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RESEARCH ARTICLE

Colorectal Cancer Screening Initiation After Age 50 Years in an Organized Program

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Introduction: Recent studies report racial disparities among individuals in organized colorectal cancer (CRC) programs; however, there is a paucity of information on CRC screening utilization by race/ethnicity among newly age-eligible adults in such programs.

Methods: This was a retrospective cohort study among Kaiser Permanente Northern California enrollees who turned age 50 years between 2007 and 2012 (N=138,799) and were served by a systemwide outreach and facilitated in-reach screening program based primarily on mailed fecal immunochemical tests to screening-eligible people. Kaplan–Meier and Cox model analyses were used to estimate differences in receipt of CRC screening in 2015–2016.

Results: Cumulative probabilities of CRC screening within 1 and 2 years of subjects' 50th birthday were 51% and 73%, respectively. Relative to non-Hispanic whites, the likelihood of completing any CRC screening was similar in blacks (hazard ratio, 0.98; 95% CI=0.96, 1.00); 5% lower in Hispanics (hazard ratio, 0.95; 95% CI=0.93, 0.96); and 13% higher in Asians (hazard ratio, 1.13; 95% CI=1.11, 1.15) in adjusted analyses. Fecal immunochemical testing was the most common screening modality, representing 86% of all screening initiations. Blacks and Hispanics had lower receipt of fecal immunochemical testing in adjusted analyses.

Conclusions: CRC screening uptake was high among newly screening-eligible adults in an organized CRC screening program, but Hispanics were less likely to initiate screening near age 50 years than non-Hispanic whites, suggesting that cultural and other individual-level barriers not addressed within the program likely contribute. Future studies examining the influences of culturally appropriate and targeted efforts for screening initiation are needed.

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INTRODUCTION

Colorectal cancer (CRC) is the third most common cancer and second-leading cause of cancer death in the U.S.[1] Despite its effectiveness, CRC screening remains underutilized. Fifty-eight percent of eligible adults were up-to-date with recommended CRC screening in 2013, a level well below nationwide screening goals.[2,3] CRC screening is especially underutilized in racial/ethnic minorities including Asians and Hispanics where less than 45% of people in these groups are reported to be up-to-date with CRC screening versus 60% in whites.[4,5] Blacks have historically had lower CRC screening prevalence than whites, a disparity that has been the focus of several studies given the higher disease

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burden in this group.[5–10] Factors contributing to lower CRC screening uptake in racial/ethnic minorities are complex but could be addressed through programs that improve awareness and access to health care, and mitigate cultural and logistic barriers to receiving needed services.[11–14] Further, delay in screening initiation can contribute to disparities and may predict future cancer screening behaviors.[15] Thus, timely screening initiation can be an important target of intervention for boosting screening rates in diverse populations. However, the impact of such programs and screening initiation has not been well studied.

In 2007, Kaiser Permanente Northern California (KPNC), an integrated health system that insures and provides health care, launched a CRC screening program using population health management approaches. The program identifies screening-eligible average-risk adults and mails a fecal immunochemical test (FIT) kit annually to their home address. An in-reach component reminds individuals and offers screening at healthcare encounters. Despite rapid CRC screening uptake throughout the program, recent studies of the program reported lower odds of CRC screening in blacks and Hispanics relative to whites, calling for increased understanding of these differences.[16,17] Thus, the objective of the present study was to examine time to receipt of CRC screening from age 50 years in a program with uniform population health approaches to delivery of screening according to race/ethnicity. Detailed patterns of the type of test utilized to better understand potential racial differences in CRC screening within the organized screening program were also examined.

METHODS

Study Population

Data on KPNC enrollees who turned age 50 years between 2007 and 2012, after the program was in place, were used in this study. KPNC provides health care to >3.8 million people annually (representing about 22% of Northern California's adults aged 22–64 years[18]) across 17 medical centers in the region. KPNC's CRC screening activities and population health management methods have been described previously.[16,19] Briefly, at the program's onset in 2007, FIT kits, along with instructions, were mailed to randomly selected adults who were not up-to-date with recommended CRC screening in weekly batches during the first 9–10 months of each calendar year. The goal is to screen all eligible people by the end of a person's 51st birth year, in accordance with Healthcare Effectiveness Data and Information Set measures.[20] Several years into the program, FIT kits were mailed on or near their 50th birthday. Nonresponders received phone or mailed reminders. Electronic medical record reminders were used to offer screening during in-person healthcare visits, hereafter referred to as in-reach screening. Approval for this study was obtained from IRBs at KPNC and Emory University.

People who had prior CRC, colorectal surgery, or inflammatory bowel disease diagnosis, or a strong family history of heredity cancers were excluded as were individuals who had received colonoscopy, FIT, or sigmoidoscopy prior to their 50th birthday; were enrolled in KPNC for <12 months; lived outside the KPNC service area; or had missing data on race/ethnicity or other key covariates.

Measures

The outcome was time to the receipt of the first CRC screening test (FIT, colonoscopy, or sigmoidoscopy) after age 50 years. Receipt of FIT and mailing dates were based on electronic laboratory and mailing records, respectively. Current Procedural Terminology and ICD codes were used to identify colonoscopy and sigmoidoscopy.

The primary independent variable was race/ethnicity categorized as non-Hispanic white (white); non-Hispanic black (black); Hispanic; Asian or Pacific Islanders (Asian); Native American; and multiple races. To account for changes in screening initiation throughout the program, year of a person's 50th birthday (2007, 2008, 2009, 2010, 2011, and 2012) was included as a covariate. Insurance payer (commercial, Medicaid, Medicare, and other) and Census tract poverty indices (low [0%–3.9%]; medium [4%–7.9%]; and high [≥8%]) were used as markers of SES. Preferred language (English/non-English) was used as measure of acculturation. Additional covariates included family history of CRC according to electronic medical records; geographic region where a person received the majority of their health care (medical service area); gender; Charlson comorbidity score (categorized as 0, 1, ≥2); and BMI category.[21]

Statistical Analysis

Chi-square and Wilcoxon signed rank tests (with α=0.05 for significance) were used to examine differences in subjects' characteristics according to race/ethnicity. People were followed from their 50th birthday until the earliest of receipt of a CRC screening, date of death, date when no longer enrolled in KPNC, or the end of the follow-up period (December 31, 2013). Kaplan–Meier product-limit estimator with log-rank statistics were used to derive the cumulative probability of receipt of CRC screening according to race/ethnicity. Among individuals receiving FIT, the time from their 50th birthday until they were mailed a FIT kit was calculated and used to represent "program" delays and the time from receiving a FIT and the lab date was used to represent "individual" delays. To determine potential differences in receipt of FIT in outreach versus in-reach settings, FIT occurring before the first mailed kit was categorized as "in-reach" whereas FIT following a mailed kit was deemed to occur through "outreach."

Cox proportional hazard models were used to estimate hazard ratios (HRs) and corresponding 95% CIs. A series of models were performed to evaluate for potential attenuation of the association between race/ethnicity and CRC screening initiation by covariates. Each model accounted for clustering of people within medical service areas using a sandwich covariance estimator. The proportional hazard assumption was tested using log–log survival curves as well as log–time and covariate interaction terms. Insurance type and year of 50th birthday violated these assumptions and were adjusted for in-strata. Interactions between race/ethnicity and all other covariates were examined.