

# Equity and practice issues in colorectal cancer screening

## Mixed-methods study

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### Abstract

**Objective** To investigate overall colorectal cancer (CRC) screening rates, patterns in the use of types of CRC screening, and sociodemographic characteristics associated with CRC screening; and to gain insight into physicians' perceptions about and use of fecal occult blood testing [FOBT] and colonoscopy for patients at average risk of CRC.

**Design** Mixed-methods study using cross-sectional administrative data on patient sociodemographic characteristics and semistructured telephone interviews with physicians.

**Setting** Toronto, Ont.

**Participants** Patients aged 50 to 74 years and physicians in family health teams in the Toronto Central Local Health Integration Network.

**Main outcome measures** Rates of CRC screening by type; sociodemographic characteristics associated with CRC screening; thematic analysis using constant comparative method for semistructured interviews.

**Main findings** Ontario administrative data on CRC screening showed lower overall screening rates among those who were younger, male patients, those who had lower income, and recent immigrants. Colonoscopy rates were especially low among those with lower income and those who were recent immigrants. Semistructured interviews revealed that physician opinions about CRC screening for average-risk patients were divided: one group of physicians accepted the evidence and recommendations for FOBT and the other group of physicians strongly supported colonoscopy for these patients, believing that the FOBT was an inferior screening method. Physicians identified specialist recommendations and patient expectations as factors that influenced their decisions regarding CRC screening type.

**Conclusion** There was considerable variation in CRC screening by sociodemographic characteristics. A key theme that emerged from the interviews was that physicians were divided in their preference for FOBT or colonoscopy; factors that influenced physician preference included the health care system, recommendations by other specialists, and patient characteristics. Providing an informed choice of screening method to patients might result in higher screening rates and fewer disparities. Changes in policy and physician attitudes might be needed in order for this to occur.

### EDITOR'S KEY POINTS

- Physician recommendation is a primary driver for disease screening and the method of screening used. With regard to colorectal cancer screening, one of this study's goals was to determine provider, as well as system and patient, factors that contribute to colorectal cancer screening rates.
- The promotion of colonoscopy by gastroenterologists and the preventive care bonus being attached only to screening by fecal occult blood tests (FOBT) emerged as prominent influencing factors in physicians' attitudes toward screening method.
- Many physician participants expressed that more affluent, better educated patients often requested colonoscopy. This reinforced beliefs among physicians who themselves preferred colonoscopy and highlighted the perceived disjuncture between patient choice and the system-level incentives that were provided for the use of FOBT. Despite current recommendations in favour of FOBT as the initial screening method for low-risk patients, most Ontarians being tested are receiving colonoscopies.

This article has been peer reviewed.  
*Can Fam Physician* 2016;62:e186-93

# Questions d'équité et de pratique dans le dépistage du cancer colorectal

## Étude à l'aide de méthodes mixtes

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### Résumé

**Objectif** Faire le point sur les taux globaux de dépistage du cancer colorectal (CCR), sur les modèles d'utilisation des types de dépistage de ce cancer et sur les caractéristiques sociodémographiques associées au dépistage du CCR; et en savoir davantage sur ce que pensent les médecins de la recherche du sang occulte dans les selles (RSOS) et de la colonoscopie, et de l'utilisation qu'on en fait chez les patients qui présentent un risque moyen de CCR.

**Type d'étude** Étude à méthodologie mixte utilisant des données administratives transversales sur les caractéristiques socioéconomiques de patients ainsi que des entrevues téléphoniques semi-structurées avec des médecins.

**Contexte** Toronto, Ontario.

**Participants** Patients âgés de 50 à 74 ans et médecins de famille œuvrant dans les équipes de santé familiale du Réseau local d'intégration des services de santé de Toronto.

#### POINTS DE REPÈRE DU RÉDACTEUR

- La recommandation d'un médecin est un facteur crucial pour promouvoir le dépistage des maladies et pour le choix de la méthode utilisée. Un des objectifs de cette étude était de déterminer les facteurs liés au médecin, au système et au patient qui jouent un rôle dans le taux de dépistage du cancer colorectal.

- La promotion de la colonoscopie par les gastroentérologues et l'avantage d'une mesure préventive qui correspond uniquement à la recherche du sang occulte dans les selles (RSOS) sont apparus comme des facteurs majeurs pour déterminer l'attitude des médecins envers une méthode de dépistage.

- Plusieurs des médecins participants ont signalé que les patients les plus fortunés et les plus instruits demandaient souvent une colonoscopie. Cela renforçait l'opinion de certains médecins qui préféraient eux-mêmes la coloscopie; cela illustre aussi l'apparente incohérence entre le choix des patients et les campagnes du système de santé préconisant l'utilisation de la RSOS. En dépit des recommandations actuelles en faveur de la RSOS comme méthode de dépistage initiale pour les personnes à faible risque, la plupart des Ontariens testés le sont par colonoscopie.

Cet article a fait l'objet d'une révision par des pairs.  
*Can Fam Physician* 2016;62:e186-93

**Principaux paramètres à l'étude** Les taux de dépistage selon le type utilisé; les liens entre les caractéristiques sociodémographiques et le dépistage du CCR; et une analyse thématique des entrevues semi-structurées à l'aide de la méthode de comparaison constante.

**Principales observations** Selon les données administratives de l'Ontario, les taux de dépistage du CCR étaient plus bas chez les hommes et chez les jeunes, chez les moins fortunés et chez les immigrants récents, ces deux derniers groupes ayant des taux de dépistage particulièrement bas. Les entrevues semi-structurées ont révélé que les médecins avaient des opinions partagées à propos du dépistage du CCR pour les patients à risque moyen: un groupe acceptait les preuves et recommandations en faveur de la RSOS, tandis que l'autre favorisait fortement la colonoscopie pour ces mêmes patients, croyant que la RSOS était une moins bonne méthode. Selon les médecins, les recommandations de spécialistes et les préférences des patients étaient des facteurs qui influençaient leurs décisions concernant le type de dépistage.

**Conclusion** Le dépistage du CCR variait beaucoup selon les caractéristiques sociodémographiques. Un thème clé qui ressortait des entrevues est que les médecins étaient divisés dans leur préférence pour la RSOS ou pour la colonoscopie; parmi les facteurs qui influençaient la préférence des médecins, mentionnons le système de santé, les recommandations des autres spécialistes et les caractéristiques des patients. Informer clairement les patients sur le choix de la méthode de dépistage pourrait résulter en un meilleur taux de dépistage et en moins de disparités. Pour que cela se produise, il faudrait peut-être apporter certains changements dans les politiques et modifier les attitudes des médecins.

The burden of colorectal cancer (CRC) in Canada is substantial. In 2014, CRC was estimated to be the second most commonly diagnosed cancer in men in Canada (13.9% of all male cancer cases) and the third most commonly diagnosed cancer in women (11.6% of all female cancer cases).<sup>1</sup> Colorectal cancer remains the second most common cause of cancer death for men and the third most common cause of cancer death for women. It was estimated that more than 24 000 Canadians would be diagnosed with CRC in 2014 and more than 9300 would die from it, a mortality rate of more than 38%.<sup>1</sup> Given the high incidence and mortality of CRC in this country, organized screening programs using guaiac fecal occult blood testing (FOBT) or fecal immunochemical testing now exist in most provinces in Canada.<sup>2</sup> Population-based studies show that using these tests to screen those at average risk of CRC saves lives and possibly reduces CRC incidence and the need for more invasive surgery. It is also important to acknowledge that harmful effects such as anxiety regarding false-positive results, complications of colonoscopy (eg, perforation), or overdiagnosis or unnecessary investigation and treatment might still occur for some.<sup>3-8</sup>

However, despite universal health care in Canada, inequities in access to cancer care in general and to screening in particular remain and are associated with factors such as income, education level, age, location of residence, and immigration status. Income-related inequity in particular has been identified as a critical factor in access to CRC screening,<sup>9</sup> as well as screening for other disease sites.<sup>10</sup> Not only are inequities in access to cancer screening and care ethically problematic, lower income is associated with poorer survival rates for several cancers including CRC.<sup>10</sup> Access to cancer services appears to be most inequitable at the start of the cancer journey (ie, screening) and at the end of life. This might be explained by the fact that screening and end-of-life care are commonly initiated by the primary care provider or the patient or the patient's family as opposed to other cancer care such as treatment, which is most often instituted by the oncology service.<sup>9</sup> Organized provincial cancer screening programs might thus have the potential to mitigate some of these inequities of access.

In Ontario, organized CRC screening using guaiac FOBT every 2 years for average-risk individuals between the ages of 50 and 74 was initiated in 2008.<sup>11</sup> Although colonoscopy for screening is also a fully covered benefit in Ontario, it has not been explicitly recommended for screening people at average risk. However, despite the implementation of an organized program, CRC screening rates appear to be substantially lower among those with low income and of younger age.<sup>12-15</sup> The combined influence of factors such as age, sex, socioeconomic status, and recent immigration are poorly understood, as are geographic variations. It is also not known how

system, patient, and provider factors contribute to CRC screening rates, but it is generally well appreciated that physician recommendation is a primary driver for both disease screening in general and the method of screening in particular. Our objective was to investigate overall CRC screening rates, patterns in the use of types of CRC screening, and sociodemographic characteristics associated with CRC screening, and to gain insight into physicians' perceptions about and use of FOBT or colonoscopy for patients at average risk of CRC.

The quantitative component of this study was performed first and its findings motivated a related qualitative study to help understand some of the reasons for the disparities we found. We chose to undertake this mixed-methods study in Toronto, Ont, as it is a setting with large disparities in other forms of cancer screening<sup>16</sup> and relatively good access to colonoscopy through hospital-based services and private endoscopy clinics.

## METHODS

### Quantitative analyses

This was a population-based study of adults aged 50 to 74 years in the Toronto Central Local Health Integration Network (LHIN) in Ontario, which had a population of approximately 1.1 million people in 2006. In order to provide context, data were also presented for the province of Ontario. Administrative data were examined from April 1, 2009, to March 31, 2011, to understand patterns of CRC screening. In this setting, all relevant physician-ordered and diagnostic tests are fully covered for permanent residents with no copayments or deductibles.

Data sets were linked using unique, encoded identifiers and analyzed at the Institute for Clinical Evaluative Sciences in Toronto. The databases used included physician and laboratory claims to the Ontario Health Insurance Plan (OHIP) for FOBT, colonoscopy, sigmoidoscopy, and barium enema. The OHIP claims and hospital discharges were used to identify those with inflammatory bowel disease who were excluded because they were at higher risk of CRC. Hospital discharge data were obtained from the Discharge Abstract Database of the Canadian Institute for Health Information. The Ontario Cancer Registry was used to identify those with previous CRC who were also excluded because they would fall into surveillance and not screening. The Registered Persons Database, Ontario's health care registry, was used for postal code, sex, date of birth, and date of first OHIP registration (a proxy for immigration for those first eligible on or after April 1, 2001). The 2006 Statistics Canada census and the Statistics Canada Postal Code Conversion File Plus were used to derive area-level income quintiles at the level of the dissemination area, each of which has approximately 600 residents.

All forms of screening combined was calculated as the proportion of those eligible as of March 2011 who had FOBT during the previous 2 years, barium enema or sigmoidoscopy in the previous 5 years, or colonoscopy within the previous 10 years. Rates of FOBT were calculated as the proportion of those eligible as of March 2011 (after removing those who had barium enema or sigmoidoscopy within the previous 5 years or colonoscopy within the previous 10 years) who had FOBT within the previous 2 years. Rates of colonoscopy were calculated as the proportion of those eligible who had colonoscopy within the previous 10 years. The use of colonoscopy as a percent of all CRC screening was calculated by dividing those with colonoscopy by those with all forms of testing (FOBT, barium enema, sigmoidoscopy, and colonoscopy). Those with conditions that would be an indication for colonoscopy were considered ineligible, including those with previous CRC and those with inflammatory bowel disease.

Descriptive analyses examined proportions stratified by income quintile, age, sex, and recent registration with OHIP, together with rate ratios.

### Qualitative analyses

All physicians from 12 family health teams (FHTs) in the Toronto Central LHIN were invited to participate via practice leads. Family health teams constitute a large and important sector of primary care and operate with the benefit of electronic medical records, interprofessional teams, and management infrastructure that facilitates processes relevant to screening programs such as follow-up and reminders. Focusing on FHTs therefore helped identify causes of variation linked to physician beliefs and preferences rather than variation linked to the presence or absence of structural supports for screening.

Physicians interested in participating contacted the researcher (L.R.) directly to complete the consent process and arrange for an interview. All interested physicians were included and 8 male and 21 female physicians at 9 FHTs in the Toronto Central LHIN participated. Participants ranged in age from 27 to 62 years and had between 1 and 27 years in independent practice.

Semistructured telephone interviews (average length of 32 minutes) were conducted between July and November 2012. Interviews explored the following: approaches to CRC screening; physician preferences for type of screening; the role of patient preferences and beliefs; the influence of gastroenterology on screening practices in family medicine; health resource and equity issues; administrative systems and infrastructure; and the effects of the preventive care bonus.

Interviews were digitally audiorecorded for verbatim transcription, and transcripts were checked against sound files for accuracy. Corrected transcripts were entered into HyperResearch software for qualitative

data analysis and coded for anticipated and emergent themes. Two other researchers (S.B. and R.H.G.) read the transcripts and independently identified key themes and concepts. A coding framework was developed in discussion with the study team. For the analysis the method of constant comparison was used and included searches for disconfirming evidence.

Research ethics board approval for the study was granted by Sunnybrook Health Sciences Centre and St Michael's Hospital in Toronto.

## RESULTS

### Quantitative analyses

In both the Toronto Central LHIN and Ontario, a little more than half of eligible residents had received any type of screening for CRC. Screening by any method and by FOBT in the Toronto Central LHIN was slightly lower than in Ontario; but screening by colonoscopy in the Toronto Central LHIN was slightly higher than in Ontario (**Table 1**).

In the Toronto Central LHIN and in Ontario, those living in lower-income neighbourhoods had substantially lower rates of any type of CRC screening than those living in higher-income neighbourhoods did, with a steeper gradient for the Toronto Central LHIN than for Ontario. The ratio of lowest to highest income quintile was 0.71 for the Toronto Central LHIN and 0.78 for Ontario. The same pattern was found for colonoscopy but with even steeper gradients than for any CRC screening modality (lowest to highest income ratio 0.53 for the Toronto Central LHIN and 0.65 for Ontario). In contrast, FOBT had little income gradient for the Toronto Central LHIN (lowest to highest income quintile 1.01), but there was a gradient for Ontario (0.83).

People aged 50 to 59 years had lower screening rates than those aged 60 to 74 did, and men had lower screening rates than women did with any method of screening, with colonoscopy, and with FOBT, with similar patterns found in the Toronto Central LHIN and in Ontario. Recent OHIP registrants (a proxy for recent immigrants) had lower rates than long-term residents did for any type of screening, with rate ratios of 0.75 and 0.74, respectively, in the Toronto Central LHIN and in Ontario. Recent registrants were less than half as likely as long-term residents were to have had colonoscopy (rate ratios 0.44 and 0.42 for Toronto Central LHIN and Ontario, respectively), but slightly more likely to have had screening with FOBT (rate ratios 1.19 and 1.02, respectively).

### Qualitative analyses

Three prominent themes with direct bearing on equity issues emerged from interviews and illustrate the complex interconnection of system, provider, and patient factors influencing the choice of screening type.

**Table 1. Colorectal cancer screening for patients in the TC LHIN and in Ontario, by screening method and sociodemographic characteristics**

PATIENTS	ANY METHOD		COLONOSCOPY		FOBT	
	TC LHIN	ONTARIO	TC LHIN	ONTARIO	TC LHIN	ONTARIO
All eligible patients, %	51.8	54.9	37.0	34.9	21.7	29.1
<b>Sociodemographic characteristics</b>						
Income quintile						
• 1 (lowest), %	44.3	47.3	27.3	27.7	21.3	25.4
• 2, %	46.9	52.0	29.5	31.1	22.9	28.7
• 3, %	49.5	54.9	34.0	34.0	21.8	30.0
• 4, %	52.4	57.7	37.5	37.2	22.2	31.0
• 5 (highest), %	62.1	61.1	51.1	42.6	21.1	30.7
• 1:5 income quintile ratio	0.71	0.78	0.53	0.65	1.01	0.83
Age						
• 50-59 y, %	47.4	49.6	32.9	30.7	20.1	25.8
• 60-74, y %	55.8	59.5	40.7	38.4	23.4	32.4
• Ratio by age	0.85	0.83	0.81	0.80	0.86	0.79
Sex						
• Female, %	54.9	57.6	38.6	36.2	24.7	31.8
• Male, %	48.6	52.1	35.4	33.4	18.7	26.5
• Male:female ratio	0.89	0.90	0.92	0.92	0.76	0.83
Recent OHIP registrant						
• Yes, %	39.1	41.1	16.4	14.7	25.7	29.7
• No, %	52.0	55.1	37.4	35.2	21.6	29.1
• Yes:no ratio	0.75	0.74	0.44	0.42	1.19	1.02

FOBT—fecal occult blood test, OHIP—Ontario Health Insurance Plan, TC LHIN—Toronto Central Local Health Integration Network.

The 3 themes were as follows: physicians' perceptions of FOBT versus colonoscopy; perceived economic and political drivers; and socioeconomic differences among patients.

**Physicians' perceptions of FOBT versus colonoscopy.**

Physicians were broadly divided into 2 groups: one group preferred FOBT, the other colonoscopy. Physicians who favoured FOBT generally accepted the current evidence supporting its use, were focused on population-level perspectives and resource management, and cited risk and inconvenience to patients as reasons supporting their views. Those who favoured colonoscopy commonly expressed scepticism about the evidence for screening by FOBT and were more focused on one-to-one relationships with patients than on population-level concerns.

While all physicians indicated that they routinely discussed both screening options with patients, many appeared unaware of how they might be influencing patient choice. For example, referring to colonoscopy as the criterion standard or alluding to the risks of and

burdensome preparation for colonoscopy were common. Some physicians also indicated that they shared their personal risk profile and screening preferences, as well as negative past experiences with patients. The wording of recommendations often appeared more influential than physicians necessarily acknowledged:

[Fecal occult blood testing] is cheaper and better than nothing and that's what I tell patients.

The risk of the perforation and the bleeding—and I've had 2 already, patients who've had bleeds from colonoscopies—has made it such that I tell them the benefit of the FOBTs ... versus the benefit of the colonoscopy ... and then they decide which way they want to go.

**Perceived economic and political drivers.** Physicians who favoured FOBT and physicians who favoured colonoscopy expressed concerns about perceived economic and political drivers related to CRC screening.

Many of those who favoured FOBT discussed the financially driven promotion of colonoscopy. Typically, this perception emerged while discussing the influence of gastroenterologists on family medicine. Many participants expressed frustration with receiving consultation notes from the other specialists indicating shorter rescreening intervals than guidelines suggest because they felt obligated to comply:

I know the recommendations: if it's completely normal you can wait 10 years, but if I have a report in front of me that says to repeat in 5 years, even if there's nothing on the report to explain why, medically I think it puts me in a bad spot if I wait the 10.

In contrast, many of those who generally preferred colonoscopy objected, sometimes strongly, to the preventive care bonus being attached only to FOBT. They argued that this was a short-sighted cost-saving measure unsupported by convincing evidence. Participants in this group did not have any incentive for changing their practice:

I think it's absolute nonsense because if I have a hundred people and I've ordered 2 fecal occult bloods you know what it looks like on me. I get nothing ... they just want fecal occult blood testing and I kind of find that backwards ... that you're getting paid to do a test that's not even that good. Yet I'm screening and not getting any compensation.

**Socioeconomic differences among patients.** Patients with higher income and with more education were widely perceived as more likely to opt for, or to insist on, colonoscopy. This was partly attributed to middle-class normative assumptions about colonoscopy as a rite of passage, as well as to the culture of executive physical examinations that values higher-technology interventions and more information. This expression of patient preference was a key driver for some physicians for whom it served to reinforce their own preference for colonoscopy: "The more affluent they are and the more ... affluent friends that they have, the more they're going to insist on the colonoscopy."

Patients with lower income, patients experiencing food or housing insecurity, or patients with mental health and addiction issues were described as very difficult to engage in CRC screening. Moreover, CRC screening was considered more difficult to carry out with these patients than either breast or cervical cancer screening because of the logistic complexity and degree of patient compliance involved.

Most of my patients who are living on the edge socio-economically are not walking into the office with the

agenda of thinking about preventive care screening ... it's just not up there on their list of priorities in the way it is for someone who's more comfortable socio-economically and has the social and mental space to think about this on an ongoing basis.

## DISCUSSION

Using Ontario's linked administrative databases, we found marked variation in CRC screening in both the Toronto Central LHIN and in Ontario, with substantially lower rates for those living in low-income neighbourhoods, those who were younger, male patients, and those who were recent OHIP registrants (a proxy for recent immigrants). Variation was even larger for colonoscopy, with especially low rates among those in low-income neighbourhoods and recent registrants. Interviews with Toronto Central LHIN FHT physicians provided considerable insights into the system, provider, and patient factors underlying these patterns.

Perceived system-level economic and political drivers such as the financially driven promotion of colonoscopy by gastroenterologists and the preventive care bonus being attached only to screening by FOBT emerged as prominent influences. At the provider level, it was clear that physicians who favoured FOBT were often more population focused and concerned about resource management, while those who favoured colonoscopy were typically more focused on the individual patient. There was also marked variation in the degree to which physicians accepted the evidence supporting the use of one method over the other, as well as often unacknowledged influencing of patient choice through the language used to present screening options. Many participants observed that more affluent, better educated patients often requested colonoscopy. This reinforced physician beliefs among those who themselves preferred colonoscopy and highlighted the perceived disjuncture between patient choice and the system-level incentives that were provided for the use of FOBT.

Variations in CRC screening and outcomes by sociodemographic characteristics have also been found in other studies. In the United States, low socioeconomic status was found to be an important determinant of low screening rates<sup>17</sup> and presentations of late-stage CRC.<sup>18</sup> Similarly, low socioeconomic status has been associated with low screening rates in Canadian settings.<sup>10,12</sup> Similar to our findings, results from the 2008 and 2012 Canadian Community Health Surveys found that higher screening rates for CRC were associated with higher income, being 65 or older, and not being a recent immigrant.<sup>13,14</sup> Low socioeconomic status and being an immigrant have been associated with lower rates of other types of cancer screening.<sup>19,20</sup>

Physician, patient, and system factors that might affect the use of various forms of CRC screening have also been investigated. Use of colonoscopy by primary care physicians in Ontario was found to be increasing over time but with substantial variation by physician and patient characteristics including higher rates in less marginalized neighbourhoods.<sup>21</sup> A mailed survey of Alberta physicians found variation by geographic region in choice of method and barriers to the use of various methods, and concerns about capacity to follow up on positive FOBT test results.<sup>22</sup> A 2008 survey of Ontario primary care physicians found a physician preference for colonoscopy, influenced by perceptions of test sensitivity, cost-effectiveness, and effect on mortality.<sup>23</sup> Patient preferences appear to be important and vary considerably among patients<sup>24-26</sup>; however, physician preferences might not align with patient preferences, especially when physicians have strong preferences for colonoscopy.<sup>27</sup> Providing patients with a choice of methods appears to be associated with higher rates of CRC screening than providing the choice of only a single method, especially among ethnic and racial minorities.<sup>28</sup>

### Strengths and limitations

These findings should be interpreted in the light of several strengths and limitations. The use of administrative data allowed a population-wide perspective on rates of screening, use of different methods, and the relationships between screening and sociodemographic factors. It revealed disparities in screening by area-level income, age, sex, and recent immigration status that were generally similar in the Toronto Central LHIN and in Ontario but that often differed for colonoscopy and FOBT. Administrative data are collected for reasons other than research and they therefore do not contain many key variables, such as individual-level income or immigration status. For that reason, proxy measures including area-level income derived from the postal code and recent registration with OHIP were used in their place. Administrative data cannot distinguish CRC testing done for screening purposes from diagnostic testing prompted by symptoms. The algorithms we used to identify screening tests have not been validated but they are based on physician and laboratory billings, so they should be relatively accurate and complete.

The quantitative analysis revealed important patterns, but the reasons behind differential use of colonoscopy and FOBT were not available in those data. The strength of the qualitative analysis lies in its ability to illuminate some of the possible explanations for the patterns of screening that were seen. In-depth interviews permitted a thorough exploration of provider approaches to screening and the reasons behind their decision making and office practices. As always in qualitative studies, people participate on a voluntary basis and those who

feel strongly about the topic might be motivated to participate. Other views might have emerged if everyone who was approached participated.

This study was conducted in a location with relatively high availability of endoscopy services. Physicians practising in locations where colonoscopy is less available would likely offer different perspectives. While we anticipated that cultural diversity among patients would have a discernible effect on CRC screening, such findings did not emerge. This was another limitation of the administrative data we used, as we were unable to collect information on ethnicity beyond a proxy measure of recent immigration. Further, even if we had been able to collect such data, urban settings like that of the Toronto Central LHIN sometimes demonstrate a homogenizing “downtown effect” that flattens out cultural differences. Further study in areas where a particular culture is predominant might yield greater insight into this issue. Similarly, because the lower-income patients described by physicians in this study were mainly those living at the far end of the income spectrum, little insight was gained into other groups such as the working poor or recent immigrants. Patient perspectives were not explored in this study but would be very worthwhile to pursue.

### Conclusion

This study has demonstrated considerable variation in CRC screening by sociodemographic characteristics, along with substantial insight into the reasons for these patterns. Physician preference for FOBT or colonoscopy emerged as a key theme, while physicians identified specialist recommendations and patient expectations as influences on their decision making. Despite current recommendations in favour of FOBT as the initial method of screening for average-risk patients, most Ontarians being tested are receiving colonoscopies. In accordance with current evidence,<sup>27</sup> providing an informed choice of screening method to patients might result in higher screening rates and fewer disparities. Changes in policy and physician attitudes might be needed in order for this to occur. 

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#### Acknowledgment

This study was funded by Cancer Care Ontario and by the Ontario Ministry of Health and Long-Term Care through its funding to the Centre for Research on Inner City Health at St Michael's Hospital in Toronto. This study was supported by the Institute for Clinical Evaluative Sciences, which is funded by an annual grant from the Ontario Ministry of Health and Long-Term Care. The opinions, results, and conclusions reported in this paper are those of the authors and are independent from the funding sources. No endorsement by the Institute for Clinical Evaluative Sciences or the Ontario Ministry of Health and Long-Term Care is intended or should be inferred. Parts of this material are based on data and information compiled and provided by the Canadian Institute for Health Information. However,

the analyses, conclusions, opinions, and statements expressed herein are those of the authors, and not necessarily those of the Canadian Institute for Health Information. Dr Glazier is supported as a Clinician Scientist in the Department of Family and Community Medicine at the University of Toronto and at St Michael's Hospital.

#### Contributors

All authors contributed to the concept and design of the study; data gathering, analysis, and interpretation; and preparing the manuscript for submission.

#### Competing interests

None declared

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#### References

- Canadian Cancer Society's Advisory Committee on Cancer Statistics. *Canadian cancer statistics 2014. Special topics: skin cancers*. Toronto, ON: Canadian Cancer Society; 2014. Available from: [www.colorectal-cancer.ca/IMG/pdf/Canadian-Cancer-Statistics-2014-EN.pdf](http://www.colorectal-cancer.ca/IMG/pdf/Canadian-Cancer-Statistics-2014-EN.pdf). Accessed 2016 Mar 9.
- Cancer System Performance [website]. *Disease site. Colorectal*. Toronto, ON: Canadian Partnership Against Cancer; 2016. Available from: [www.systemperformance.ca](http://www.systemperformance.ca). Accessed 2015 Mar 1.
- Canadian Task Force on Preventative Health Care [website]. *Colorectal cancer—protocol*. Calgary, AB: Canadian Task Force on Preventative Health Care; 2016. Available from: <http://canadiantaskforce.ca/ctfphcguidelines/2015-colorectal-cancer/protocol/>. Accessed 2015 Mar 1.
- Gordon PH. Screening for colorectal carcinoma. *Curr Oncol* 2010;17(2):34-9.
- Kronborg O, Fenger C, Olsen J, Jørgensen OD, Søndergaard O. Randomised study of screening for colorectal cancer with faecal-occult-blood test. *Lancet* 1996;348(9040):1467-71.
- Kewenter J, Brevinge H, Engarås B, Haglund E, Ahrén C. Results of screening, rescreening, and follow-up in a prospective randomized study for detection of colorectal cancer by fecal occult blood testing. Results for 68,308 subjects. *Scand J Gastroenterol* 1994;29(5):468-73.
- Mandel JS, Church TR, Ederer F, Bond JH. Colorectal cancer mortality: effectiveness of biennial screening for fecal occult blood. *J Natl Cancer Inst* 1999;91(5):434-7.
- Hewitson P, Glasziou PP, Irwig L, Towler B, Watson E. Screening for colorectal cancer using the faecal occult blood test, hemoccult. *Cochrane Database Syst Rev* 2007;(1):CD001216.
- Maddison AR, Asada Y, Urquhart R. Inequity in access to cancer care: a review of the Canadian literature. *Cancer Causes Control* 2011;22(3):359-66. Epub 2011 Jan 8.
- Ramji F, Cotterchio M, Manno M, Rabeneck L, Gallinger S. Association between subject factors and colorectal cancer screening participation in Ontario, Canada. *Cancer Detect Prev* 2005;29(3):221-6.
- Cancer Care Ontario [website]. *Screening guidelines—colon cancer*. Toronto, ON: Cancer Care Ontario; 2015. Available from: [www.cancercare.on.ca/pcs/screening/coloscreening/ccstandardsguidelines/](http://www.cancercare.on.ca/pcs/screening/coloscreening/ccstandardsguidelines/). Accessed 2015 Mar 1.
- Singh SM, Paszat LF, Li C, He J, Vinden C, Rabeneck L. Association of socioeconomic status and receipt of colorectal cancer investigations: a population-based retrospective cohort study. *CMAJ* 2004;171(5):461-5.
- Wilkins K, Shields M. Colorectal cancer testing in Canada—2008. *Health Rep* 2009;20(3):21-30.
- Singh H, Bernstein CN, Samadder JN, Ahmed R. Screening rates for colorectal cancer in Canada: a cross-sectional study. *CMAJ Open* 2015;3(2):E149-57.
- Culleton S, Slater M, Lofters A. Predictors of low colorectal cancer screening in an urban academic family practice. *Open J Prev Med* 2014;4:438-45.
- Lofters A, Glazier RH, Agha MM, Creatore MI, Moineddin R. Inadequacy of cervical cancer screening among urban recent immigrants: a population-based study of physician and laboratory claims in Toronto, Canada. *Prev Med* 2007;44(6):536-42. Epub 2007 Mar 21.
- Doubeni CA, Laiyemo AO, Reed G, Field TS, Fletcher RH. Socioeconomic and racial patterns of colorectal cancer screening among Medicare enrollees in 2005. *Cancer Epidemiol Biomarkers Prev* 2009;18(8):2170-5.
- Mandelblatt J, Andrews H, Kao R, Wallace R, Kerner J. The late-stage diagnosis of colorectal cancer: demographic and socioeconomic factors. *Am J Public Health* 1996;86(12):1794-7.
- Katz SJ, Hofer TP. Socioeconomic disparities in preventive care persist despite universal coverage. Breast and cervical cancer screening in Ontario and the United States. *JAMA* 1994;272(7):530-4.
- Lofters AK, Moineddin R, Hwang SW, Glazier RH. Predictors of low cervical cancer screening among immigrant women in Ontario, Canada. *BMC Womens Health* 2011;11:20.
- Jacob BJ, Baxter NN, Moineddin R, Sutradhar R, Del Giudice L, Urbach DR. Social disparities in the use of colonoscopy by primary care physicians in Ontario. *BMC Gastroenterol* 2011;11:102.
- McGregor S, Hilsden R, Yang H. Physician barriers to population-based, fecal occult blood test-based colorectal cancer screening programs for average-risk patients. *Can J Gastroenterol* 2010;24(6):359-64.
- Zettler M, Mollon B, da Silva V, Howe B, Speechley M, Vinden C. Family physicians' choices of and opinions on colorectal cancer screening modalities. *Can Fam Physician* 2010;56:e338-44. Available from: [www.cfp.ca/content/56/9/e338.full.pdf+html](http://www.cfp.ca/content/56/9/e338.full.pdf+html). Accessed 2016 Mar 9.
- Marshall DA, Johnson FR, Phillips KA, Marshall JK, Thabane L, Kulin NA. Measuring patient preferences for colorectal cancer screening using a choice-format survey. *Value Health* 2007;10(5):415-30.
- Tinmouth J, Ritvo P, McGregor SE, Patel J, Guglietti C, Levitt CA, et al. ColonCancerCheck Primary Care Invitation Pilot project. Patient perceptions. *Can Fam Physician* 2013;59:e541-9. Available from: [www.cfp.ca/content/59/12/e541.full.pdf+html](http://www.cfp.ca/content/59/12/e541.full.pdf+html). Accessed 2016 Mar 9.
- Tinmouth J, Ritvo P, McGregor SE, Claus D, Pasut G, Myers RE, et al. A qualitative evaluation of strategies to increase colorectal cancer screening uptake. *Can Fam Physician* 2011;57:e7-15. Available from: [www.cfp.ca/content/57/1/e7.full.pdf+html](http://www.cfp.ca/content/57/1/e7.full.pdf+html). Accessed 2016 Mar 9.
- McQueen A, Bartholomew LK, Greisinger AJ, Medina GG, Hawley ST, Haidet P, et al. Behind closed doors: physician-patient discussions about colorectal cancer screening. *J Gen Intern Med* 2009;24(11):1228-35. Epub 2009 Sep 18.
- Inadomi JM, Vijan S, Janz NK, Fagerlin A, Thomas JP, Lin YV, et al. Adherence to colorectal cancer screening: a randomized clinical trial of competing strategies. *Arch Intern Med* 2012;172(7):575-82.

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