Prostate cancer screening practices amongst physicians in the North Simcoe Muskoka Local Health Integration Network

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Introduction: *The prostate-specific antigen (PSA) screening test is controversial and can result in both over-diagnosis and over-treatment. Recently, the Canadian Task Force on Preventive Health Care (CTFPHC) has recommended against routine screening for prostate cancer. We sought to determine how the CTFPHC has impacted the practice patterns among family physicians in the North Simcoe Muskoka (NSM) Local Health Integration Network (LHIN).*

Materials and methods: *We surveyed all 439 family physicians within the NSM LHIN as well as 21 residents of the Family Medical Teaching Unit. Surveys were distributed by either mail or fax. Questions covered three sections: 1) demographics, 2) screening practice, and 3) perceptions of screening efficacy.*

Results: *The overall survey response rate was 33.3%. In all, 39.5% of physicians felt that prostate cancer screening did not provide a survival benefit, and 13.1% did not offer PSA screening. These beliefs were more likely to be held by younger physicians (age < 45), and those with < 10 years of practice ($p < 0.05$). Interestingly, female physicians were less likely to believe that PSA screening provided a survival benefit ($p \leq 0.01$); however, no gender bias for PSA screening practices was observed ($p = 0.73$). Of the physicians who agreed with CTFPHC's recommendation (31.8%), 6.0% do not offer PSA screening because of the recommendation. The CTFPHC recommendation had no impact on the age at which physicians begin or stop offering PSA screening ($p > 0.05$).*

Conclusion: *Despite the CTFPHC recommendations, prostate cancer screening remains controversial. Practice patterns amongst general practitioners in the NSM LHIN vary considerably, but seem to have been minimally impacted.*

Key Words: prostate-specific antigen, prostate cancer, screening

Introduction

Prostate cancer is common, affecting approximately 1 in 7 men in their lifetime. Additionally, prostate cancer is the third leading cause of cancer-related deaths in Canadian men, with approximately 1 in 27 cases resulting in mortality.[1,2] Screening for prostate cancer includes the use of the prostate-specific antigen (PSA) test, a practice used by most Ontario physicians.[1]

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PSA has been shown to be a valuable oncological marker for prostate cancer. Circulating PSA is normally detected in the bloodstream; however, increased PSA levels occur whenever there is a disruption in the cellular architecture within the prostate gland. One of the causes of this disruption is malignant growth.[3,4] PSA levels can be used to stratify a patient's risk of having prostate cancer.[3-5]

Since the introduction of PSA screening, there has been a gradual decline in prostate cancer-specific mortality; however, the direct relationship between PSA screening and the observed decrease in mortality have not been explicitly shown. Thus, there remains much controversy associated with PSA screening.[6]

Both the Canadian Task Force on Preventive Health Care (CTFPHC) and the United States

Preventive Services Task Force (USPSTF) have recently recommended against routine screening for prostate cancer.[7,8] Both have focused on the harms of prostate cancer screening and emphasized the morbidity associated with treatments. In contrast, two major long term studies, specifically the European Randomized Study of Screening Prostate Cancer (ERSPC) and the Göteborg randomized population-based prostate-cancer screening trial, have shown that PSA screening has significantly lowered cancer-specific mortality rates over a period of 9 or more years.[9,10] This dichotomy has led to a conflict in recommendations with professional associations such as the Canadian and American Urological Associations.[11,12]

Although the CTFPHC analyses only constitute a recommendation, it is utilized by many family physicians in Ontario as a guideline for clinical practice. Our goal was to determine the impact that these recommendations had on the clinical practice among family physicians in the North Simcoe Muskoka (NSM) Local Health Integration Network (LHIN).

Materials and methods

In Ontario, LHINs were created in 2006 with the aim to focus health care delivery in regional authorities. There are currently 14 LHINs in Ontario. We designed a survey that was delivered to all primary care physicians in the NSM LHIN. In total, surveys were sent to all 439 primary care physicians and 21 residents of the Family Medical Teaching Unit at the Royal Victoria Regional Healthcare Centre. The survey questions were separated into three different categories: 1) demographics, 2) general perception of screening efficacy, and 3) screening practices. The answers were formatted in a multiple choice and Likert scale format, with an optional written opinion question at the end.

The survey was directed towards primary care physicians – individuals who would offer prostate cancer screening to their patients. A physical copy of the survey was sent either through the mail or by fax to all 460 physicians in July of 2015.

Statistical analysis was applied to determine the associations between demographic information, screening practice, and general perception and efficacy. A chi-square test was used with a $p < 0.05$ to show statistical significance. All surveys were used, but for several of the statistical results, surveys that had missing information on the specific statistical relationship between varying questions were excluded.

Results

Demographics

The survey was sent to 460 physicians of the NSM LHIN (37.8% female and 62.2% male). The survey response rate was 33.3%. Of the respondents, 50 (32.7%) were female and 103 (67.3%) were male. Most physicians had been in practice for more than 15 years (59.2%), 8.6% had been in practice 11-15 years, 9.2% have been in practice 6-10 years, and 23.0% have been in practice for 5 years or less. These data are similar to the entire population of Ontario family physicians (≤ 5 years in practice: 20.7%; 6-10 years: 12.5%; 11-15 years: 9.3%; > 15 years: 57.5%).[1] A summarized collection of demographic results is illustrated in Table 1.

Screening practices

Of the 153 respondents, 131 (85.6%) offer PSA screening to their patients, while 20 (13.1%) do not. Where screening was offered, 0.6% of respondents began screening before the age of 40, 12.4% between 40-49, 70.6% between 50-59, and 2.0% between the ages of 60-69, Figure 1a. Many physicians continue to offer screening to patients of advanced age and 1.3% of physicians stop offering PSA screening to patients at age 60, 41.8% at age 70, 32.0% by age 80, 2.6% by age 90, and 7.8% offer lifetime PSA screening, Figure 1b. Among the physicians who offer PSA screening, 12.3% have ≤ 25% of their patients choosing to undergo screening, 21.7% have 26%-50% of their patients choosing to undergo screening, 23.9% have 51%-75% of their patients choosing to undergo screening, and 42.0% have ≥ 76% of

TABLE 1. **Summarized table of survey demographics**

	Surveys delivered (n = 460)
Male	286 (62.2%)
Female	174 (37.8%)
Gender	**Number of responses (n = 153)**
Male	103 (67.3%)
Female	50 (32.7%)
Physician age	
≤ 34	23 (15.2%)
35-44	33 (21.9%)
45-55	42 (27.8%)
> 55	53 (35.1%)
Years of practice	
≤ 5	35 (23.0%)
6-10	14 (9.2%)
11-15	13 (8.6%)
> 15	90 (59.2%)

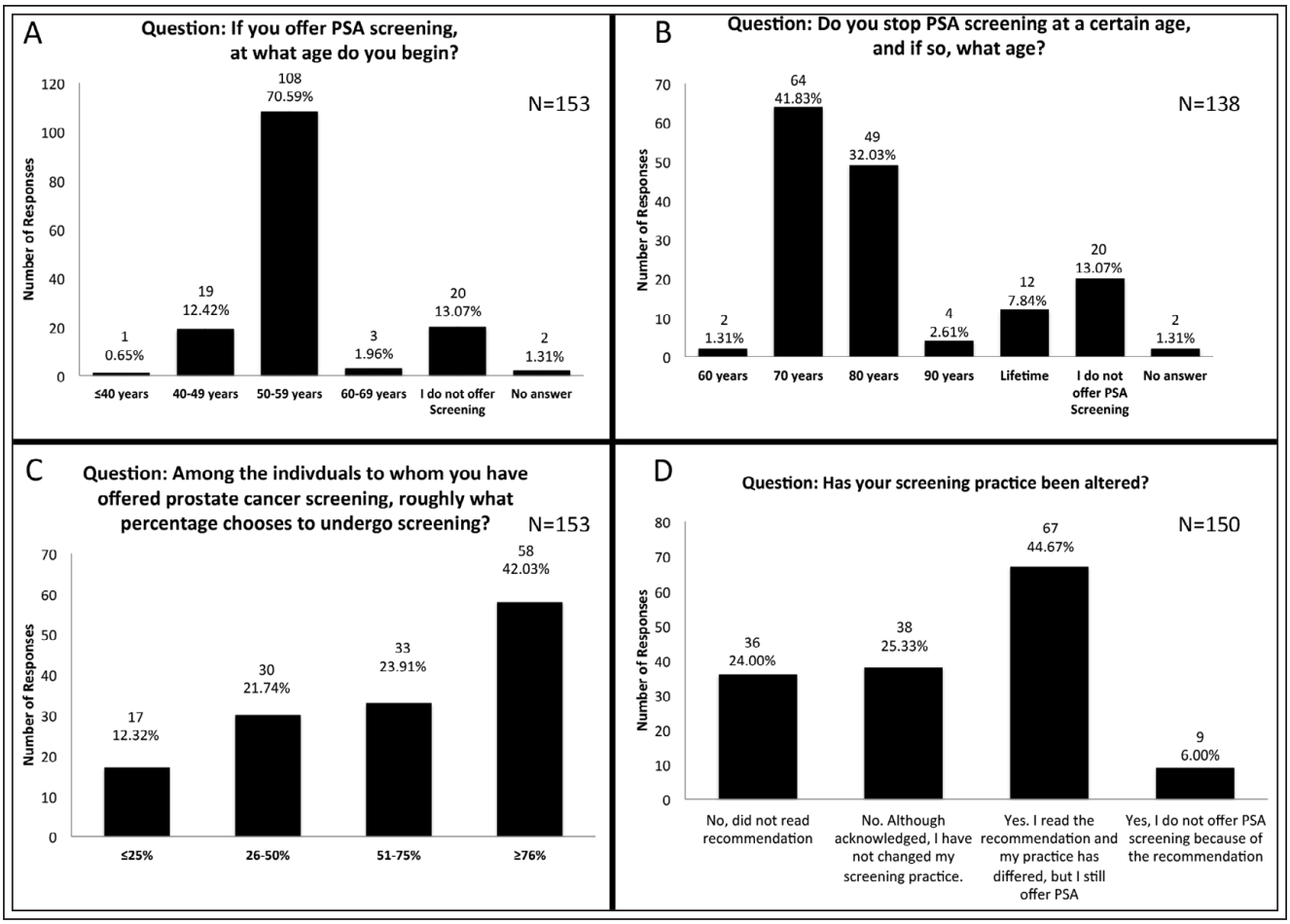

Figure 1. Physicians' responses to survey questions. **A)** when physicians begin to offer PSA screening. **B)** when physicians stop offering PSA screening to patients. **C)** the percentage of patients who choose to undergo screening. **D)** physicians' practice after the CTFPHC recommendation.

their patients choosing to undergo screening, Figure 1c. A patient's decision to undergo PSA screening was correlated with their physicians' beliefs towards prostate cancer screening ($p < 0.05$). Finally, prostate cancer screening practices varied significantly with regards to the physicians' number of years in practice and gender – male physicians and those who had been in practice longest were more likely to screen using the PSA blood test ($p < 0.05$).

General perception of screening efficacy

Of responding physicians, the majority (70.9% n = 151) has read the CTFPHC's recommendation on PSA screening. However, agreement with the recommendation was mixed: 6.1% of responses strongly agreed with the recommendation, 25.7% of responses agreed, 28.4% of responses were neutral, 12.2% of responses disagreed, and 0.7% strongly disagreed. Our data found that among responding physicians, 25.3% had read the CTFPHC recommendation, but not changed their screening practices; 44.7% had altered their screening practice, but still continued to offer PSA screening; and 6.0% discontinued PSA screening altogether, Figure 1d. In the entire cohort, 56.0% of respondents felt that PSA and digital rectal examination (DRE) screening provided a survival benefit, while 44.0% felt that it did not. There was no significant association between respondents who read the CTFPHC's document and PSA/prostate cancer screening practices ($p > 0.05$). Summary of the respondents' perceptions and attitudes are shown in Figure 2.

Discussion

The CTFPHC's recommendations on screening for prostate cancer with the PSA test was published October 2014.[8] Since its publication, 73.0% of primary care physicians in the NSM LHIN have read the

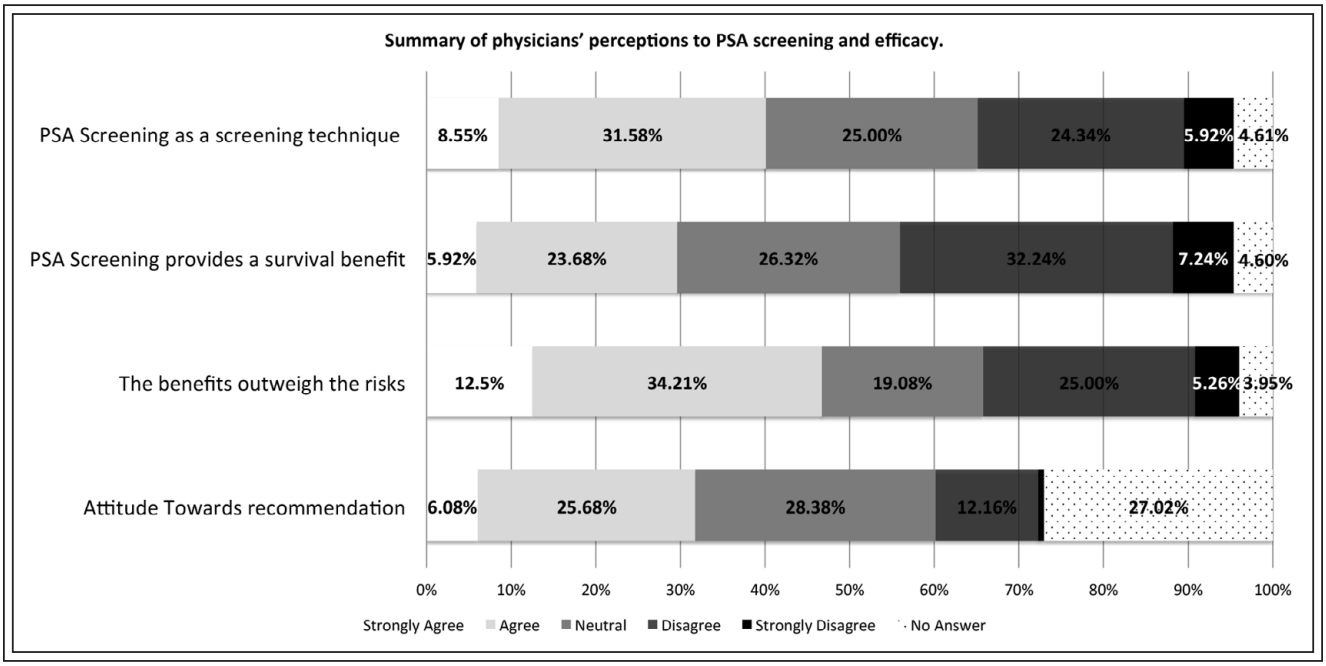

Figure 2. Summary of physicians' perceptions to PSA screening and efficacy.

recommendation. This document has considerably influenced PSA screening practices locally, with 50.7% of primary care physicians admitting to a change in their practice pattern as a result. Although it has altered the practice of many, only 6.0% of the physicians in our LHIN have discontinued screening as a result. This 6% that do not even offer screening may be a concerning trend as both task forces do recommend shared decision making regarding PSA screening.

In 2011, Allard et al performed a similar research study investigating prostate cancer screening practices amongst all primary care physicians in Ontario prior to the release of the CTFPHC's recommendation.[1] Their study results were similar to ours with respect to the age at which doctors begin to offer PSA screening. However, the age at which physicians stop offering PSA screening was significantly lower in our study of the NSM LHIN. Furthermore, the age that physicians stop offering PSA has dropped, but still differs significantly from the CTFPHC's recommendation.

The results of our survey also indicate that prostate cancer screening practice varied significantly with the age of the physician, the number of years in practice, and gender. The respondents who were ≥ 45 years of age showed a higher likelihood to accept the benefits of PSA screening, while younger respondents showed a higher tendency to repudiate PSA and believe that the potential risks outweigh any benefit. Similar results are shown for physicians with fewer years in practice – this may reflect inertia among physicians to change their practice patterns despite changes in evidence and guideline development. In addition, it is also possible that physicians with more years of experience were more likely to have confidence in the benefits of PSA screening compared to physicians with fewer years of experience. Female physicians were also found to be more likely to believe that screening for prostate cancer was harmful. These results are in contrast to Allard et al who found no correlation between gender or years of practice.[1] Perhaps not surprisingly, we also found that physicians who believed that PSA and prostate cancer screening did not provide a survival benefit led to a lower percentage of patients choosing to undergo PSA screening.

PSA screening practices are likely complicated by conflicting recommendations promoted by various medical societies. In particular, confusion is often noted between the recommendations presented by both the CTFPHC and the Canadian Urological Association (CUA). The guideline promoted by the CUA – updated in 2014 – differed greatly from the CTFPHC's recommendation, and suggests that physicians should screen their patients for prostate cancer.[11] Such conflicts increase the burden on family physicians. In 2014, the CUA released a statement highlighting the contrasting viewpoints. The 2014 press release states: "To recommend against screening because 'Available evidence does not conclusively demonstrate that screening with the PSA test will

reduce mortality from prostate cancer' is misleading and reflects errors of fact, omission, interpretation, and statistics."[11]

Although not quantifiable, an optional opinion question was presented at the end of the survey in which respondents could voice any additional views. Many of these responses indicated the frustration and difficulties that are associated with the controversy behind PSA screening. It was expressed that many physicians are not entirely knowledgeable of the appropriate guidelines to the PSA screening practice. The majority of respondents had read the CTFPHC's guidelines and had altered but not stopped their PSA practice, indicating that many primary care physicians are using a conservative approach towards PSA screening. Several responses indicated that family history, race, and the use of active surveillance for prostate cancer forms part of the decision. These are all considerations emphasized by the CUA viewpoint.

Several criticisms of the CTFPHC and USPTF have previously been made. Included among these criticisms is the fact that neither of the task forces included any medical experts with specific background in the prevention or treatment of prostate cancer. Additionally, the CTFPHC made recommendations supported solely by low quality evidence only.[7,8] The task force stated that randomized trials did not show a decrease in overall mortality; however, the screening trials were not designed to demonstrate a decrease in mortality. Finally, the recommendations were based on an outdated understanding of PSA and cut offs for intervention that are not used in contemporary clinical practice.

Since the USPSTF's publication in 2011, physicians have had the opportunity to adjust their practice in accordance with the recommendation. Several studies have been published to determine the results of the recommendation in the United States and Canada.[13-15] Trends have shown that prostate cancer screening has decreased, and that there has been a corresponding decrease in the amount of prostate cancer diagnoses.[13,14] Specifically, a 28% decrease in prostate cancer diagnoses in the United States was observed just one year after the USPTF recommendation.[14] Similar significant decreases have also been observed in Canada.[13] Although the decrease in prostate cancer diagnoses indicates fewer low risk prostate cancers diagnosed, there has also been a decrease in intermediate to high grade prostate cancer (Gleason 7-10). The lack of diagnosis of treatable, but potentially fatal prostate cancer is a significant concern.[13,15] A recent study of 767,550 prostate cancer patients published by Weiner et al highlights this concern, documenting that the incidence of metastatic prostate cancer has increased significantly in the United States – increasing by 72% from 2004-2013.[16] Although the study does not show the direct correlation between the recommendations and increased metastatic incidence, it highlights the need for refinements in prostate cancer screening to prevent mortality from metastatic disease.

Finding a suitable biomarker that can reliably discriminate between the aggressive and indolent phenotypes of prostate cancer represents an active area of research and may provide a solution to the controversy. Several biomarkers have recently been studied and show promise. These biomarkers include: Prostate Cancer Antigen 3 (PCA3), proPSA as part of the Prostate Health Index (PHI), and Four-Kallikrein Panel Tissue Kallikrein.[17] PCA3 expresses non-coding RNA; this RNA is highly overexpressed in prostate tumor tissue compared to that of normal prostate tissue.[18] The PHI is a multi-biomarker test that takes into account several forms of PSA that aims to try and accurately detect prostate cancer.[18] The Four-Kallikrein Panel Tissue kallikrein and kallikrein-related enzymes comprise a family of 15 serine proteases. The expression of messenger RNA is detected in prostate tissue for all 15 proteases, but the KLK2 and KLK3, specifically, have been used in detecting aggressive prostate cancer.[19] Although promising, none of these methods have thus far yielded consistent identification of more advanced prostate cancer, but research remains ongoing.

Our study has several potential limitations. First, selection bias may be present as physicians with strong opinions on PSA screening may have been more likely to respond. Additionally, our survey was sent to all primary care physicians identified in the NSM LHIN by the College of Physicians and Surgeons of Ontario's online directory who could receive either mail or fax. Surveys may also have been sent to physicians who are retired, or who currently do not hold a practice in the NSM LHIN. As the demographics of our LHIN may not represent the total physician population of Ontario, our results may not be generalizable to all primary care physicians nation-wide. The respondents of the survey were aware that urologists designed the survey, raising the possibility of response bias. The survey was designed to be short in order to maximize the overall response rate, limiting the specificity of the questions. Finally, respondents were not asked on the use and attitude towards active surveillance of low risk prostate cancer, and questions did not take into account the effects race and family history had on prostate cancer screening. In spite of the limitations, our study provides a relatively high response rate (33.3%)[1] of the physicians in the NSM LHIN, representing the general practices and attitudes of these physicians.

Conclusion

It is evident that there is still controversy associated with PSA screening practice, and there is still significant variation among family physicians in the NSM LHIN. Reaching a consensus is unlikely to occur until major long term, randomized studies bring forth strong evidence on the efficacy of PSA screening leading to similar recommendations from both the CTFPHC and CUA. Until that time, the AUA and CUA guidelines should be utilized since they place greater emphasis on the stronger and longer term ERSPC and Göteborg studies. □

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