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Lack of follow-up colonoscopy after positive FOBT in an organized colorectal cancer screening program is associated with modifiable health care practices

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ABSTRACT

Background. ColonCancerCheck (CCC), Ontario's organized colorectal cancer (CRC) screening program, uses guaiac fecal occult blood testing (gFOBT). To reduce CRC-related mortality, persons with a positive gFOBT must have colonoscopy. We identified factors associated with failure to have colonoscopy within 6 months of a positive gFOBT.

Methods. Population-based, retrospective cohort analysis of CCC participants with positive gFOBT (April 2008 to December 2009) using health administrative data. Patient, physician and health care utilization factors associated with a lack of follow-up colonoscopy were identified using descriptive and multivariate analyses.

Results. There were 21,839 participants with a positive gFOBT; 14,091 (64%) had colonoscopy within 6 months. The strongest factors associated with failure to follow-up were recent colonoscopy (in 2 years prior vs. >10 years or never, OR: 4.31, 95% C.I.: 3.82, 4.86), as well as repeat gFOBT (OR: 6.08, 95% C.I.: 5.46, 6.78) and hospital admission (OR: 4.35, 95% C.I.: 3.57, 5.26) in the follow-up period.

Conclusion. In the first 18 months of the CCC Program, 1/3 of those with a positive gFOBT did not have colonoscopy within 6 months. Identification of potentially modifiable factors associated with failure to follow up lay the groundwork for interventions to address this critical quality gap.

Background & aims

Colorectal cancer (CRC) is the second leading cause of cancer death in Canada; an estimated 23,900 Canadians were diagnosed with CRC in 2013 (Canadian Cancer Society's Steering Committee on Cancer Statistics, 2013). Screening using gFOBT has been shown to reduce CRC-related mortality (Hardcastle et al., 1996; Kronborg et al., 1996; Mandel et al., 1993). While gFOBT is the initial screening test, adherence to follow-up colonoscopy after positive gFOBT is necessary to achieve reduction of CRC-related mortality at the population level.

In April of 2008, Cancer Care Ontario and the Ontario Ministry of Health and Long-Term Care launched the ColonCancerCheck (CCC) program, Canada's first organized province-wide CRC screening program.

Abbreviations: ADGs, Aggregated Diagnosis Groups; CAPE, Client Agency Program Enrollment; CCC, ColonCancerCheck; CIRT, Colonoscopy Interim Reporting Tool; CRC, colorectal cancer; FHG, family health group; FHO, family health organization; FHN, family health network; FHT, family health team; gFOBT, guaiac fecal occult blood test; ICES, Institute for Clinical Evaluative Sciences; LRT, Laboratory Reporting Tool; OHIP, Ontario Health Insurance Program; PEMs, patient enrolled models.

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In Ontario's CCC program, persons aged 50 to 74 years visit their family physician to receive CRC screening. Those at increased risk, defined as having one or more first degree relatives with CRC, are offered screening with colonoscopy. For those at average risk, providers dispense gFOBT kits. Family physicians receive the gFOBT results and are responsible for making the referral for follow-up colonoscopy in participants with a positive result.

Reported rates of colonoscopy following a positive gFOBT vary across jurisdictions (Anonymous, 2005; Choi et al., 2012; Ferrat et al., 2013; Logan et al., 2012; Paszat et al., 2007) from 55% (up to 2 years from the gFOBT) in Australia (Anonymous, 2005) to 90% (within 12 months of gFOBT) in the French CRC screening program in the Val-de-Marne district (Ferrat et al., 2013). British and European guidelines indicate that at least 85% of patients with abnormal gFOBT should have follow-up colonoscopy (Chilton and Rutter, 2010; European Commission, 2010). Failure to have a follow-up colonoscopy after positive gFOBT has been associated with inappropriate physician recommendation (Baig et al., 2003; Jimbo et al., 2009; Lurie and Welch, 1999; Nadel et al., 2005; Shields et al., 2001) (e.g., repeat gFOBT or incomplete colonoscopic evaluation), being a solo practitioner (Turner et al., 2003), as well as patient factors such as residence in high depravation/low SES neighborhoods (Ferrat et al., 2013; Morris et al., 2012; Moss et al., 2012; Steele et al., 2010), non-compliance (Baig et al., 2003; Fisher et al., 2006; Jimbo et al., 2009), ethnicity (Ferrat et al., 2013; Morris et al., 2012; Moss et al., 2012), insurance status (Choi et al., 2012; Rao et al., 2009), and recent colonoscopy (Carlson et al., 2011; Fisher et al., 2006; Jimbo et al., 2009; Rao et al., 2009; Van Kleek et al., 2010).

Evaluation of factors associated with failure to have a colonoscopy following positive gFOBT provides the basis to develop interventions to improve adherence. In this population-based study, our aim was to identify patient, physician, and health-utilization factors associated with failure to have colonoscopy within 6 months of a positive gFOBT in the context of an organized colorectal cancer screening program.

Methods

The study was approved by the research ethics board at Sunnybrook Health Sciences Centre.

Data sources

This study was conducted at the Institute for Clinical Evaluative Sciences (ICES), which contains the administrative health records for all 13.5 million Ontarians. Databases from the CCC program were linked to ICES' administrative databases using an encrypted version of the provincial health insurance number.

ColonCancerCheck program databases

The Laboratory Reporting Tool (LRT) and the Colonoscopy Interim Reporting Tool (CIRT) databases contain CRC screening data since program inception on April 1, 2008. The CIRT includes data on all colonoscopies, regardless of indication, done at collaborating CCC hospitals, accounting for 60% of colonoscopies done in the province. The LRT comprises data, including results, on the non-rehydrated gFOBT (Hema-Screen, Immunostics, Inc., NJ, USA) administered by the CCC program. Each gFOBT kit contains three test cards. Each card has 2 windows where stool is applied; cards are called positive if 1 or both windows are positive. The LRT reports the number of cards (out of 3) positive. If 1 or more of the 3 cards is positive, the overall kit result is positive and follow-up colonoscopy is indicated. See Appendix 1 for more details on the CCC databases used.

ICES databases

The ICES databases used include the Canadian Institute of Health Information databases, the Ontario Health Insurance Program (OHIP) database, the Ontario Cancer Registry, the Registered Persons Database, ICES Physician Database, and the Client Agency Program Enrollment (CAPE) registry. Detailed descriptions of ICES databases have been published elsewhere (Alharbi et al., 2009; Robles et al., 1988). Of note, the OHIP database captures all physician billings in Ontario's single payor system, including colonoscopies that are not captured by CIRT. The CAPE registry is a centralized electronic record of patients enrolled to physicians who participate in patient enrolled models (PEMs) of care. PEMs consist of groups of family physicians working with other health care professionals to provide enrolled patients with comprehensive health care and extended hours. PEMs also incorporate a financial incentive structure to reward use of health care measures such as CRC screening (HealthForceOntario, 2013). It is estimated that 75% of Ontario residents received their primary care via a PEM in 2008–2009 (Glazier et al., 2012). See Appendix 1 for more details on the ICES databases used.

Defining the study cohort

Using Cancer Care Ontario's LRT database, we identified all participants in the CCC program with a positive gFOBT result between April 1st, 2008 and December 31st, 2009. The index date was the date of the first positive gFOBT. Persons diagnosed with CRC prior to the index event, those who died during the follow up period, and those who were less than 50 or greater than 74 years of age as of the index date were excluded.

Defining the primary outcome

The primary outcome was defined as any colonoscopy, regardless of indication, within 6 months of the index event as defined by OHIP fee codes for colonoscopy or a record in the CIRT database. The 6 month cut-off was selected based on the clinical reasoning that colonoscopies occurring after 6 months were less likely to be related to the positive result and on the observed rates of follow-up in the cohort. As shown in Fig. 1, the monthly colonoscopy rate in our cohort begins to drop off after 2 months and approaches zero around 6 months. We used a 12 month cut-off as the outcome in a sensitivity analysis. If a colonoscopy was documented in both OHIP and CIRT, the earliest record was used.

Factors examined

Participant factors

At the index date, we determined the participant's age (categorized as 50–59, 60–69, and 70–74 years), sex, median neighborhood income category (categorized as rural and highest to lowest urban quintile), health region, comorbidity, immigration status, continuity of primary care, and health region annual colonoscopy rate. Median neighborhood income category is a proxy measure for socioeconomic status. It is derived by linking the median household income at the level of the enumeration area, obtained from Statistics Canada Census data, to participant's area of residence, identified by postal code (James et al., 2007). Ontario has 14 health regions, also known as Local Health Integration Networks (Anonymous). These networks are responsible for planning, integrating and funding local health care. Comorbidity was measured by counting the number of Aggregated Diagnosis Groups (ADGs) in the prior

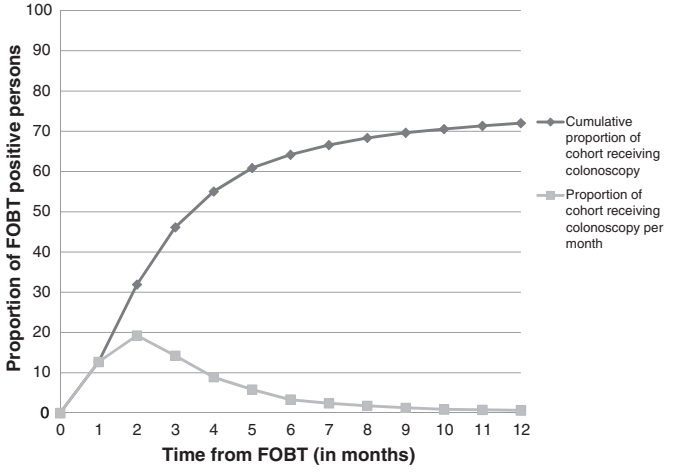

Fig. 1. Cumulative proportion of the cohort receiving colonoscopy after positive gFOBT by month and rate of colonoscopy by month in the cohort.