

# Provision of preventive care to unannounced standardized patients

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## Abstract

**Objective:** To examine the relation between physician, training and practice characteristics and the provision of preventive care as described in the guidelines of the Canadian Task Force on the Periodic Health Examination.

**Design:** Cross-sectional study.

**Setting:** Family practices open to new patients within 1 hour's drive of Hamilton, Ont.

**Participants:** A total of 125 family physicians were randomly selected from respondents to an earlier preventive care survey. Of the 125, 44 (35.2%) declined to participate, and an additional 19 (15.2%) initially consented but later withdrew when they closed their practices to new patients. Sixty-two physicians thus participated in the study.

**Intervention:** Unannounced standardized patients posing as new patients to the practice visited study physicians' practices between September 1994 and August 1995, portraying 4 scenarios: 48-year-old man, 70-year-old man, 28-year-old woman and 52-year-old woman.

**Outcome measures:** Proportion of preventive care manoeuvres carrying grade A, B, C, D and E recommendations from the Canadian Task Force on the Periodic Health Examination that were performed, offered or advised. A standard score was computed based on the performance of grade A and B manoeuvres (good or fair evidence for inclusion in the periodic health examination) and the non-performance of grade D and E manoeuvres (fair or good evidence for exclusion from the periodic health examination).

**Results:** Study physicians performed or offered 65.6% of applicable grade A manoeuvres, 31.0% of grade B manoeuvres, 22.4% of grade C manoeuvres, 21.8% of grade D manoeuvres and 4.9% of grade E manoeuvres. The provision of evidence-based preventive care was associated with solo (v. group) practice and capitation or salary (v. fee-for-service) payment method. Preventive care performance was unrelated to physician's sex, certification in family medicine or problem-based (v. traditional) medical school curriculum.

**Conclusions:** Preventive care guidelines of the Canadian Task Force on the Periodic Health Examination have been incompletely integrated into clinical practice. Research is needed to identify and reduce barriers to the provision of preventive care and to develop and apply effective processes for the creation, dissemination and implementation of clinical practice guidelines.

## Résumé

**Objectif :** Examiner le lien entre les caractéristiques des médecins, de la formation et de la pratique, et la prestation de soins préventifs décrits dans les lignes directrices du Groupe d'étude canadien sur l'examen médical périodique.

**Conception :** Étude transversale.

**Contexte :** Cabinets de médecine familiale accueillant de nouveaux patients à moins d'une heure de route de Hamilton (Ont.).

**Participants :** Au total, 125 médecins de famille ont été choisis au hasard parmi les répondants à un sondage antérieur sur les soins préventifs. Sur les 125, 44 (35,2 %) ont refusé de participer et 19 autres (15,2 %) y ont consenti mais se



## Evidence

## Études

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‡ See related articles pages 197 and 205

sont retirés par la suite lorsqu'ils cessé d'accueillir de nouveaux patients. Soixante-deux médecins ont ainsi participé à l'étude.

**Intervention :** Des patients normalisés non annoncés se faisant passer pour de nouveaux patients ont rendu visite au cabinet des médecins participant à l'étude, entre septembre 1994 et août 1995. Ils représentaient 4 scénarios : homme de 48 ans, homme de 70 ans, femme de 28 ans et femme de 52 ans.

**Mesures de résultats :** Proportion des interventions de soins préventifs comportant des recommandations de grade A, B, C, D et E du Groupe d'étude canadien sur l'examen médical périodique qui ont été exécutées, offertes ou conseillées. On a calculé un résultat normalisé fondé sur l'exécution d'interventions de grade A et B (preuves bonnes ou raisonnables pour les inclure à l'examen médical périodique) et l'inexécution d'interventions de grade D et E (preuves bonnes ou raisonnables pour les exclure de l'examen médical périodique).

**Résultats :** Les médecins participant à l'étude ont exécuté ou offert 65,6 % des interventions applicables de grade A, 31,0 % des interventions de grade B, 22,4 % des interventions de grade C, 21,8 % des interventions de grade D et 4,9 % des interventions de grade E. On a établi un lien entre la prestation de soins préventifs fondés sur des données probantes et la pratique individuelle (c. collective) et le mode de rémunération par capitation ou salaire (c. rémunération à l'acte). Il n'y avait aucun lien entre l'exécution de soins préventifs et le sexe du médecin, son certificat en médecine familiale ou le programme d'études à une faculté de médecine fondée sur les problèmes (plutôt que classique).

**Conclusions :** Les lignes directrices sur les soins préventifs du Groupe d'étude canadien sur l'examen médical périodique n'ont pas été intégrées complètement à la pratique clinique. Il faut effectuer des recherches pour définir et réduire les obstacles à la prestation des soins préventifs et pour élaborer et appliquer des processus efficaces portant sur la création, la diffusion et la mise en oeuvre de guides de pratique clinique.

Numerous studies of the provision of preventive care in primary care settings have shown that many eligible patients — often a majority — do not receive recommended preventive services.<sup>1-15</sup> In an effort to enhance the provision of effective preventive care (and discourage the provision of ineffective interventions), the Canadian Task Force on the Periodic Health Examination has published and regularly updated evidence-based preventive care guidelines since 1979.<sup>16</sup>

Studies examining the relation between physician and practice characteristics on one hand and preventive care provision on the other<sup>1,6,17-26</sup> have relied on approaches to performance measurement (physician self-report, patient surveys or chart review) that are subject to potential bias, measurement error and incomplete documentation of performance. To overcome these difficulties, we designed and conducted a study of family physicians' preventive care performance with unannounced standardized patients posing as new patients to the physicians' practices. In addition to the potential correlates of preventive care performance examined in earlier studies (physician's sex,<sup>17-21</sup> family medicine certification,<sup>1,6,22</sup> method of physician payment<sup>17,23-25</sup> and group versus solo practice<sup>1,20</sup>), we wished to assess whether graduates of the problem-based medical education program at McMaster University,

Hamilton, Ont., differed from graduates of more traditional programs. We also wanted to compare graduates from the 1970s (before the first report of the Canadian Task Force on the Periodic Health Examination) with more recent graduates.

## Methods

### *Selection and recruitment of physicians*

In an earlier phase of this research we conducted a preventive care survey among physicians listed in the CMA's Physician Resource Databank as general practitioners and family physicians whose recorded year of graduation from medical school was between 1972 and 1988 and who had addresses in an area of southern Ontario including the counties of Niagara, Haldimand-Norfolk, Brant, Waterloo, Wellington, Wentworth, Halton and Peel and the western half of metropolitan Toronto. The survey area was limited to communities within 1 hour's drive of Hamilton, Ont., to facilitate the standardized patient phase of the study. After 3 mailings of the questionnaire, usable responses were obtained from 480 (49.8%) of the 964 eligible physicians surveyed. The methods and results of the survey have been reported elsewhere.<sup>27-29</sup>



From among the physicians who returned the survey questionnaire and indicated that their practice was open to new patients, we drew a stratified random sample for recruitment to a study of preventive care performance using unannounced standardized patients. Physicians in capitated practices (health service organizations) and salaried practices (community health centres) and McMaster medical school graduates were oversampled relative to physicians in fee-for-service practices and non-McMaster graduates respectively. Community physician recruiters were paid a small honorarium to assist in the recruitment process. When a physician agreed by telephone to participate in the study, a form was sent to the physician to obtain written consent to enter unannounced standardized patients into the physician's practice. Participating physicians received feedback on their performance and were eligible for 4 hours of continuing medical education credit from the College of Family Physicians of Canada.

### **Standardized patient scenarios**

Four standardized patient scenarios were developed: a 48-year-old man, a 70-year-old man, a 28-year-old woman and a 52-year-old woman. Two people were trained to portray each scenario. The scenarios were developed to provide an opportunity for the provision of a range of preventive manoeuvres that carried grade A or B recommendations from the Canadian Task Force on the Periodic Health Examination (good or fair evidence "to support the recommendation that the condition be specifically considered in a periodic health examination"), grade C recommendations ("poor evidence regarding the inclusion or exclusion of the condition in a periodic health examination, but recommendations may be made on other grounds") and grade D or E recommendations (fair or good evidence "to support the recommendation that the condition be excluded from consideration in a periodic health examination").<sup>16</sup> We attempted to include all applicable manoeuvres carrying grade A, B, D and E recommendations and a sample of manoeuvres dealing with common conditions carrying grade C recommendations (Appendix 1).

For each scenario a "cover" story was created to explain why the patient was seeking a new physician to provide ongoing care. For example, the 28-year-old woman said she was moving to the area to live with her boyfriend and needed a family physician. She was healthy but needed a renewal for her oral contraceptive prescription.

The standardized patients were given historical information about when they had last had a series of preventive care manoeuvres (e.g., breast examination, Pap smear or mammography for the women, vaccinations and booster shots for common preventable illnesses). They were in-

structed to decline rectal and pelvic examinations, offering menstruation and anal discomfort or hemorrhoids as reasons for refusal.

Because we were aware that some physicians extend their initial assessment of new patients over 2 visits and may deal with preventive issues at either or both of those visits, we allowed for one follow-up visit by the standardized patients.

### **Training of standardized patients**

One-way mirrors were used during training of the standardized patients so that they could be observed in role with physician interviewers. Both members of the patient pairs observed the encounters of his or her "double." After each training encounter the interviewing physician, the trainers and the "patient" scored the encounter. The recall form consisted of a series of Yes/No questions concerning items the physician inquired about, performed or recommended and information about the encounter (e.g., length). Discrepancies in ratings were discussed, and agreement was reached on how items should be rated. Very high agreement (95% to 100%) was observed after a few items were clarified. The standardized patients also returned for a further check on the accuracy of their reports midway through the project. Again, over 95% agreement was seen across pairs within an encounter.

### **Physician visits**

The standardized patients scheduled their own appointments with physicians. Each physician was visited by one member of the patient pair between September 1994 and August 1995. Assignment of physicians depended on when the standardized patients were available and the area where the "patient" lived (they preferred appointments involving less travel time). The "patients" used bogus health insurance cards to allow unannounced entry into physicians' practices and payment to physicians for standardized patient visits. Payment records were retrieved from the provincial health insurance plan, which was then reimbursed. The standardized patients completed the recall forms immediately after each visit and retained all requisitions for laboratory and imaging investigations.

After physicians were visited by all 4 standardized patients they were given the names of the "patients" and completed a brief questionnaire about whether they suspected or detected any of them.

### **Scoring of encounters**

Scoring of the physicians' preventive care performance was based on data from the recall forms and requisitions

for diagnostic tests. We scored performance using the most recent version of the recommendations of the Canadian Task Force on the Periodic Health Examination.<sup>16</sup>

As our principal measure of preventive care performance, we created a dependent variable that simultaneously captured the performance of manoeuvres carrying grade A and B recommendations and nonperformance of those carrying grade D and E recommendations. Because the number of applicable A and B manoeuvres and D and E manoeuvres differed, we first computed standard scores for each physician for A and B manoeuvres and for D and E manoeuvres using the following formula: number of manoeuvres performed minus group mean, divided by the standard deviation (SD) for the group. The physician's standard score for D and E manoeuvres was then subtracted from his or her standard score for A and B manoeuvres. The higher the resulting score, the more the physician performed A and B manoeuvres while avoiding D and E manoeuvres.

### Analysis

For descriptive data analysis, we computed means and their SD for continuous data and used frequency distributions to characterize categorical data. We used  $\chi^2$  tests to compare the background characteristics of nonrespondents and respondents to the main survey and to the subsequent standardized patient study. The computed score for preventive care performance became the dependent variable in a linear regression equation in which dummy variables were created for the following predictor variables: family medicine certification status, type of remuneration, physician's sex, decade of graduation, practice type, time spent with the standardized patient, medical school (McMaster University v. other) and standardized patient detection. As well, one interaction term was used (practice type  $\times$  remuneration type). All predictor variables were entered simultaneously into the regression model to examine their effects while simultaneously taking the effect of all other variables in the model into account (SPSS for Windows, version 6.1, SPSS Inc., Chicago).

The standardized patients made their visits during an 11-month period that began 1 month before the October 1994 release by the Canadian Task Force on the Periodic Health Examination of its updated recommendations.<sup>16</sup> This compilation contained changes in the classification of certain manoeuvres and recommendations covering manoeuvres that had not been considered previously. Recognizing that some physicians might be practising on the basis of pre-1994 recommendations during the time standardized patients visited their practices, we conducted a sensitivity analysis in which physician performance was

assessed relative to the pre-1994 recommendations of the task force.

### Ethics

Peer recruiters described the study to prospective physician participants by telephone. Physicians who agreed to participate were sent more detailed written information about the study and a form to provide written consent for unannounced standardized patients to enter their practices. Physicians were free to withdraw from the study at any time. The study was approved by the Ethics Review Committee of McMaster University's Faculty of Health Sciences.

### Results

A total of 480 physicians completed the preventive care survey, of whom 251 had open practices and were eligible to participate in the standardized patient study. Certificants of the College of Family Physicians of Canada were more likely than noncertificants to have closed practices and, therefore, were less likely to be eligible.

Of the physicians who responded to the preventive care survey, 125 (75 men and 50 women) were approached to be involved in the standardized patient study. Of the 125, 44 (35.2%) declined to participate, and an additional 19 (15.2%) initially consented but later withdrew when they closed their practices to new patients. Sixty-two physicians thus participated in the study.

**Table 1: Characteristics of 62 general practitioners and family physicians practising in southern Ontario**

Characteristic	No. (and %) of physicians
<b>Sex</b>	
Male	40 (64.5)
Female	22 (35.5)
<b>Decade of graduation</b>	
1970s	34 (54.8)
1980s	28 (45.2)
<b>McMaster University graduate</b>	
Yes	19 (30.6)
No	43 (69.4)
<b>Fee-for-service remuneration</b>	
Yes	51 (82.2)
No	11* (17.7)
<b>Certified in family medicine</b>	
Yes	41 (66.1)
No	21 (33.9)
<b>Group practice (v. solo practice)</b>	
Yes	45 (72.6)
No	17 (27.4)

\*Eight were capitated physicians (in health service organizations) and 3 were salaried physicians (in community health centres).



The mean age of the participating physicians was 40.2 (SD 5.3) years. They saw a mean of 4.8 (SD 1.3) patients per hour on an average day. The mean proportion of their patients who were female was 60% (SD 14.9%). Other characteristics of the participating physicians are shown in Table 1. Compared with physicians who participated in the study, those who declined or withdrew were significantly more likely to have graduated in the 1980s than in the 1970s ( $p = 0.005$ ) but did not differ from the participants in any of the other characteristics listed in Table 1.

All 62 physicians saw the 48-year-old man, the 70-year-old man and the 28-year-old woman. Two physicians did not see the 52-year-old woman. Of the 60 physicians who saw all 4 standardized patients, 34 (56.7%) had at least 1 standardized patient return for a second visit. Only 5 physicians (8.3%) had more than 1 "patient" return for a second visit. The proportion of physicians seeing a standardized patient for a second visit varied among the 4 scenarios, no physicians seeing the 28-year-old woman twice, 2 physicians (3.3%) seeing the 52-year-old woman twice, 12 (19.4%) seeing the 48-year-old man twice and 17 (27.4%) seeing the 70-year-old man twice.

The mean length of time spent with each patient was 19.3 (SD 8.0) minutes per physician but varied among scenarios: 12.7 (SD 9.6) minutes for the 28-year-old woman, 15.8 (SD 9.1) minutes for the 52-year-old woman, 22.3 (SD 12.9) minutes for the 48-year-old man and 26.2 (SD 15.5) minutes for the 70-year-old man.

Standardized patients were detected (the physician reported asking the patient if she or he was a standardized patient) in 5 (2.0%) of the 246 encounters and were suspected in a further 51 encounters (20.7%). Only 2 physicians (3.2%) detected and 28 physicians (45.2%) suspected at least 1 standardized patient. The principal reason for detection or suspicion was failure of the patient to fit the physician's practice profile in terms of characteristics such as ethnicity, age and

**Table 2: Proportion of applicable preventive manoeuvres offered or performed**

Manoeuvre	Standardized patient no.*	No. (and %) of applicable manoeuvres
<b>Grade A recommendations</b>		
Obtain history of tobacco use	1, 2, 3, 4	214/246 (87.0)
Mammography	4	48/60 (80.0)
Smoking cessation counselling	1	49/62 (79.0)
Nicotine replacement therapy	1	46/62 (74.2)
Blood pressure measurement	1, 3, 4	126/184 (68.5)
Tetanus vaccination	1, 2, 3, 4	104/246 (42.3)
Clinical breast examination	4	17/60 (28.3)
Total		604/920 (65.6)
<b>Grade B recommendations</b>		
Blood pressure measurement	2	56/62 (90.3)
Cervical cytology	3, 4	110/122 (90.2)
Obtain history of alcohol use	1, 2, 3, 4	183/246 (74.4)
Estrogen replacement therapy	4	44/60 (73.3)
Counselling re: exercise/physical activity	1, 2, 3, 4	144/246 (58.5)
Diet/nutrition counselling	1, 2, 3, 4	112/246 (45.5)
Influenza vaccination	2	19/62 (30.6)
Determination of rubella antibody titre	3	14/62 (22.6)
Visual acuity testing	2	5/62 (8.1)
Counselling re: seat-belt use	1, 2, 3, 4	14/246 (5.7)
Exposure to sun/counselling re: cover-up	1, 2, 3, 4	11/246 (4.5)
Clinical hearing examination	2, 3, 4	4/184 (2.2)
Obtain history of exposure to excessive noise	1, 2, 3, 4	4/246 (1.6)
Counselling re: use of smoke detector in home	1, 2, 3, 4	3/246 (1.2)
Total		723/2336 (31.0)
<b>Grade C recommendations</b>		
Mouth examination	1	39/62 (62.9)
Serum cholesterol testing	1, 2, 3, 4	123/246 (50.0)
Digital rectal examination	2	29/62 (46.8)
Testicular examination	1	26/62 (41.9)
Low-dose ASA therapy	1	24/62 (38.7)
Counselling re: sexual behaviour	1, 2, 3, 4	43/246 (17.5)
Vaccination against pneumococci	2	10/62 (16.1)
Thyroid palpation	4	9/60 (15.0)
Complete skin examination	2, 3, 4	22/184 (12.0)
Testing for thyroid-stimulating hormone	4	7/60 (11.7)
Counselling re: drinking and driving	2	7/62 (11.3)
Testing stool for occult blood	1, 2, 3, 4	24/246 (9.8)
Counselling re: bicycle helmet use	3	3/62 (4.8)
Sigmoidoscopy	1, 2, 4	6/184 (3.3)
Total		372/1660 (22.4)
<b>Grade D recommendations</b>		
Serum glucose testing	1, 2, 3, 4	78/246 (31.7)
Urinalysis	1, 2, 3, 4	74/246 (30.1)
Bone density testing	4	10/60 (16.7)
Chest roentgenography	1, 2, 3, 4	33/246 (13.4)
Bimanual pelvic examination for ovarian cancer	4	3/60 (5.0)
Testing for prostate specific antigen	2	3/62 (4.8)
Total		201/920 (21.8)
<b>Grade E recommendations</b>		
Tuberculin testing	1	12/62 (19.4)
Sputum cytology	1, 2, 3, 4	3/246 (1.2)
Total		15/308 (4.9)

\*1 = 48-year-old man, 2 = 70-year-old man, 3 = 28-year-old woman, 4 = 52-year-old woman.



sex. Female physicians were significantly more likely than male physicians to detect or suspect male standardized patients (57.1% v. 25.0%) ( $p = 0.03$ ) but not female standardized patients.

The proportion of applicable preventive manoeuvres offered or performed, by grade of recommendation, is shown in Table 2. Overall, 65.6% of manoeuvres carrying a grade A recommendation were offered or performed; the proportion ranged from 28.3% (clinical breast examination) to 87.0% (obtaining history of tobacco use). A total of 31.0% of applicable grade B manoeuvres were offered or performed; the proportion ranged from 1.2% (counselling regarding use of smoke detectors) to 90.3% (blood pressure measurement). Clinical hearing examinations and counselling regarding seat-belt use and sun exposure were rarely performed. The overall proportions of applicable grade C, D and E manoeuvres offered or performed were 22.4%, 21.8% and 4.9% respectively. Serum glucose testing and urinalysis (grade D recommendations) were ordered or performed during more than 30% of the encounters.

The mean proportion of manoeuvres performed, by version of recommendations (1994 or pre-1994) of the Canadian Task Force on the Periodic Health Examination, is shown in Table 3. In each category (grade A and B, C, and D and E) the proportion of manoeuvres performed based on the 1994 recommendations was highest

**Table 3: Proportion of preventive manoeuvres performed**

Scenario	Version of recommendations; mean proportion (and SD*)	
	1994	Pre-1994
<b>Grade A and B manoeuvres</b>		
48-year-old man†	0.52 (0.19)	0.50 (0.19)
70-year-old man†	0.37 (0.16)	0.45 (0.21)
28-year-old woman‡	0.39 (0.17)	0.54 (0.20)
52-year-old woman‡	0.37 (0.18)	0.43 (0.20)
Mean per physician‡	0.41 (0.12)	0.48 (0.14)
<b>Grade C manoeuvres</b>		
48-year-old man†	0.37 (0.27)	0.34 (0.26)
70-year-old man†	0.24 (0.19)	0.25 (0.18)
28-year-old woman†	0.15 (0.18)	0.18 (0.22)
52-year-old woman‡	0.12 (0.14)	0.17 (0.19)
Mean per physician‡	0.22 (0.12)	0.26 (0.15)
<b>Grade D and E manoeuvres</b>		
48-year-old man†	0.36 (0.32)	0.32 (0.28)
70-year-old man†	0.18 (0.19)	0.15 (0.15)
28-year-old woman†	0.07 (0.15)	0.09 (0.14)
52-year-old woman‡	0.09 (0.14)	0.07 (0.12)
Mean per physician‡	0.17 (0.13)	0.16 (0.11)

\*SD = standard deviation.

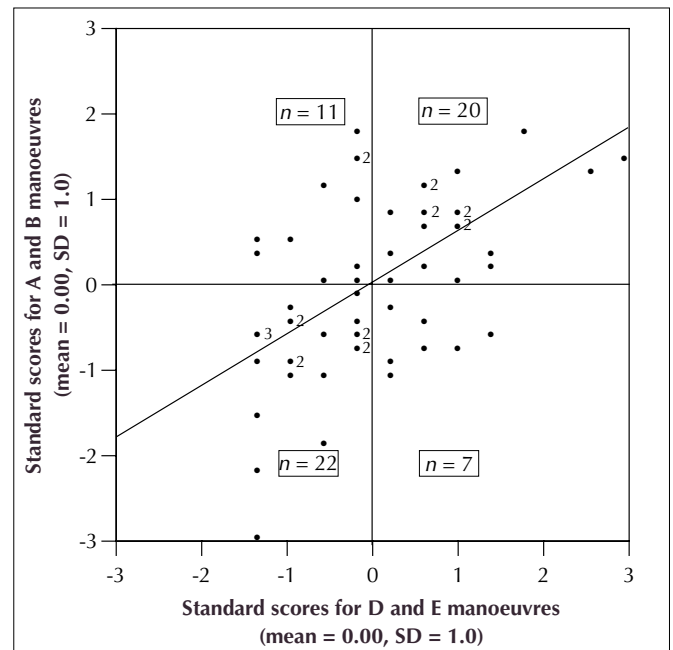
†n = 62.

‡n = 60.

for the 48-year-old man. The performance of grade A and B manoeuvres was significantly correlated with the performance of grade C manoeuvres (correlation coefficient 0.683,  $p < 0.001$ ) and of grade D and E manoeuvres (correlation coefficient 0.544,  $p < 0.001$ ). The performance of grade C manoeuvres was significantly correlated with the performance of grade D and E manoeuvres (correlation coefficient 0.683,  $p < 0.001$ ).

Fig. 1 shows the relation between the performance of A and B manoeuvres and the performance of D and E manoeuvres at the individual physician level. Physicians' standard scores for A and B manoeuvres are plotted against their standard scores for D and E manoeuvres. Of the 60 physicians who saw all 4 standardized patients, 20 scored above the mean for both A and B manoeuvres and D and E manoeuvres, and 22 scored below the mean for both A and B manoeuvres and D and E manoeuvres. Only 11 physicians scored above the mean for A and B manoeuvres and below the mean for D and E manoeuvres.

Tables 4 and 5 present the relation between our measure of preventive care performance (which incorporates performance of grade A and B manoeuvres and nonperformance of grade D and E manoeuvres) in relation to the predictor variables we selected a priori, the time physicians spent with standardized patients and whether the physician suspected or detected the standardized patient. Table 4 shows the results of bivariate analyses, restricted to the 60 physicians who saw all 4 standardized patients. Scores for performance of preventive manoeuvres differed



**Fig. 1: Scattergram of standard scores for manoeuvres with grade A or B recommendations and those with grade D or E recommendations. Correlation coefficient = 0.54. SD = standard deviation.**



significantly between fee-for-service and non-fee-for-service physicians ( $p = 0.009$ ). The regression model explained 26% of the variance in physicians' performance scores (Table 5). Lower performance scores were associated with fee-for-service practice and with group practice. No other variables were significantly related to preventive care performance.

In our sensitivity analysis the model explained 19% of the variance in physicians' performance scores. None of the variables in the model was significantly related to preventive care performance. Fee-for-service remuneration and group practice were associated with poorer preventive care performance after other variables in the model were controlled for; however, the relations were not statistically significant.

A comparison of preventive care performance by fee-for-service versus capitation or salary remuneration and by group versus solo practice is presented in Table 6. Fee-for-service physicians and physicians in group practice performed a lower proportion of A and B manoeuvres and a higher proportion of D and E manoeuvres than capitated or salaried physicians and physicians in solo practice. There were no between-group differences in the performance of C manoeuvres.

## Discussion

Our results indicate that the physicians who participated in this study are not providing preventive care that is consistent with the recommendations of the Canadian

**Table 4: Correlates of physician performance in bivariate analyses**

Predictor variable	<i>n</i>	Performance score*	Difference	<i>p</i> value
<b>Certified in family medicine</b>				
Yes	41	0.131		
No	19	-0.282	0.412	0.121
<b>Fee-for-service remuneration</b>				
Yes	49	-0.151		
No	11	0.670	0.821	0.009
<b>Decade of graduation</b>				
1970s	33	-0.193		
1980s	27	0.236	0.429	0.084
<b>Type of practice</b>				
Group	44	-0.109		
Solo	16	0.298	0.407	0.146
<b>Average time spent with SP, † min</b>				
≤ 15	18	-0.327		
> 15	42	0.140	0.468	0.082
<b>McMaster University graduate</b>				
Yes	19	0.141		
No	41	-0.065	0.206	0.441
<b>Any SP detected or suspected‡</b>				
Yes	27	0.250		
No	32	-0.227	0.478	0.056

\*Standard score for A and B manoeuvres minus standard score for D and E manoeuvres.

†SP = standardized patient.

‡One physician who saw all 4 SPs did not return the SP detection questionnaire.

**Table 5: Correlates of physician performance in multivariate regression analysis**

Predictor variable	$\beta$	<i>t</i>	<i>p</i> value
Certification	0.204	1.73	0.090
Fee-for-service remuneration (v. capitation/salary)	-0.679	-2.58	0.013
Female (v. male)	0.101	0.772	0.444
Graduated in 1980s (v. 1970s)	0.246	1.94	0.058
Group practice (v. solo practice)	-0.792	-2.47	0.017
Time spent with SP	0.111	0.876	0.385
McMaster University (v. other medical school)	-0.082	-0.643	0.523
SP detected or suspected	0.190	1.58	0.120
Group practice $\times$ fee-for-service remuneration	0.602	1.59	0.119

Adjusted  $R^2 = 0.26$ .

Significance of overall  $F = 0.0034$ .

Task Force on the Periodic Health Examination. On average, they provided 41% of recommended manoeuvres for which, according to the task force, there is good or fair evidence for inclusion in a periodic health examination and 17% of manoeuvres for which there is good or fair evidence for exclusion from a periodic health examination. Often physicians who performed a high proportion of A and B manoeuvres seemed to do so mainly by being thorough in their approach. Selectively offering A and B manoeuvres to the exclusion of D and E manoeuvres was rare.

Our results may have been affected by selection bias because only half of the eligible physicians responded to our mailed survey, and, of the subset of survey respondents eligible and approached for the study, only half participated. We suspect that those who responded to the survey and those who consented to participate in the study are more likely to be committed to the provision of preventive care than nonrespondents and refusers. Were this the case, our results would overstate the preventive care performance of family physicians practising in the study area.

On the other hand, some physicians participating in the study may have planned to deliver recommended preventive care opportunistically during the course of subsequent visits for other reasons, in keeping with the preventive care strategy recommended by the Canadian Task Force on the Periodic Health Examination. In that case, our approach to assessing performance will have underestimated preventive care performance over the longer term.

Our use of standardized patients to assess performance precluded the assessment of preventive care provided by physicians with closed practices.

Provision of preventive care was negatively correlated with fee-for-service remuneration (v. capitation or salary payment) and group (v. solo) practice. However, the magnitude of differences in performance between fee-for-service and capitated or salaried physicians and between physicians in group versus solo practice was moderate, and the variability in performance among physicians within subgroups was substantial. Physician performance

was not related to certification in family medicine, sex, recency of graduation or medical school. Although suspicion or detection of standardized patients was associated with better preventive care performance, the relation was not statistically significant.

Given the cross-sectional nature of our study, we have no way of knowing whether solo practice and payment methods other than fee-for-service facilitate the provision of appropriate preventive care. An alternative explanation of our findings is that physicians committed to the selective provision of effective preventive interventions are attracted to solo practice and alternatives to fee-for-service payment.

For almost 2 decades the Canadian Task Force on the Periodic Health Examination has devoted much time, energy and resources to the development of evidence-based practice guidelines for clinical prevention. These efforts have received worldwide recognition. However, our results indicate that the task force's guidelines have been incompletely integrated into clinical practice. We therefore suggest that resources be invested in the identification and reduction of barriers to the provision of preventive care<sup>26</sup> and the development and application of effective processes for creating, disseminating and implementing clinical practice guidelines.<sup>30</sup>

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**Table 6: Proportion of preventive manoeuvres performed by type of remuneration and type of practice**

Predictor variable	Grade of manoeuvre; mean proportion (and SD)		
	A and B	C	D and E
<b>Type of remuneration</b>			
Fee-for-service (n = 49)	0.39 (0.12)	0.21 (0.12)	0.18 (0.13)
Capitation/salary (n = 11)	0.47 (0.10)	0.21 (0.12)	0.15 (0.10)
<b>Type of practice</b>			
Group (n = 44)	0.40 (0.13)	0.21 (0.12)	0.18 (0.13)
Solo (n = 16)	0.42 (0.09)	0.22 (0.11)	0.15 (0.11)





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#### Appendix 1: Recommendations of the Canadian Task Force on the Periodic Health Examination<sup>16</sup> for 4 patient scenarios

48-year-old man	70-year-old man	28-year-old woman	52-year-old woman
<b>Grade A and B manoeuvres</b>	<b>Grade A and B manoeuvres</b>	<b>Grade A and B manoeuvres</b>	<b>Grade A and B manoeuvres</b>
Tetanus vaccination (A)	Tetanus vaccination (A)	Tetanus vaccination (A)	Tetanus vaccination (A)
Blood pressure measurement (A)	Obtain history of tobacco use (A)	Blood pressure measurement (A)	Blood pressure measurement (A)
Smoking cessation counselling (A)	Clinical hearing examination (B)	Obtain history of tobacco use (A)	Clinical breast examination (A)
Nicotine replacement therapy (A)*	Blood pressure measurement (B)	Clinical hearing examination (B)	Mammography (A)
Obtain history of tobacco use (A)	Visual acuity testing (B)†	Cervical cytology (B)	Obtain history of tobacco use (A)
Obtain history of exposure to excessive noise (B)	Influenza vaccination (B)	Determination of rubella antibody titre (B)*	Clinical hearing examination (B)
Obtain history of alcohol use (B)	Obtain history of exposure to excessive noise (B)	Obtain history of exposure to excessive noise (B)	Cervical cytology (B)
Exposure to sun/counselling re: cover-up (B)†	Obtain history of alcohol use (B)	Obtain history of alcohol use (B)	Estrogen replacement therapy (B)*
Counselling re: seat-belt use (B)†	Exposure to sun/counselling re: cover-up (B)†	Obtain history of alcohol use (B)	Obtain history of exposure to excessive noise (B)
Counselling re: use of smoke detector in home (B)*	Counselling re: seat-belt use (B)†	Exposure to sun/counselling re: cover-up (B)†	Obtain history of alcohol use (B)
Diet/nutrition counselling (B)	Counselling re: use of smoke detector in home (B)*	Counselling re: seat-belt use (B)†	Exposure to sun/counselling re: cover-up (B)†
Counselling re: exercise/physical activity (B)*	Diet/nutrition counselling (B)†	Counselling re: use of smoke detector in home (B)*	Counselling re: seat-belt use (B)†
<b>Grade C manoeuvres</b>	Counselling re: exercise/physical activity (B)*	Diet/nutrition counselling (B)†	Counselling re: use of smoke detector in home (B)*
Counselling re: sexual behaviour	<b>Grade C manoeuvres</b>	Counselling re: exercise/physical activity (B)*	Diet/nutrition counselling (B)†
Mouth examination	Sigmoidoscopy	<b>Grade C manoeuvres</b>	Counselling re: exercise/physical activity (B)†
Low-dose acetylsalicylic acid therapy	Digital rectal examination	Counselling re: sexual behaviour	<b>Grade C manoeuvres</b>
Serum cholesterol testing	Vaccination against pneumococci	Serum cholesterol testing	Counselling re: sexual behaviour
Testing stool for occult blood	Counselling re: sexual behaviour	Complete skin examination‡	Serum cholesterol testing
Sigmoidoscopy	Serum cholesterol testing	Counselling re: bicycle helmet use*	Complete skin examination‡
Testicular examination	Complete skin examination‡	Testing stool for occult blood	Sigmoidoscopy
<b>Grade D and E manoeuvres</b>	Testing stool for occult blood	<b>Grade D and E manoeuvres</b>	Testing stool for occult blood
Serum glucose testing (D)	Counselling re: drinking and driving*	Chest roentgenography (D)	Testing for thyroid-stimulating hormone
Urinalysis (D)	<b>Grade D and E manoeuvres</b>	Serum glucose testing (D)	Thyroid palpation
Chest roentgenography (D)	Serum glucose testing (D)	Urinalysis (D)	<b>Grade D and E manoeuvres</b>
Sputum cytology (E)	Urinalysis (D)	Sputum cytology (E)	Serum glucose testing (D)
Tuberculin testing (E)	Chest roentgenography (D)		Urinalysis (D)
	Testing for prostate-specific antigen (D)		Chest roentgenography (D)
	Sputum cytology		Bone density testing (D)
			Bimanual pelvic examination for ovarian cancer (D)*
			Sputum cytology (E)

\*New in 1994.

†Upgraded from C or D in 1994.

‡Upgraded from D in 1994.