Follow-Up of Abnormal Breast and Colorectal Cancer Screening by Race/Ethnicity

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Introduction: Timely follow-up of abnormal tests is critical to the effectiveness of cancer screening, but may vary by screening test, healthcare system, and sociodemographic group.

Methods: Timely follow-up of abnormal mammogram and fecal occult blood testing or fecal immunochemical tests (FOBT/FIT) were compared by race/ethnicity using Population-Based Research Optimizing Screening through Personalized Regimens consortium data. Participants were women with an abnormal mammogram (aged 40–75 years) or FOBT/FIT (aged 50–75 years) in 2010–2012. Analyses were performed in 2015. Timely follow-up was defined as colonoscopy ≤3 months following positive FOBT/FIT; additional imaging or biopsy ≤3 months following Breast Imaging Reporting and Data System Category 0, 4, or 5 mammograms; or ≤9 months following Category 3 mammograms. Logistic regression was used to model receipt of timely follow-up adjusting for study site, age, year, insurance, and income.

Results: Among 166,602 mammograms, 10.7% were abnormal; among 566,781 FOBT/FITs, 4.3% were abnormal. Nearly 96% of patients with abnormal mammograms received timely follow-up versus 68% with abnormal FOBT/FIT. There was greater variability in receipt of follow-up across healthcare systems for positive FOBT/FIT than for abnormal mammograms. For mammography, black women were less likely than whites to receive timely follow-up (91.8% vs 96.0%, OR=0.71, 95% CI=0.51, 0.97). For FOBT/FIT, Hispanics were more likely than whites to receive timely follow-up than whites (70.0% vs 67.6%, OR=1.12, 95% CI=1.04, 1.21).

Conclusions: Timely follow-up among women was more likely for abnormal mammograms than FOBT/FITs, with small variations in follow-up rates by race/ethnicity and larger variation across healthcare systems.

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Introduction

Screening reduces mortality risk for breast and colorectal cancers.[1–4] However, failure to receive appropriate follow-up after a positive result undermines the benefits of screening and may compound disparities.[5,6] Compared with whites, black and Hispanic women have lower likelihood of receiving follow-up for abnormal mammography.[7–16] Little data exist on racial/ethnic disparities in time to follow-up of abnormal fecal occult blood testing or fecal immunochemical tests (FOBT/FIT).[17] Comparisons across cancers may suggest processes that promote timely resolution of positive screening tests. However, no previous reports have simultaneously examined follow-up of abnormal breast and colorectal cancer screening tests by race/ethnicity. This study evaluated the receipt of timely follow-up of abnormal screening mammogram or FOBT/FIT[18] and whether racial/ethnic differences in follow-up exist by screening type and healthcare system.

Methods

Data were obtained from the National Cancer Institute–funded Population-Based Research Optimizing Screening through Personalized Regiments (PROSPR) consortium (healthcaredelivery.cancer.gov/prospr/introduction.html).[19] Breast cancer screening data came from Dartmouth Hitchcock Medical Center and Brigham and Women's Hospital, University of Pennsylvania Health System, and Vermont Breast Cancer Surveillance System. FOBT/FIT data came from Kaiser Permanente, Northern (KPNC) and Southern California (KPSC); Group Health; and Parkland Hospital and Health System–University of Texas Southwestern Medical Center (PHHS-UTSW).[20] Each study site's IRB approved the study.

The study population included women with either abnormal mammograms (2011–2012) or positive FOBT/FIT (2010–2012), with race/ethnicity identified as non-Hispanic white, non-Hispanic black, Hispanic, or Asian/Pacific Islander. The mammography cohort included breast cancer–free women aged 40–75 years with mammograms classified as 0, 3, 4, or 5 on the Breast Imaging Reporting and Data System (BI-RADS)[21] with no imaging within 3 months prior. The FOBT/FIT cohort was colorectal cancer–free women aged 50–75 years with a first positive FOBT/FIT after the cohort entry date with no prior colectomy, colonoscopy within 10 years, or sigmoidoscopy within 5 years.

Patient information, including race/ethnicity, age, screening exam date, the types and results of screening and follow-up exams, and insurance coverage status were obtained from electronic databases. Median household incomes at the ZIP code of residence were obtained by linking to 2010 U.S. Census data.

The outcome was timely follow-up, based on standard definitions used by the PROSPR consortium,[18] defined as additional imaging or biopsy within 3 months of BI-RADS 0, 4, and 5 mammograms, or within 9 months for BI-RADS 3 mammograms and colonoscopy within 3 months of a positive FOBT/FIT.

The proportions of abnormal screening exams were compared by race/ethnicity and PROSPR sites, separately for breast and colorectal cancer screening. Multivariable logistic regression models were used to estimate the relative odds of timely follow-up by race/ethnicity, adjusted for age, test year, and study site. Expanded models also adjusted for insurance and ZIP code income. The Vermont site lacked insurance data, so it was excluded from the expanded models.

Results

Among 166,602 screening mammograms, 17,746 (10.7%) were abnormal, with a similar fraction abnormal across racial/ethnic groups (p=0.84) (Table 1). Among 566,781 screening FOBT/FITs, 24,424 (4.3%) were positive, with a range from 3.9% for Asian/Pacific Islanders to 4.8% for blacks ($p<0.001$).

Receipt of timely follow-up was higher and less variable across study sites for abnormal mammograms (Table 2; 92.9%–96.7%) than for positive FOBT/FITs (39.8%–71.3%). In general, the proportion with timely follow-up was fairly similar by race; however, small differences were statistically significant. Blacks were less likely than whites to receive timely follow-up of mammography at all study sites ($p<0.001$). Timely follow-up by race/ethnicity was more variable across healthcare systems for FOBT/FIT.

Overall, black women were less likely than white women to receive timely follow-up of abnormal mammograms (Table 3), though differences were attenuated after adjusting for insurance and income (OR=0.71, 95% CI=0.51, 0.97). For FOBT/FIT, compared with whites, blacks had similar a rate of timely follow-up whereas Hispanics were more likely to have timely follow-up (AOR=1.12, 95% CI=1.04, 1.21) after adjusting for study site, age, year of test, insurance, and income. Analyses stratified by study site are displayed in Appendix Table 1 (available online). There were no significant interactions between study site and race/ethnicity. Sensitivity analyses using 6 months instead of 3 months as the definition of timely follow-up produced similar results (Appendix Table 2, available online).

Discussion

There were different patterns of timely follow-up of positive screening test by race/ethnicity for mammography and FIT/FOBT. Mammography follow-up rates were high for all racial/ethnic groups. Black women were less likely than whites to receive timely follow-up of abnormal mammograms, but the absolute percentage difference in follow-up between whites and blacks was relatively small. By contrast, timely follow-up of positive FOBT/FIT was lower than abnormal mammography, and racial/ethnic differences were not significant. Positive FOBT/FIT follow-up rates