

# Family physicians' choices of and opinions on colorectal cancer screening modalities

Michael Zettler MD Brent Mollon MD Vitor da Silva MD Brett Howe MD Mark Speechley MA PhD Chris Vinden MD

## ABSTRACT

**OBJECTIVE** To determine FPs' choices of and opinions on colorectal cancer (CRC) screening options in the context of a new provincewide screening program.

**METHODS** Mailed survey, using a modified Dillman protocol, which asked about 5 recommended CRC screening modalities.

**SETTING** Ontario.

**PARTICIPANTS** Computer-generated random sample of 894 eligible FPs and GPs from a commercially available physician directory.

**MAIN OUTCOME MEASURES** Physicians' preferences for personal CRC screening; perceptions of patients' preferences for CRC screening; knowledge of screening test characteristics; and opinions on cost-effectiveness and mortality reduction of screening modalities.

**RESULTS** Of the 894 eligible FPs and GPs who received the mailed survey, 465 physicians responded (response rate of 52%). Respondents were diverse in demographic and practice characteristics. Decennial colonoscopy and biennial fecal occult blood testing (FOBT) were the 2 most popular screening methods. There was a statistically significant difference between physicians' preferences of screening options and their perceptions about patient preferences ( $P < .001$ ), with 50.8% of physicians preferring colonoscopy (vs 39.6% FOBT) but 64.1% believing the average patient prefers FOBT (vs 29.0% colonoscopy). Opinions on the cost-effectiveness and effect on mortality of screening modalities and FOBT sensitivity, but not colonoscopy wait times, significantly influenced both physician preferences and their perceptions of patient preferences. Of the respondents, 54.4% believed colonoscopy had the greatest mortality reduction, while 66.1% chose FOBT as the most cost-effective CRC screening method.

**CONCLUSION** There was a significant difference between primary care physicians' preferences and their perceptions of patient preferences for CRC screening ( $P < .001$ ). Screening choice was influenced by physicians' perceptions of FOBT sensitivity and their opinions on cost-effectiveness and mortality reduction of the screening modality. Colonoscopy wait times did not influence physicians' screening choices. As some screening programs emphasize FOBT for most people, this might result in fewer physician-patient discussions about options of other screening modalities. Further research into patient preferences for screening is warranted.

## EDITOR'S KEY POINTS

- Although colorectal cancer (CRC) is the second leading cause of cancer-related deaths in Canada, screening is underused.
- This study shows that primary care physicians choose colonoscopy for personal CRC screening and they believe patients prefer fecal occult blood testing.
- Primary care physicians' CRC screening choices were influenced by their perceptions of fecal occult blood testing sensitivity and their opinions on the screening modality's cost-effectiveness and mortality reduction. Colonoscopy wait times did not influence physicians' screening choices.

This article has been peer reviewed.  
*Can Fam Physician* 2010;56:e338-44

# Opinion des médecins de famille sur les modalités de dépistage du cancer colorectal et le choix qu'ils en font

Michael Zettler MD Brent Mollon MD Vitor da Silva MD Brett Howe MD Mark Speechley MA PhD Chris Vinden MD

## RÉSUMÉ

**OBJECTIF** Déterminer l'opinion des MF sur les divers modes de dépistage du cancer colorectal (CCR) et le choix qu'il en font, dans le contexte d'un nouveau programme provincial de dépistage.

**MÉTHODES** Enquête postale, à l'aide d'un protocole de Dillman modifié portant sur 5 modalités de dépistage recommandées.

**CONTEXTE** L'Ontario.

**PARTICIPANTS** Un échantillon aléatoire généré par ordinateur de 894 MF éligibles, à partir d'un annuaire de médecins commercialement disponible.

**PRINCIPAUX PARAMÈTRES À L'ÉTUDE** Préférences des médecins pour un dépistage personnel du CCR; leurs perceptions des préférences des patients pour ce dépistage; leur connaissance des caractéristiques des tests de dépistage; et leurs opinions sur le rapport coût-bénéfice et sur la réduction de la mortalité appartenant à chaque modalité.

**RÉSULTATS** Des 894 MF et omnipraticiens qui ont reçu l'enquête postale, 465 ont répondu (taux de réponse de 52%). Les répondants présentaient divers types de caractéristiques démographiques et de pratique. Les 2 méthodes de dépistage les plus populaires étaient la colonoscopie aux 10 ans et la recherche du sang occulte dans les selles (RSOS) aux 2 ans. On observait une différence statistiquement significative entre la modalité de dépistage préférée par les médecins et leur perception des préférences des patients ( $P < ,001$ ), 50,8% des médecins préférant la colonoscopie contre 39,6% préférant plutôt la RSOS, tandis que 64,1% des médecins croyaient que le patient moyen préférerait la RSOS contre 29,0% croyant qu'ils préféreraient la colonoscopie. Les préférences des médecins ainsi que leur perception des préférences des patients étaient significativement influencées par leur opinion sur le rapport coût-bénéfice et l'effet sur la mortalité de chaque modalité et par leur opinion sur la sensibilité de la RSOS, mais non par le temps d'attente pour la colonoscopie. Parmi les répondants, 54,4% estimaient que la colonoscopie avait le taux le plus élevé de réduction de la mortalité, tandis que 66,1% choisissaient la RSOS comme la méthode ayant le meilleur rapport coût-bénéfice.

**CONCLUSION** On notait une différence significative entre les préférences des médecins de première ligne et leur perception des préférences des patients pour le mode de dépistage du CCR ( $P < ,001$ ). Le choix du dépistage était influencé par l'opinion des médecins sur la sensibilité de la RSOS et sur le rapport coût-bénéfice et la réduction de la mortalité correspondant à chaque méthode. Le temps d'attente pour la colonoscopie n'avait pas d'influence sur le mode de dépistage choisi par le médecin. Comme certains programmes de dépistage mettent l'accent sur la RSOS pour la majorité des gens, cela risque de réduire le nombre de discussions médecin-patient à propos des autres modalités de dépistage offertes. D'autres études seront nécessaires pour mieux comprendre les préférences des patients à propos du dépistage.

## POINTS DE REPÈRE DU RÉDACTEUR

- Même si le cancer colorectal (CCR) est la deuxième cause de décès dus au cancer au Canada, son dépistage demeure sous-utilisé.
- Cette étude montre que les médecins de première ligne choisissent la colonoscopie pour un dépistage personnel du CCR et qu'ils croient que les patients préfèrent la recherche du sang occulte dans les selles.
- Le choix des médecins de première ligne pour le dépistage du CCR était influencé par leur opinion sur la sensibilité de la recherche du sang fécal occulte et sur l'aspect coût-bénéfice et la réduction de la mortalité correspondant à chaque méthode de dépistage. Le temps d'attente pour la colonoscopie n'avait pas d'influence sur le choix des médecins.

Cet article a fait l'objet d'une révision par des pairs.  
*Can Fam Physician* 2010;56:e338-44

Colorectal cancer (CRC) is the second leading cause of cancer-related deaths in Canada, with an estimated 21 500 newly diagnosed cases and 8900 deaths in 2008.<sup>1</sup> Early detection of CRC has been shown to substantially reduce mortality.<sup>2</sup> The Canadian Association of Gastroenterology currently recommends patients undergo 1 of 5 screening modalities to detect CRC and precancerous lesions: fecal occult blood testing (FOBT) every 2 years, colonoscopy every 10 years, flexible sigmoidoscopy every 5 years, flexible sigmoidoscopy with FOBT every 5 years, or double-contrast barium enema every 5 years.<sup>3</sup> Of these screening methods, FOBT is the best studied, with multiple randomized controlled trials and meta-analyses reporting reductions in mortality by 15% to 33%.<sup>4,5</sup> A 2007 Cochrane review reported a 16% relative risk reduction in CRC mortality<sup>6</sup> (relative risk 0.84, 95% confidence interval 0.78 to 0.90). Colonoscopy, although supported by strong biologic rationale and indirect evidence of mortality reduction,<sup>2</sup> is not currently supported by randomized controlled trial evidence.

Unfortunately, CRC screening is underused, with only 30% of the eligible Canadian population screened in 2003.<sup>7</sup> Awareness of CRC screening is also poor, with approximately half of Ontarians unaware of FOBT screening.<sup>8</sup> Clearly, primary care physicians can have an important effect on CRC screening by discussing the topic with their patients. The purpose of our study was to determine primary care physicians' knowledge about and opinions on CRC screening, as these factors influence the basis for, and content of, discussions with patients. A 2004 survey of primary care physicians in Alberta found that despite the evidence of mortality reduction, FOBT was rated poorly as a screening test and that most physicians (64%) chose colonoscopy for themselves.<sup>9</sup> Most physicians in other specialties also chose colonoscopy, including more than 90% of Canadian gastroenterologists in a 2006 survey.<sup>10</sup>

After these surveys were conducted, the province of Ontario launched a CRC screening program in 2008; the goal was to increase screening rates and reduce mortality using FOBT as the standard screening modality for average-risk patients. This program includes both a public and a professional education campaign and an incentive bonus for primary care physicians related to the proportion of their patients who are screened with FOBT. In this context, we surveyed primary care physicians in Ontario to determine which screening modality they preferred for themselves and which screening modality they believed most of their patients preferred, and to explore factors underlying these preferences to help explain any discrepancy. We hypothesized that primary care physicians would prefer colonoscopy for themselves and that they would believe their patients preferred FOBT because of its estimated sensitivity and availability.

### METHODS

To address our research questions, a brief paper survey was developed. Questions in the survey were designed to assess demographic and practice characteristics, as well as knowledge of and opinions on CRC screening. All questions were limited to nominal and ordinal responses. Responses requiring selection of a screening modality included those modalities in current Canadian Association of Gastroenterology guidelines.<sup>3</sup> Survey content is summarized in **Tables 1** and **2**. The survey was reviewed by FPs, general surgeons, gastroenterologists, and epidemiologists, and their feedback was incorporated to produce the final version. The study was approved by the University of Western Ontario's research ethics board.

A group of Ontario primary care physicians was randomly selected from a commercially available physician directory (MD Select; Scott's Directories). Those physicians currently practising family medicine or general practice in Ontario were eligible. Surveys were disseminated between June and September 2008, using a modified Dillman<sup>11</sup> method, which emphasizes personally addressed communication, reminders, and repeat mailings. By this protocol, each randomly selected physician was mailed the survey, a personally addressed letter of information, and a preaddressed, postage-paid return envelope. A reminder postcard was sent to all physicians 1 week afterward. A second survey package was mailed to nonrespondents after 6 weeks. One week after the second survey package was mailed, each participant who had yet to respond was reminded once more with a telephone call by one of the research team members. Coded return envelopes were used to remove participants from future contacts, but all response data were collected anonymously. As an incentive, all respondents were entered into a draw for 100 tickets for a large provincial lottery. At any time, participants had the option of declining participation or could opt out in the event they were ineligible. Participants who were deemed ineligible for our survey (eg, retired, not practising family medicine) were removed from the sample.

Based on Canadian Medical Association data<sup>12</sup> of an Ontario FP population of approximately 12 000, a total of 456 individual responses are needed to report with 95% confidence that the results are within 4.5% of the true mean. With a conservative estimate of response rate (<50%) in mind, we sampled 980 primary care providers.

### Statistical analyses

Descriptive statistics were used to characterize the demographics of survey respondents. Nominal and ordinal variables were grouped into similar categories and were analyzed by  $\chi^2$  analysis. In the event an output table had 20% or more cells with an expected value

**Table 1. Respondent characteristics**

VARIABLES	N (%)*
Sex	
• Male	207 (46.0)
• Female	243 (54.0)
Age, y	
• <30	2 (0.4)
• 30-39	113 (24.8)
• 40-49	160 (35.1)
• 50-59	134 (29.4)
• ≥60	47 (10.3)
Practising family medicine, y	
• 1-5	72 (15.6)
• 6-10	73 (15.8)
• 11-15	71 (15.3)
• 16-20	75 (16.2)
• ≥21	172 (37.1)
Population of community served	
• < 10 000	73 (15.9)
• 10 000-99 999	95 (20.7)
• 100 000-499 999	123 (26.8)
• 500 000-1 000 000	63 (13.7)
• > 1 000 000	105 (22.9)
Practice format	
• Group	354 (76.3)
• Single or other	110 (23.7)
Teaching or university affiliation	
• Yes	183 (42.5)
• No	248 (57.5)
Recall reading ColonCancerCheck pamphlet	
• Yes	398 (86.9)
• No	30 (6.6)
• Unsure	29 (6.3)
• Did not receive the information package	1 (0.2)
Perceived knowledge of CRC screening (1 = novice; 3 = average; 5 = expert)	
• 1	3 (0.6)
• 2	7 (1.5)
• 3	249 (53.9)
• 4	177 (38.3)
• 5	26 (5.6)

CRC—colorectal cancer.

\*A total of 465 surveys were received. Any deviation from this number in the total responses represents missing data (eg, abstain, unclear responses).

of less than 5, or a cell had an expected value of less than 1, the table was collapsed to include the 2 most

populated columns and  $\chi^2$  values were recalculated. In the event that the Cochran criteria<sup>13</sup> were not met, or a 0 cell was present, statistical significance was not calculated. All statistical analyses were conducted using SPSS version 17.0.

## RESULTS

Of the 980 physicians initially selected, 49 were ineligible for the survey and 37 were never contacted owing to incorrect addresses. This left a final sample of 894 physicians; 465 of them completed the survey (response rate of 52%).

Respondents were diverse in terms of demographic features (Table 1) and similar in age distribution to FPs in Ontario<sup>12</sup>; however, we had a higher proportion of female respondents (54.0% female respondents in our study vs 38% female primary care physicians nationally). Eighty-seven percent recalled reading the government-distributed ColonCancerCheck educational material, which was part of the screening program launch. This material provided recommendations for CRC screening, including the initial use of FOBT for average-risk patients. Most respondents believed they had average (53.9%) or above-average (38.3%) knowledge of CRC screening.

Table 2 summarizes survey responses. Fifty percent of respondents said the wait time for colonoscopy in their community was 2 to 6 months; 17.9% reported a wait time of less than 2 months; and 23.2% reported a wait time between 6 and 12 months. Sensitivity of FOBT was considered to be less than 40% by 31.2% of physicians; between 40% and 59% by 33.3%; and more than 60% by 35.5%. More than half of respondents (54.4%) believed that colonoscopy every 10 years would have the greatest effect on reducing CRC-related mortality in Ontario, while 20.9% believed FOBT would have the greatest effect. Most respondents (66.1%) believed FOBT was the most cost-effective CRC screening modality.

### Screening preferences

Decennial colonoscopy and biennial FOBT were the 2 most popular screening methods, accounting for more than 90% of both the physicians' personal preferences and their perceptions of patients' preferences. Because other methods accounted for less than 10% of responses, they were collapsed into an "other" category for subsequent analyses. Personal preferences and perceived patient preferences differed between the 2 primary modalities. For example, 64.1% of respondents thought their average-risk patients would prefer FOBT screening and only 29.0% thought their patients would prefer colonoscopy. In contrast, 39.6% of FPs would want FOBT for themselves, with 50.8% preferring colonoscopy. The difference in physicians' personal screening choices and



**Table 2. Results of CRC screening-related responses**

RESPONSES	N (%)*
Preference for personal CRC screening	
• FOBT every 2 y	181 (39.6)
• Colonoscopy every 10 y	232 (50.8)
• Flexible sigmoidoscopy every 5 y	2 (0.4)
• Flexible sigmoidoscopy with FOBT every 5 y	23 (5.0)
• Double-contrast barium enema every 5 y	1 (0.2)
• None of the above	18 (3.9)
Perceived patient preference for CRC screening	
• FOBT every 2 y	288 (64.1)
• Colonoscopy every 10 y	130 (29.0)
• Flexible sigmoidoscopy every 5 y	1 (0.2)
• Flexible sigmoidoscopy with FOBT every 5 y	17 (3.8)
• Double-contrast barium enema every 5 y	2 (0.4)
• None of the above	11 (2.4)
Average wait time for colonoscopy in community, mo	
• <2	82 (17.9)
• 2-6	231 (50.5)
• 6-12	106 (23.2)
• 12-18	29 (6.3)
• >18	9 (2.0)
Perceived sensitivity of a single standard FOBT kit, %	
• 0-19	41 (8.9)
• 20-39	102 (22.2)
• 40-59	153 (33.3)
• 60-79	127 (27.7)
• 80-100	36 (7.8)
Screening modality that will have the greatest effect on the reduction of CRC mortality in Ontario	
• FOBT every 2 y	93 (20.9)
• Colonoscopy every 10 y	242 (54.4)
• Flexible sigmoidoscopy every 5 y	5 (1.1)
• Flexible sigmoidoscopy with FOBT every 5 y	44 (9.9)
• Double-contrast barium enema every 5 y	2 (0.4)
• None of the above	6 (1.3)
• Do not know	53 (11.9)
Most cost-effective CRC screening modality	
• FOBT every 2 y	302 (66.1)
• Colonoscopy every 10 y	62 (13.6)
• Flexible sigmoidoscopy every 5 y	1 (0.2)
• Flexible sigmoidoscopy with FOBT every 5 y	23 (5.0)
• Double-contrast barium enema every 5 y	3 (0.7)
• None of the above	3 (0.7)
• Do not know	63 (13.8)

CRC—colorectal cancer, FOBT—fecal occult blood testing.  
 \*A total of 465 surveys were received. Any deviation from this number in the total responses represents missing data (eg, abstain, unclear responses); percentages do not add to 100% owing to rounding.

their perceptions of patients' preferences was statistically significant ( $\chi^2_4=150.5, P<.001$ ) (Table 3).

While no demographic factor was associated with physician personal preference, age ( $\chi^2_2=6.146, P=.046$ ) and practice format ( $\chi^2_2=7.929, P=.019$ ) were significantly associated with perceived patient preferences, with physicians younger than 50 years of age or those in single practices tending to believe their patients preferred FOBT (data not shown).

There was a significant association between perceived sensitivity and personal screening choice, with higher FOBT sensitivity estimates resulting in a higher proportion of physicians wanting FOBT for their own screening ( $\chi^2_4=14.75, P=.005$ ). This relationship varied by degree, with higher perceived sensitivities of FOBT increasing the proportion of physicians wishing to be screened in this manner. Physician preference for personal screening was also associated with perceived cost-effectiveness ( $\chi^2_4=87.12, P<.001$ ) and effect on mortality reduction ( $\chi^2_4=113.3, P<.001$ ) of the screening modality. There was no association between personal preference and colonoscopy wait times ( $P=.37$ ).

Similar patterns were found for physicians' perceptions of patient preferences for screening. Specifically, FOBT sensitivity, cost-effectiveness, and effect on mortality were all associated with perceived patient preference for FOBT (all  $P<.001$ ), while there was no statistically significant association with wait time ( $P=.376$ ; data not shown).

## DISCUSSION

Our survey had a response rate of 52% and included 465 respondents, which is likely to be a reliable sample of Ontario FPs. The results indicate that half of physicians prefer colonoscopy for their own CRC screening, but they believe their patients prefer FOBT. Physicians' personal preferences in our study support previous findings; however, we found a lower proportion of physicians choosing colonoscopy (50.8% here vs 64.1% in a 2004 Alberta survey).<sup>9</sup> The reasons for this decrease and the discrepancy between physicians' preferences and their perceptions of patients' preferences might be related to knowledge of and opinions on important screening test-related factors. In our study, screening choice was influenced by perceived FOBT sensitivity and beliefs about cost-effectiveness and mortality reduction of the screening modalities but not by colonoscopy wait times.

The sensitivity estimates by physicians for a standard 3-card FOBT kit varied widely in our sample and, on the whole, 69% of respondents selected values greater than the 12.9%<sup>14</sup> to 25%<sup>15</sup> reported in the literature for non-rehydrated samples, as used in Ontario. Not surprisingly, in our study, higher FOBT sensitivity estimates increased the proportion of those who preferred to be screened

**Table 3. Respondents' choice of personal CRC screening modality, by responses to CRC screening-related questions**

QUESTIONS	SCREENING PREFERENCE OF RESPONDENTS			NO. OF RESPONSES*	$\chi^2_4$	P VALUE
	FOBT N (%)	COLONOSCOPY N (%)	OTHER N (%)			
What would your patients most want for their own screening?				444	150.5	<.001
• FOBT every 2 y	157 (55.3)	106 (37.3)	21 (7.4)			
• Colonoscopy every 10 y	17 (13.2)	108 (83.7)	4 (3.1)			
• Other	5 (16.1)	10 (32.3)	16 (51.6)			
What is the wait time for colonoscopy in your community?				450	4.312	.37
• 0-6 mo	129 (42.0)	146 (47.6)	32 (10.4)			
• 6-12 mo	37 (35.2)	61 (58.1)	7 (6.7)			
• > 12 mo	13 (34.2)	21 (55.3)	4 (10.5)			
What is the sensitivity of a single FOBT kit?				452	14.75	.005
• < 40%	48 (34.0)	78 (55.3)	15 (10.6)			
• 40%-59%	48 (31.8)	89 (58.9)	14 (9.3)			
• ≥ 60%	81 (50.6)	64 (40.0)	15 (9.4)			
Which screening modality will have the greatest effect on the reduction of CRC-related mortality in Ontario?				388	113.3	<.001
• FOBT every 2 y	60 (65.9)	26 (28.6)	5 (5.5)			
• Colonoscopy every 10 y	59 (24.6)	169 (70.4)	12 (5.0)			
• Other	26 (45.6)	11 (19.3)	20 (35.1)			
What is the most cost-effective method of CRC screening in Ontario?				389	87.12	<.001
• FOBT every 2 y	145 (48.5)	134 (44.8)	20 (6.7)			
• Colonoscopy every 10 y	5 (8.3)	53 (88.3)	2 (3.3)			
• Other	5 (16.7)	12 (40.0)	13 (43.3)			

CRC—colorectal cancer, FOBT—fecal occult blood testing.

\*A total of 465 surveys were received. Any deviation from this number in the total responses represents missing data (eg, abstain, unclear responses); percentages do not add to 100% owing to rounding.

with this method and those who believed patients preferred it.

Respondents' selections for the most cost-effective screening method also favoured FOBT. Those who selected FOBT also chose the test more often for their patients and for themselves. Interestingly, multiple analyses suggest that colonoscopy might be the most cost-effective screening modality.<sup>16,17</sup> On the other hand, evidence of mortality reduction<sup>4,5</sup> with FOBT did not result in its selection as the most efficacious. Colonoscopy was most commonly chosen as having the largest effect on mortality reduction; and those who believed this chose colonoscopy more often for themselves and their patients. Wait time for colonoscopy was a notable factor that did not influence physicians' preferences or their perceptions of patient preferences.

We are uncertain of the influence of the provincewide CRC screening program introduced shortly before the distribution of this survey. Programmatic educational material, which recommends biannual FOBT screening for average-risk asymptomatic patients 50 years of age or older, was read by 87% of our sample. This recommendation might explain the change in physician preference since 2004, and some of the perceived

patient preference for FOBT screening.

### Limitations

Our study is limited in that we were only able to determine physicians' opinions on which tests their patients preferred, not the direct preference of individuals. Further research in this area could focus on the screening preferences of the general population and the factors that lead to patient and physician decision making on CRC screening.

### Conclusion

The CRC screening modality physicians prefer for themselves (ie, colonoscopy) is different than what they believe their patients prefer (ie, FOBT). While we could not determine causality, personal preferences and perceived patient preferences were likely influenced directly by estimated FOBT sensitivity, mortality reduction, and cost-effectiveness of the screening modalities but not by wait times. We believe the above findings have implications for family practice and current single-modality-based CRC screening programs. When different paths exist for screening, FPs should obtain informed consent for testing by explaining the

available options. As patient preference has been shown to vary after receiving education on screening,<sup>18</sup> physician recommendation is an important influence. Family physicians' knowledge of common CRC screening tests is crucial to these recommendations. As the Ontario screening program emphasizes FOBT for most people, physicians might have fewer discussions with patients about the options of other screening modalities (including physician-preferred colonoscopy); and those other screening options might become less available to patients who might prefer them.✱

**Dr Zettler, Dr Mollon, Dr da Silva, and Dr Howe** are at the Schulich School of Medicine & Dentistry at the University of Western Ontario in London, Ont. **Dr Speechley** is an Associate Professor in the Department of Epidemiology and Biostatistics at the University of Western Ontario. **Dr Vinden** is an Assistant Professor in the Division of General Surgery at the Schulich School of Medicine & Dentistry.

#### Contributors

**Dr Zettler, Dr Mollon, Dr da Silva, and Dr Howe** contributed equally to the concept, design, and execution of the study and drafting of the manuscript. **Dr Speechley** was involved in the methodological conception and statistical analysis of the study. **Dr Vinden** was involved in generating the study concept, designing the methods, and drafting the manuscript. All authors reviewed and approved the final manuscript.

#### Competing interests

None declared

#### Correspondence

**Dr Chris Vinden**, London Health Sciences Centre, Victoria Hospital, 800 Commissioners Rd E, London, ON N6A 5W9; e-mail [cvinden@sympatico.ca](mailto:cvinden@sympatico.ca)

#### References

1. Canadian Cancer Society, National Cancer Institute of Canada. *Canadian cancer statistics 2008*. Toronto, ON: Canadian Cancer Society, National Cancer Institute of Canada; 2008. Available from: [www.cancer.ca/canada-wide/about%20cancer/cancer%20statistics/canadian%20cancer%20statistics.aspx?sc\\_lang=en](http://www.cancer.ca/canada-wide/about%20cancer/cancer%20statistics/canadian%20cancer%20statistics.aspx?sc_lang=en). Accessed 2009 Apr 26.
2. Pignone M, Rich M, Teutsch SM, Berg AO, Lohr KN. Screening for colorectal cancer in adults at average risk: a summary of the evidence for the U.S. Preventive Services Task Force. *Ann Intern Med* 2002;137(2):132-41.
3. Leddin D, Hunt R, Champion M, Cockeram A, Flook N, Gould M, et al.

- Canadian Association of Gastroenterology and the Canadian Digestive Health Foundation: guidelines on colon cancer screening. *Can J Gastroenterol* 2004;18(2):93-9.
4. Towler B, Irwig L, Glasziou P, Kewenter J, Weller D, Silagy C. A systematic review of the effects of screening for colorectal cancer using the faecal occult blood test, hemoccult. *BMJ* 1998;317(7158):559-65.
5. Heresbach D, Manfredi S, D'halluin PN, Bretagne JF, Branger B. Review in depth and meta-analysis of controlled trials on colorectal cancer screening by faecal occult blood test. *Eur J Gastroenterol Hepatol* 2006;18(4):427-33.
6. 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. DOI: 10.1002/14651858.CD001216.pub2.
7. Sewitch MJ, Fournier C, Ciampi A, Dyachenko A. Adherence to colorectal cancer screening guidelines in Canada. *BMC Gastroenterol* 2007;7:39.
8. Ritvo P, Myers R, Del Giudice ME, Pazzat L, Cotterchio M, Howlett R, et al. Fecal occult blood testing. People in Ontario are unaware of it and not ready for it. *Can Fam Physician* 2009;55:176-7.e1-4. Available from: [www.cfp.ca/cgi/reprint/55/2/176](http://www.cfp.ca/cgi/reprint/55/2/176). Accessed 2010 Jul 28.
9. McGregor SE, Hilsden RJ, Murray A, Bryant HE. Colorectal cancer screening: practices and opinions of primary care physicians. *Prev Med* 2004;39(2):279-85.
10. Raza M, Bernstein CN, Ilnyckyj A. Canadian physicians' choices for their own colon cancer screening. *Can J Gastroenterol* 2006;20(4):281-4.
11. Dillman DA. *Mail and internet surveys. The tailored design method*. 2nd ed. Hoboken, NJ: John Wiley & Sons; 2007.
12. Canadian Medical Association. *Statistical information on Canadian physicians*. Ottawa, ON: Canadian Medical Association; 2009. Available from: [www.cma.ca/index.cfm/ci\\_id/16959/la\\_id/1.htm#1](http://www.cma.ca/index.cfm/ci_id/16959/la_id/1.htm#1). Accessed 2009 Oct 15.
13. Rosner B. *Fundamentals of biostatistics*. 5th ed. Belmont, CA: Duxbury Thomson Learning; 2000. p. 395.
14. Imperiale TF, Ransohoff DF, Itzkowitz SH, Turnbull BA, Ross ME. Fecal DNA versus fecal occult blood for colorectal-cancer screening in an average-risk population. *N Engl J Med* 2004;351(26):2704-14.
15. Sung JJ, Chan FK, Leung WK, Wu JC, Lau JY, Ching J, et al. Screening for colorectal cancer in Chinese: comparison of fecal occult blood test, flexible sigmoidoscopy, and colonoscopy. *Gastroenterology* 2003;124(3):608-14.
16. Vijan S, Hwang EW, Hofer TP, Hayward RA. Which colon cancer screening test? A comparison of costs, effectiveness, and compliance. *Am J Med* 2001;111(8):593-601.
17. Sonnenberg A, Delcò F, Inadomi JM. Cost-effectiveness of colonoscopy in screening for colorectal cancer. *Ann Intern Med* 2000;133(8):573-84.
18. Leard LE, Savides TJ, Ganiats TG. Patient preferences for colorectal cancer screening. *J Fam Pract* 1997;45(3):211-8.

