Education

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Prostate-specific antigen testing in Ontario: reasons for testing patients without diagnosed prostate cancer

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Abstract

Background: The use of the prostate-specific antigen (PSA) test has been increasing rapidly in Canada since its introduction in 1988. The reasons for using the PSA test in patients without known prostate cancer are unclear. This paper reports on the first study in Canada to use physician records to assess the use of PSA testing.

Methods: A questionnaire was mailed to physicians attending 475 patients without diagnosed prostate cancer. The patients were randomly selected from 2 laboratory databases of PSA test records in the greater Toronto area during 1995. The physicians were asked to consult their patient records to avoid recall bias. Information obtained included physician's specialty, patient's age at time of PSA test and reason(s) for the test.

Results: There were 264 responses (56%), of which 240 (91%) were usable. Of these 240, 63% (95% confidence interval [CI] 58%–70%) indicated that the test was conducted to screen for prostate cancer, 40% (95% CI 34%–47%) said it was to investigate urinary symptoms, and 33% (95% CI 27%–40%) responded that it was a follow-up to a medical procedure or drug therapy. More than one reason was permitted. Of 151 responses indicating screening as one reason for testing, 64% (95% CI 56%–72%) stated that it was initiated by the patient, and 73% (95% CI 65%–80%) stated that it was part of a routine examination. For 19%, both investigation of symptoms and screening asymptomatic patients were given as reasons for testing, and for another 19% both follow-up of a medical procedure and screening were given as reasons. Screening was recorded as a reason for testing far more commonly for patients seen by family physicians and general practitioners than for patients seen by urologists (67% v. 29%, $p < 0.001$). In contrast, the use of PSA testing to diagnose urinary symptoms was more common for patients seen by urologists than for those seen by family physicians and general practitioners (52% v. 37%, $p = 0.044$). No significant difference was found between physician groups in the use of PSA testing as a follow-up of a medical procedure (42% for urologists and 31% for family physicians and general practitioners). About 24% of the PSA test records were for patients younger than 50 and older than 70 years. PSA testing initiated by patients was more common in the practices of family physicians and general practitioners than in the practices of urologists (44% v. 13%, $p < 0.001$).

Interpretation: Screening for prostate cancer was the most common reason for PSA testing in our study group; it occurred most commonly in the family and general practice setting and was usually initiated by the patient. Differences in reasons for testing were identified by practice specialty. Although PSA screening for prostate cancer is sometimes recommended for men between 50 and 70 years of age, it is being conducted in men outside this age group.

Résumé

Contexte : L'utilisation du test de dépistage de l'antigène prostatique spécifique augmente rapidement au Canada depuis son introduction en 1988. On ne sait pas pourquoi on utilise le test de dépistage de l'antigène chez les patients qui n'ont pas un cancer de la prostate reconnu. Ce document présente un rapport

sur la première étude réalisée au Canada dans le cadre de laquelle les dossiers des médecins ont servi à évaluer l'utilisation du test de dépistage de l'antigène.

Méthodes : On a envoyé un questionnaire par la poste aux médecins traitant 475 patients qui n'avaient pas de cancer de la prostate diagnostiqué. Les patients ont été choisis au hasard dans deux bases de données de laboratoire contenant des dossiers sur des tests de dépistage de l'antigène effectués dans la région métropolitaine de Toronto en 1995. On a demandé aux médecins de consulter les dossiers de leurs patients pour éviter l'erreur systématique de rappel. Les renseignements obtenus portaient notamment sur la spécialité du médecin, l'âge du patient au moment où l'on a procédé au test de dépistage de l'antigène et les justifications du test.

Résultats : On a obtenu 264 réponses (56 %), dont 240 (91 %) étaient utilisables. Sur ces 240 réponses, 63 % (intervalle de confiance [IC] à 95 %, 58 % à 70 %) ont indiqué qu'on a procédé au test comme moyen de dépistage du cancer de la prostate, 40 % (IC à 95 %, 34 % à 47 %) ont déclaré que c'était pour investiguer des symptômes urinaires et 33 % (IC à 95 %, 27 % à 40 %) ont répondu que c'était pour donner suite à une intervention médicale ou à une pharmacothérapie. On a permis de mentionner plus d'une raison. Chez les 151 réponses indiquant qu'on a avoir procédé au test pour des raisons de dépistage, 64 % (IC à 95 %, 56 % à 72 %) ont déclaré que c'était à la demande du patient et 73 % (IC à 95 %, 65 % à 80 %) ont indiqué que le test faisait partie d'un examen de routine. L'investigation de symptômes et le dépistage de patients asymptomatiques ont été des raisons invoquées par 19 % des médecins pour procéder au test, tandis qu'un autre 19 % a effectué le test pour donner suite à une intervention médicale et pour des raisons de dépistage. Le dépistage a été indiqué comme justification du test beaucoup plus souvent dans le cas des patients qui ont consulté un médecin de famille et un omnipraticien que dans celui des patients qui ont consulté un urologue (67 % c. 29 %, $p < 0{,}001$). En revanche, l'utilisation du test de dépistage de l'antigène pour diagnostiquer des symptômes urinaires a été plus fréquente dans le cas des patients qui ont consulté un urologue que dans celui des patients qui ont consulté un médecin de famille et un omnipraticien (52 % c. 37 %, $p = 0{,}044$). On n'a constaté aucune différence significative entre les groupes de médecins quant à l'utilisation des tests de dépistage de l'antigène comme suivi d'une intervention médicale (42 % chez les urologues et 31 % chez les médecins de famille et les omnipraticiens). Environ 24 % des dossiers de tests de dépistage de l'antigène portaient sur des patients de moins de 50 ans et de plus de 70 ans. Le test de dépistage de l'antigène effectué à la demande des patients a été plus fréquent dans les cabinets de médecins de famille et d'omnipraticiens que dans ceux d'urologues (44 % c. 13 %, $p < 0{,}001$).

Interprétation : Le dépistage du cancer de la prostate a été la raison la plus fréquente qu'on a invoquée pour effectuer des tests de dépistage de l'antigène prostatique spécifique dans notre groupe d'étude. Cette raison a été invoquée plus souvent par des médecins de famille et des omnipraticiens et le test était habituellement effectué à la demande du patient. On a cerné les différences quant à la raison du test selon la spécialité. Même si l'on recommande parfois le dépistage du cancer de la prostate au moyen de l'antigène prostatique spécifique chez les hommes de 50 à 70 ans, on effectue ce test chez des hommes qui ne font pas partie de ce groupe d'âge.

The prostate-specific antigen (PSA) test is used to screen for or diagnose prostate cancer and to monitor the treatment of patients with prostate cancer. In about 60% of patients presenting clinically with prostate cancer, the disease is found beyond the prostate,[1] and in up to 40% of patients with clinically organ-confined prostate cancer, the disease is subsequently found beyond the prostate.[2,3] To increase the probability of diagnosing organ-confined prostate cancer (which is potentially curable), annual screening with the PSA test and a digital rectal examination (DRE) have been proposed for men with a life expectancy of 10 years or more

who are either between 50 and 70 years of age or at high risk of prostate cancer (over 40 years of age with a family history of prostate cancer or African ancestry).[4,5] This use of PSA testing is controversial and has strong advocates[6–8] and opponents.[9–14]

There is little information on the use of PSA testing in Canada. Earlier work by our group[15] has shown that more than 300 000 PSA tests were performed in Ontario in 1995/96 and that this rate is increasing sharply. In a 1995 telephone survey of Canadian men,[16] about 20% of those over 50 years of age had had their PSA measured. Detailed reports on the use of PSA testing have been submitted to provincial governments in Saskatchewan[17] and Quebec.[18] However, there have been no studies in Canada of physician records to determine the reasons for PSA testing.

Methods

This study was designed to determine, among patients without diagnosed prostate cancer, the proportion of PSA tests conducted for investigating urinary symptoms, following up on medical procedures such as DRE or transrectal ultrasonography (TRUS), screening asymptomatic men, following up on a previous PSA test result, or other reasons. We also examined whether there was a relation between the reason for testing and physician specialty, documented the nature of the symptoms or procedures that led to PSA testing, determined the extent to which patients initiated PSA testing and identified the age range of patients being tested. This information was collected using a self-administered questionnaire sent to physicians of randomly selected patients without diagnosed prostate cancer who had had a PSA test in 1995.

We designed the questionnaire using standard principles[19–23] and finalized it after receiving comments and suggestions from 4 family physicians and 2 urologists. For ease of administration, the questions were formulated to elicit Yes or No responses wherever possible. Where choices were applicable (e.g., the type of symptoms experienced by the patient) a list was provided for physicians to indicate the most appropriate. The questionnaire was sent to 49 patients in a pilot mailing.

The process by which the recipients of the questionnaire were selected is illustrated in Fig. 1. Patients who had had a PSA test in 1995 were identified from the databases of 2 laboratories in Toronto. For the pilot mailing, we used records from Intercounty Laboratories, which refers specimens to the Sunnybrook Health Science Centre (now Sunnybrook and Women's College Health Sciences Centre), a tertiary care teaching hospital with a regional cancer centre. For the main mailing, we used records from Gamma-Dynacare Medical Laboratories (GDML), a large private laboratory that provides services to about one-third of the physicians in private practice in Ontario. The records from both these databases were linked with data from the Ontario Cancer Registry (OCR) to identify people who had had a PSA test but in whom prostate cancer had not been diagnosed. After this linkage, 1000 names were randomly selected, and the postal codes of physicians' practices were then used to select only records in metropolitan Toronto (46%) and surrounding areas (54%).

To capture as many cancer diagnoses as possible, the records selected for the main mailing were linked with OCR's pathology database to identify patients in whom prostate cancer was diagnosed after the initial linkage with the OCR. This resulted in another 26 patients being excluded. We could not obtain information from records associated with a GDML-owned London laboratory (for some specimens from the Toronto area) through the GDML database because of technical difficulties, so these names were excluded from our study. This left 428 records eligible for the main mailing.

The questionnaire, along with a covering letter and a brief summary of the research protocol, was first sent to 47 of the 49 physicians identified in the pilot mailing. These 49 comprised all of the Sunnybrook records that met the study criteria. The pilot mailing was conducted to test the effectiveness of the questionnaire and the mailing strategy; it proved successful and no changes were required to either the questionnaire or the mailing strategy. The main mailing to physicians attending 428 patients on the GDML database then proceeded. In both mailings, a follow-up reminder was sent 3 weeks after the first mailing. Physicians were asked to consult their patient records to avoid recall bias. As an incentive, each physician who returned a questionnaire became eligible to win a prize. The research protocol was approved by the Sunnybrook Health Science Centre's Ethics Review Board and by both private laboratories involved. To maintain confidentiality, questionnaires had no patient or physician identifiers, and physicians were contacted indirectly, through the laboratories.

Because physicians from both the pilot mailing and the main mailing were selected from the same geographic area and because the same questionnaire was used, the responses from both mailings were included in our study. Proportions of responses and their 95% confidence intervals (CIs) were calculated, and distributions were compared using the χ^2 test.

Results

The overall response rate was 56% (264/475). Of the 47 questionnaires sent out for the pilot study, 35 (74%) were returned, of which 27 (77%) were usable. Of the 428 questionnaires sent in the main mailing, 229 (54%) were returned, of which 213 (93%) were usable. Table 1 shows the physician and patient characteristics for the 240 returned questionnaires that were usable. The distributions of practice specialty, patient age and postal code of the physicians' practices did not differ significantly between the eligible recipients and the respondents.

Of the returned questionnaires, 24 were unusable because a diagnosis of prostate cancer had been made before the date of the PSA test (6), the questionnaire was incomplete (6), the physician was unable to obtain the information from the chart (usually because it was not his or her patient) or could not be reached (12).

A summary of the reasons given for PSA testing is

shown in Table 2. Because we allowed respondents to give more than one reason for testing, we recorded on average 1.5 reasons per usable response.

The presence of urinary symptoms was listed as a reason for PSA testing in 40% (95% CI 34%–47%) of the responses; this finding is close to that reported in a study of unselected men between the ages of 60 and 85 years.[24] On average 1.9 symptoms were reported per patient record; these were nocturia (45%), hesitancy urinating (28%), urgency urinating (28%), post-void dribbling (25%), delayed emptying of the bladder (25%), frequent daytime urination (13%) and other (21%), which comprised weak stream, hematuria, hemospermia, groin pain, post-void pain and dysuria.

The proportion of PSA tests conducted as a follow-up to a medical procedure was 33% (95% CI 27%–40%). On average there were 1.1 procedures per patient, the main ones being DRE (91%), transurethral resection of the prostate (TURP) (11%), drug therapy (5%) and TRUS (3%). The high rate of DRE is consistent with the screening recommendations to do both the PSA test and DRE.[4,5,13] The proportion of PSA tests done to follow up a

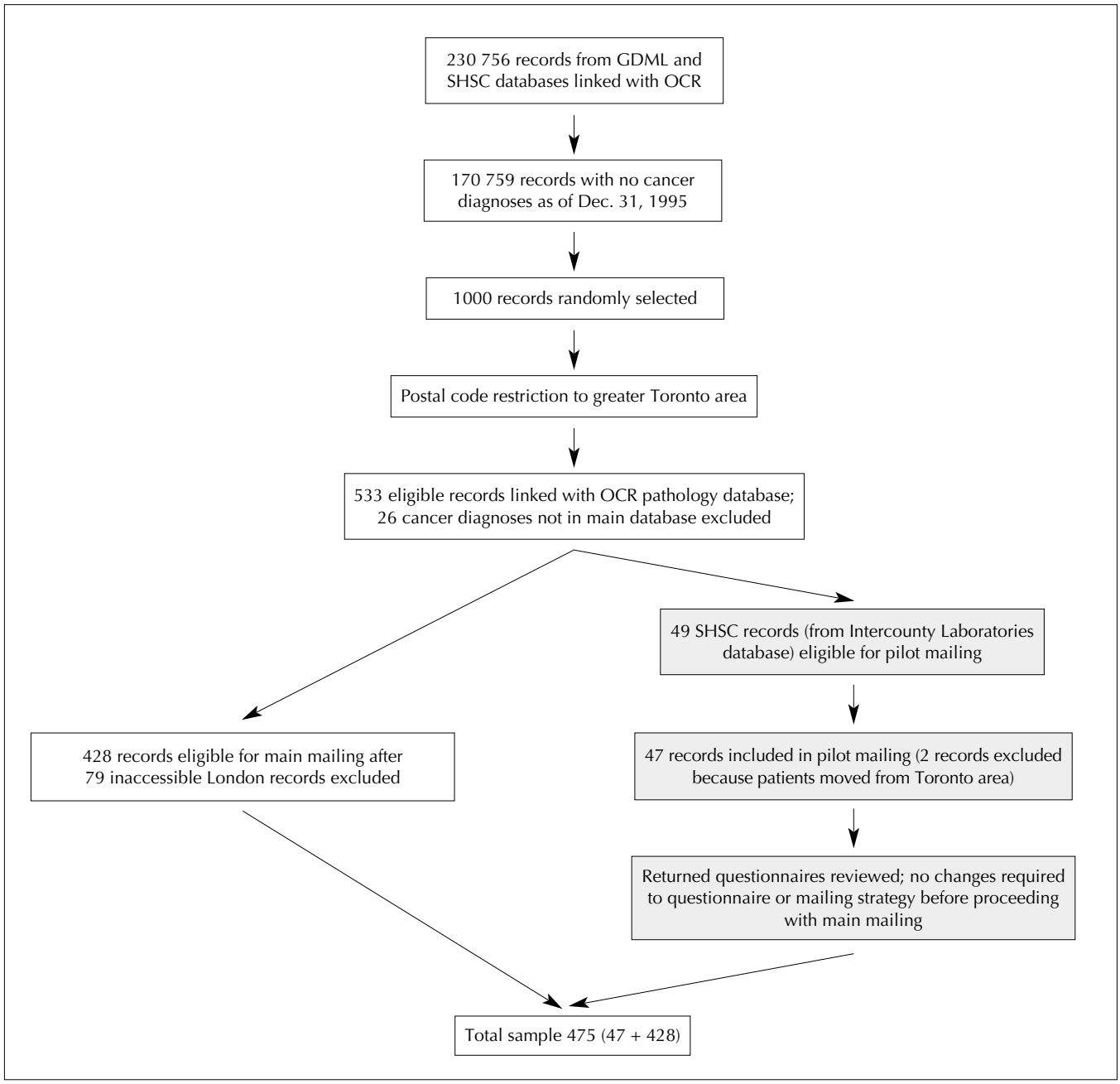

Fig. 1: Process for selecting physician sample for pilot and main mailings. OCR = Ontario Cancer Registry, GDML = Gamma-Dynacare Medical Laboratories, SHSC = Sunnybrook Health Science Centre. For details, see Methods.

previous PSA test (6%) was lower than expected, considering the recommendations for annual screening.[4,5,13]

The proportion of records that listed screening as at least one reason for PSA testing was 63% (95% CI 56%–72%); this finding is in close agreement with the practice reported in Saskatchewan.[17] Of these screening PSA tests, 66% were for screening only (i.e., for no other reason), 64% (95% CI 56%–72%) were reported as being initiated by the patient, and 73% (95% CI 65%–80%) were requested as part of a routine examination. Only 8% of the responses listed other reasons for PSA testing.

Screening was recorded as a reason for testing far more commonly for patients seen by family physicians and general practitioners than for those seen by urologists (67% v. 29%, $p < 0.001$) (Table 2). In contrast, PSA testing to diagnose urinary symptoms was more common in patients seen by urologists than in those seen by family physicians and general practitioners (52% v. 37%, $p = 0.044$). No significant difference was found between the physician groups in the proportion of PSA tests used as a follow-up to a medical procedure (42% v. 31%, $p < 0.2$).

Table 1: Characteristics of physicians* who responded to questionnaire on reasons for prostate-specific antigen (PSA) testing, and their patients

Characteristic	No.	(and %)
Practice specialty		
Family or general practice	201	(84)
Urology	31	(13)
Other	8	(3)
Total	240	(100)
Patient age, yr		
< 50	45	(19)
50–70	145	(62)
> 70	45	(19)
Total	235†	(100)

*Some physicians responded to more than 1 questionnaire.
†Age not available for 5 patients.

Our findings suggest that family physicians and general practitioners were significantly more likely than urologists to request PSA screening in response to a patient request (44% [89/201] v. 13% [4/31], $p < 0.001$) and as part of a routine examination (49% [98/201] v. 19% [6/31], $p < 0.001$).

From the GDML database, which was used to select the main sample, we could determine that PSA testing was done in men under the age of 50 in 18% (93/507) of the records of the eligible recipients and in 19% (45/235) of the records of the respondents; it occurred in men over the age of 70 in 20% (103/507) of the eligible recipients and in 19% (45/235) of the respondents. Therefore, multiplying the proportion of responses with screening cited as a reason for PSA testing (63%) by the proportion of responses indicating that testing was done in men outside the age range of 50–70 years (38%) reveals that 24% of PSA screening occurred outside the age range suggested by the guidelines advocating screening.

Interpretation

Our sample was confined to physicians practising in the greater Toronto area, so it is possible that PSA testing for screening and diagnostic practices cannot be generalized to populations beyond this practice area. Our 56% response rate was likely affected by our inability to conduct follow-up phone calls with physicians. However, the similarities between the eligible recipients and the respondents suggests no bias in responses.

The proportion of responses with both urinary symptoms and screening identified as reasons for testing (19%) was coincidentally the same as the proportion identifying both follow-up to procedures and screening as reasons for testing. It is possible that some physicians misunderstood the question (although it stated clearly that screening was related to asymptomatic patients) or that some physicians were of the opinion that symptoms of prostatism do not imply a diagnostic context and are compatible with

Table 2: Reasons given by physicians for PSA testing

Reason	Practice specialty; no. (and %) of responses: Family or general practice *n = 201*	Urology *n = 31*	Other *n = 8**	Total (and %) *n = 240*
Presence of urinary symptoms	74 (37)	16 (52)	5 (62)	95 (40)
Follow-up of a medical procedure	62 (31)	13 (42)	3 (38)	78 (32)
Confirmation of previous PSA test result	11 (5)	3 (10)	0 (0)	14 (6)
Screening for prostate cancer	134 (67)	9 (29)	8 (100)	151 (63)
Screening only	93 (69)	3 (33)	4 (50)	100 (66)
Request initiated by patient	89 (66)	4 (44)	4 (50)	97 (64)
Part of routine examination	98 (73)	6 (67)	6 (75)	110 (73)
Other†	15 (7)	2 (6)	1 (12)	18 (8)

*Other specialties include general medicine (2), general surgery (2), nephrology (1), gastroenterology (2) and dermatology (1).
†Family history (4), patient fears cancer (4), benign prostatic hyperplasia (2), monitoring prostatitis (2), impotence or pre-androgen therapy (4), abnormal urinalysis results (1), recommended by psychologist (1).

screening (i.e., symptoms are more likely related to benign prostatic hyperplasia than to prostate cancer).

Physicians were completing the questionnaires themselves, and in 20% of the responses indicating that the presence of urinary symptoms was the reason for testing, no particular symptom was reported. The patient records may have been incomplete, or some physicians may have responded from memory rather than checking the chart. However, in the majority of cases the specific information requested was supplied.

Our results indicate that PSA screening is most often initiated by the patient and occurs largely in the family and general practice setting. The fact that screening occurred to this extent suggests that the recommendations against screening made by various bodies[9–14] are not being followed. Furthermore, we estimated that approximately 24% of the screening occurred outside the recommended age range of 50–70 years.

Significant confusion has been shown to exist among patients,[16] primary care physicians[25,26] and urologists [27,28] as to expectations of, knowledge about and practices in relation to PSA screening. The use of PSA testing will likely continue to increase in Ontario.[15] Our findings, together with those of others,[16,25–28] show that there is a clear need for better education of both patients and physicians in order for them to make an informed choice about a procedure of uncertain benefit.

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Competing interests: For Drs. Goel, Williams and Iscoe, none declared. During the study period, Dr. Bunting was employed by the Sunnybrook Health Science Centre. Gamma-Dynacare Medical Laboratories was part owner of the laboratory of that hospital.

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