4	0.9	1.5	2.9	5.9	9.7	14.2	22.0	32.4	41.8	52.2	62.6	65.2
2005–2009	0.2	0.5	1.2	2.0	3.9	6.5	9.9	14.3	19.6	28.2	38.7	45.1	52.9	59.3
2010–2013	0.2	0.6	1.3	2.6	4.5	7.8	10.8	12.9	18.1	23.1	31.1	40.6	48.4	53.4

NOTE. SEER summary staging describes localized disease as limited to large bowel, regional as limited to nearby lymph nodes or other organs, and distant disease as systemic metastases.

Supplementary Table 6. Age-adjusted Incidence (per 100,000 Persons) of CRC by Age, SEER Summary Stage, and Time Period for Blacks, SEER 9, 1975–2013

	Age (*y*)													
	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–84	85+
Localized														
1975–1979	0.2	0.4	1.0	2.7	6.0	9.3	19.6	31.7	45.8	53.9	85.8	110.7	113.1	145.0
1980–1984	0.1	0.4	1.2	2.3	5.3	10.6	22.8	34.1	53.1	72.0	99.1	108.5	143.9	102.1
1985–1989	0.1	0.4	1.2	3.2	6.2	9.7	22.4	40.8	63.1	83.0	98.7	131.4	155.7	140.3
1990–1994	0.0	0.1	1.3	3.3	5.6	9.5	27.0	42.5	55.2	79.9	114.3	136.3	150.4	129.9
1995–1999	0.1	0.6	1.3	2.7	5.0	10.6	25.6	37.4	54.0	88.7	112.9	134.6	161.5	134.0
2000–2004	0.2	0.6	1.9	3.7	5.6	10.6	27.0	40.7	66.6	84.9	98.3	149.3	158.3	141.1
2005–2009	0.4	0.5	1.4	2.9	6.2	12.5	35.6	45.7	58.6	85.0	106.0	122.7	135.4	119.1
2010–2013	0.1	1.0	2.3	3.0	5.8	13.6	32.5	37.0	49.2	66.8	85.8	115.2	99.9	83.4
Regional														
1975–1979	0.4	1.4	1.6	3.3	6.2	13.7	22.5	37.8	49.2	59.7	92.8	126.1	127.4	110.6
1980–1984	0.0	0.6	1.8	3.6	10.8	9.9	20.8	40.7	66.7	77.0	106.3	131.1	163.7	127.2
1985–1989	0.1	1.0	1.1	4.1	6.8	13.8	27.2	39.6	61.0	92.5	106.7	127.8	142.5	94.0
1990–1994	0.3	1.0	1.5	3.0	7.6	14.6	27.4	36.9	62.6	80.8	115.8	123.2	147.7	109.4
1995–1999	0.5	0.5	1.5	2.6	6.1	14.9	24.4	36.0	64.5	75.3	100.4	126.7	134.6	120.0
2000–2004	0.3	0.7	1.2	3.1	6.3	12.9	25.0	37.8	57.2	74.3	105.7	123.4	135.9	129.3
2005–2009	0.2	0.7	1.5	2.8	7.2	12.2	24.6	29.8	44.0	56.2	87.0	86.5	106.2	103.0
2010–2013	0.2	1.1	1.6	2.5	6.4	12.4	18.6	28.2	36.2	51.7	55.8	73.2	90.8	60.6
Distant														
1975–1979	0.2	0.2	1.1	2.7	2.9	8.7	17.0	26.9	30.7	52.4	71.8	83.4	129.2	93.4
1980–1984	0.1	0.5	1.4	1.8	3.4	8.5	15.6	26.6	40.1	53.6	80.3	99.8	128.4	96.8
1985–1989	0.2	0.2	1.0	2.5	3.7	9.0	16.2	24.1	41.3	62.0	73.2	91.2	89.5	89.8
1990–1994	0.2	0.4	1.0	2.7	4.1	9.7	13.9	28.4	41.0	60.7	71.0	85.5	98.1	80.9
1995–1999	0.3	0.5	1.1	1.8	4.1	8.4	16.5	28.1	39.2	47.9	67.9	83.3	82.3	85.3
2000–2004	0.0	0.2	1.0	2.3	6.4	9.9	15.8	30.1	42.3	55.5	58.1	81.1	88.4	94.9
2005–2009	0.3	0.7	1.2	2.9	6.1	10.0	19.8	23.9	35.1	44.0	55.7	68.3	79.9	90.4
2010–2013	0.2	0.5	0.7	2.9	4.9	12.1	17.7	23.5	34.1	46.9	49.7	58.6	63.3	71.2

NOTE. SEER summary staging describes localized disease as limited to large bowel, regional as limited to nearby lymph nodes or other organs, and distant disease as systemic metastases.