

# Recording blood pressure readings in elderly patients' charts

*What patient and physician characteristics make it more likely?*

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## ABSTRACT

**OBJECTIVE** To identify patient and physician characteristics associated with family physicians recording blood pressure (BP) measurements in the medical charts of their elderly patients.

**DESIGN** Retrospective review of patients' charts during a 12-month period and baseline questionnaire on the sociodemographic and practice characteristics of family physicians participating in the Community Hypertension Assessment Trial. The chart review collected data on patients' demographics, cardiovascular risk factors, antihypertensive medications, number of visits to family physicians, and number of BP readings recorded.

**SETTING** Non-academic family practices in Hamilton and Ottawa, Ont.

**PARTICIPANTS** Data were abstracted from the charts of 55 randomly selected regular elderly patients (65 years old and older) from each of 28 participating family practices (N=1540 charts).

**MAIN OUTCOME MEASURE** Number of recordings of BP measurements in medical charts during a 12-month period.

**RESULTS** About 16% (241/1540) of elderly patients had not had their BP recorded in their charts during the 12-month review period. Among this 16%, almost half (47%, 114/241) had not had a BP measurement recorded during the previous 24 months. Multivariate analysis indicated that the likelihood of BP recording increased with the number of visits made to family physicians and was greater among patients taking antihypertensive medications or diagnosed with hypertension. Physicians who had more recently graduated from medical school ( $\leq 24$  years) were more likely to record BP measurements.

**CONCLUSION** Hypertension guidelines recommend that, for patients at risk, BP be measured and recorded at each office visit. Although more than 84% of older patients had at least 1 BP reading documented in their charts, patients who were already diagnosed with hypertension or who made frequent visits to the office were more likely to have their BP measured and recorded. A more systematic approach to monitoring elderly patients who visit their family physicians less frequently or who are not currently diagnosed with hypertension is needed.

## EDITOR'S KEY POINTS

- The residual lifetime risk for hypertension in a person older than 55 is more than 90%. The cornerstone of appropriate diagnosis and treatment of hypertension is accurate blood pressure measurement.
- In this retrospective chart review, 7.4% of elderly patients studied had not had a blood pressure measurement recorded during the previous 24 months and 16% had not had a measurement recorded during the previous year.
- Physicians who are not measuring or recording the blood pressure of their elderly patients are missing opportunities to identify hypertension, begin treatment, and reduce the risk of cardiovascular complications in these patients.

\*Full text is available in English at [www.cfp.ca](http://www.cfp.ca).

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# Inscription des valeurs de tension artérielle dans le dossier des patients âgés

## Caractéristiques des médecins et des patients favorisant cette pratique

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### RÉSUMÉ

**OBJECTIF** Déterminer les caractéristiques des patients et des médecins qui favorisent l'inscription des valeurs de tension artérielle (TA) des patients âgés.

**TYPE D'ÉTUDE** Étude rétrospective de dossiers de patients durant une période de 12 mois et questionnaire sur les caractéristiques sociodémographiques et professionnelles de base des médecins de famille participant au *Community Hypertension Assessment Trial*. L'étude relevait les données sur les caractéristiques des patients, les facteurs de risque cardiovasculaire, la médication anti-hypertensive, le nombre de visites à des médecins de famille et le nombre d'inscriptions de la TA.

**CONTEXTE** Cliniques de médecine familiale non universitaires d'Hamilton et d'Ottawa.

**PARTICIPANTS** Les données ont été tirées des dossiers choisis au hasard de 55 patients réguliers d'au moins 65 ans dans chacune des cliniques de médecine familiale participantes (N = 1540 dossiers).

**PRINCIPAUX PARAMÈTRES À L'ÉTUDE** Nombre d'inscriptions de la TA dans les dossier sur une période de 12 mois.

**RÉSULTATS** Environ 16% des patients âgés (241/1540) n'avaient eu aucune inscription de la TA dans leur dossier pendant les 12 mois d'observation. De ce groupe, environ la moitié (47%, 114/241) n'en avait pas eu dans les 24 mois précédents. L'analyse multifactorielle révéla que la probabilité d'une inscription de la TA augmentait avec le nombre de visites chez un médecin de famille et qu'elle était plus grande pour les patients recevant des anti-hypertenseurs ou ayant un diagnostic d'hypertension. Les médecins plus récemment diplômés ( $\leq 24$  ans) étaient plus susceptibles d'enregistrer les valeurs de TA.

**CONCLUSION** Les directives cliniques sur l'hypertension recommandent de mesurer et d'enregistrer la TA à chaque visite pour les patients à risque. Même si plus de 84% des patients âgés avaient au moins une valeur de TA inscrite au dossier, ceux qui avaient déjà un diagnostic d'hypertension ou qui voyaient leur médecin de famille plus souvent étaient plus susceptibles d'avoir une mesure et un enregistrement de leur TA. Il est nécessaire d'adopter une façon plus systématique de surveiller la TA des patients âgés qui consultent moins fréquemment leur médecin de famille ou qui n'ont pas encore de diagnostic d'hypertension.

### POINTS DE REPÈRE DU RÉDACTEUR

- Chez les plus de 55 ans, le risque d'hypertension pour les années qui restent à vivre est supérieur à 90%. La pierre angulaire du diagnostic et du traitement appropriés de l'hypertension est la mesure précise de la tension artérielle.
- Dans cette étude rétrospective sur dossiers, 7,4% des patients âgés n'avaient pas eu d'inscription de la tension artérielle au cours des 24 mois précédents et 10% n'en avaient pas eu dans l'année précédente.
- Le médecin qui ne mesure pas la tension artérielle d'un patient âgé manque l'occasion de découvrir une hypertension, d'amorcer un traitement et de réduire ainsi le risque de complications cardiovasculaires chez son patiente.

\*Le texte intégral est accessible en anglais à [www.cfp.ca](http://www.cfp.ca).

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**H**igh blood pressure (BP) is a well established and modifiable risk factor for cardiovascular disease.<sup>1</sup> Deaths from ischemic heart disease and stroke increase as BP levels increase.<sup>2</sup> Canadian Hypertension Education Program guidelines recommend using lifestyle and pharmacologic therapies to reduce BP to target values,<sup>3</sup> as clinically significant reductions in BP can be achieved through a combination of these therapies.<sup>4</sup>

The cardiovascular health of Canada's aging population is clearly a public health issue.<sup>5</sup> High BP affects about 22% of all Canadians<sup>6</sup> and more than 50% of people 60 years old and older.<sup>2,6,7</sup> The residual lifetime risk of developing hypertension for people 55 and older is 90%.<sup>8</sup>

In a national study, 42% of adults with high BP were unaware of their high BP, 19% were aware but were not receiving medical treatment, and 23% were receiving treatment but their BP was inadequately controlled. Hence, only 16% of those with high BP had it treated and controlled.<sup>7,9</sup> The cornerstone of appropriate diagnosis and treatment of BP is accurate BP measurement. Current guidelines recommend that family physicians take at least 2 BP readings at each patient visit and note the averaged result, both verbally to patients and in writing in patients' charts.<sup>2,3,10,11</sup> In this study, we examined whether any physician and patient characteristics were associated with family physicians recording BP measurements in the medical charts of their elderly patients. We wanted to identify which patients were at highest risk of not having their BP assessed and recorded regularly.

## METHODS

### Selection of practices

Lists of family physicians in the Ottawa (n=592) and Hamilton (n=335) regions of Ontario were generated, and 242 family physicians (200 from Ottawa and 42 from Hamilton) were randomly selected and invited to come for an assessment of their eligibility for participation in

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the Community Hypertension Assessment Trial (CHAT).<sup>12</sup> The CHAT was a paired cluster randomized controlled trial evaluating the effectiveness of an invitational cardiovascular health promotion program held in local pharmacies and staffed by specially trained peer health educators. The program emphasized BP control and management. Of the physicians selected for assessment, 25% (60/242) met the initial eligibility criteria. Eligible physicians were those who had non-academic, full-time, regular family practices in terms of patient population and case mix and who were able to generate a roster of regular patients aged 65 and older. Only 1 physician per group practice was eligible to participate in the study. In total, 47% (28/60) of eligible family physicians agreed to participate. The primary reasons for not participating were being too busy and having no interest in the project.

### Selection of patients

In the 28 participating practices, patients who were community-dwelling, 65 years old and older, and regular patients of the family physician and who had visited the office at least once during the previous 12 months were eligible. The health records of 55 eligible patients from each practice were randomly selected for review using random number generator software.

### Data collection and quality assurance

From May 2003 to January 2004, 7 trained abstractors (4 in Ottawa and 3 in Hamilton) reviewed the records using a pretested standardized clinical data extraction form. To train the abstractors, 59 health records from practices not participating in the CHAT were reviewed by at least 2 abstractors. During this training exercise, interobserver reliability was very good ( $\kappa$  scores ranged from 0.66 to 1.00, with an average of 0.88) for all variables except smoking status and family history of cardiovascular disease ( $\kappa$  scores of 0.47 and 0.55, respectively).

Patients were considered to be diagnosed with hypertension if any of the following notations was found in their health records: diagnosis of "hypertension," or "high blood pressure," or "high BP" in the context of a diagnosis rather than based on 1 elevated reading or ambiguous notations such as "query," "probable" or "probably," and "monitor."

Patients' demographic characteristics, cardiovascular risk factors, current antihypertensive medication profiles, number of visits to family physicians during the 12-month review period, and number of BP recordings were obtained from the health records. If no BP was recorded during the 12-month review period, the date of last BP measurement was noted as far back as 24 months before the date of the review. All participating physicians completed a baseline questionnaire on their sociodemographic and practice characteristics.

The study was reviewed and approved by the research ethics boards of the SCO Health Service and Hamilton

Health Sciences and the Faculty of Health Sciences at McMaster University in Hamilton.

Data analysis

Blood pressure recording was defined as a reading at an office visit recorded in patients' charts during the previous 12 months. The associations between physician characteristics (sex, years since graduation from medical school, practice type, and method of payment) and BP recording were examined using univariate logistic regression analysis. Years since graduation from medical school were calculated by subtracting age at graduation from age at audit; the median number of years since graduation, 24, was used to dichotomize the variable. Three types of family practices were identified: solo, group sharing office space only, and group sharing a patient roster. Two types of payment methods were identified: fee-for-service and capitation, which included payment through health service organizations and primary care networks.

The associations between patient characteristics (age, sex, smoking status, family history of cardiovascular disease, diagnosis of hypertension or taking antihypertensive medication, diabetes, heart disease including peripheral vascular disease and aortic aneurysm, stroke or transient ischemic attack, retinopathy, nephropathy, number of visits to a family physician during the past 12 months) and BP recording were examined using univariate logistic regression analysis. To avoid multicollinearity, a composite variable including patients with diagnosed hypertension or patients taking antihypertensive medications was created. A composite variable including heart disease, peripheral vascular disease, and aortic aneurysm was also constructed.

Patient and physician characteristics significant at  $P < .1$  in univariate logistic regression analysis were retained for a full multivariate logistic regression model

to examine their association with BP recording. A reduced multivariate model included only those variables that were statistically significant at  $P < .05$  in the full multivariate model. Odds ratios (OR), 95% confidence intervals (CI), and 2-tailed  $P$  values were calculated for each variable in the univariate and multivariate logistic regression models. Analyses were conducted using SAS 9.1.3. All univariate and multivariate analyses accounted for clustering of patients within practices using the PROC GENMOD program.

RESULTS

Blood pressure was recorded in 84% (1298/1540) of the health records reviewed. Mean age of patients was 74.3 years, and 43% (658/1540) were male. About 50% of patients (776/1540) had been diagnosed with hypertension, and 86% of these (669/776) were taking at least 1 antihypertensive medication. Associated health conditions were also recorded: 25% (386/1540) of patients had heart disease, 17% (258/1540) had diabetes, and 7% (101/1540) had experienced strokes or transient ischemic attacks.

Mean age of physicians was 52.3 years, and their mean number of years since graduation from medical school was 25.8. About 54% of physicians were practising under fee-for-service and 46% under capitation payment schemes (29% in primary care networks and 18% in health service organizations). In univariate analyses, BP recording was less likely among physicians working in group practices sharing patient rosters than among physicians in solo practice ( $P = .007$ ), but there was no difference between group practices sharing office space and solo practices ( $P = .78$ ) (Table 1). Years since graduation from medical school was also significant at

Table 1. Physician characteristics correlating with blood pressure measurement and recording

| PHYSICIAN CHARACTERISTICS (N)<br>N = 28     | % OF PATIENTS WITH BLOOD<br>PRESSURE RECORDED (N) | ODDS RATIO (95% CONFIDENCE<br>INTERVAL) | P VALUE |
|---|---|---|---------|
| Sex   |   |   |         |
| • Male (20)                                 | 84 (924 of 1099)                                  | 0.9 (0.6-1.6)                           | .8      |
| • Female (8)                                | 85 (374 of 440)                                   |   |         |
| Years since graduation from medical school* |   |   |         |
| • >24 (14)                                  | 81 (624 of 769)                                   | 0.6 (0.4-1.0)                           | .05     |
| • ≤24 (14)                                  | 88 (674 of 770)                                   |   |         |
| Type of practice                            |   |   |         |
| • Group, shared office space only (12)      | 86 (566 of 660)                                   | 0.9 (0.5-1.7)                           | .8      |
| • Group, shared patient roster (5)          | 76 (208 of 275)                                   | 0.5 (0.3-0.8)                           | .007    |
| • Solo (11)                                 | 87 (524 of 604)                                   |   |         |
| Type of remuneration                        |   |   |         |
| • Capitation† (13)                          | 79 (567 of 714)                                   | 0.5 (0.3-0.8)                           | .002    |
| • Fee-for-service (15)                      | 89 (731 of 825)                                   |   |         |

\*Median 24.0 (mean 25.8, standard error [SE] 1.4); years since graduation were calculated by subtracting age at graduation (mean 26.5, SE 0.4) from age at audit (mean 52.3, SE 1.2); median years since graduation (24.0) was used to dichotomize the variable.

†Capitation includes health service organization and primary care network remuneration.

$P = .05$  (**Table 1**); physicians with fewer than 25 years since graduation were more likely to record BP.

The 84% of patients (1298/1540) who had at least 1 BP recording noted had visited their family physicians 1 to 37 times (mean 6.3, standard deviation 4.3) during the 12-month review period. Among the 16% of patients (241/1540) with no BP recorded during the review period, 47% (114/241) had had no BP measurement recorded during the 24 months before the chart review either.

Patients diagnosed with hypertension or taking antihypertensive medications (93%, 908/975) were

more likely to have had their BP recorded during the 12-month period than patients not diagnosed with hypertension or not taking antihypertensive medications (69%, 386/558) (**Table 2**). Patients diagnosed with diabetes (92%, 238/258) were more likely than non-diabetic patients (83%, 1056/1276) to have had their BP recorded, as were patients diagnosed with heart disease (90%, 386/428) compared with those without heart disease (82%, 905/1104). Patients with a history of stroke or transient ischemic attack were somewhat more likely to have had their BP recorded (91%,

**Table 2. Patient characteristics correlating with having blood pressure measured and recorded: P values were calculated from logistic regression analyses accounting for clustering within practices.**

| PATIENT CHARACTERISTICS   | % OF PATIENTS WITH BLOOD PRESSURE RECORDED | ODDS RATIO (95% CONFIDENCE INTERVAL) | P VALUE |
|---|--|--------------------------------------|---------|
| Age* (y)  |  |                                      |         |
| • $\geq 75$   | 85 (577 of 680)                            | 1.1 (0.8-1.4)                        | .8      |
| • 65-74   | 84 (721 of 859)                            |                                      |         |
| Sex   |  |                                      |         |
| • Male  | 84 (555 of 658)                            | 1.0 (0.7-1.4)                        | >.99    |
| • Female  | 84 (743 of 881)                            |                                      |         |
| Smoking status  |  |                                      |         |
| • Currently smoking   | 77 (95 of 123)                             | 0.5 (0.3-0.7)                        | .06     |
| • Not currently smoking   | 87 (939 of 1076)                           |                                      |         |
| Family history of cardiovascular disease  |  |                                      |         |
| • Yes   | 88 (446 of 509)                            | 1.3 (0.8-2.1)                        | .4      |
| • No  | 85 (298 of 352)                            |                                      |         |
| Diagnosed hypertension or taking antihypertensive medications <sup>†</sup>      |  |                                      |         |
| • Yes   | 93 (908 of 975)                            | 6.4 (4.5-8.1)                        | <.001   |
| • No  | 69 (386 of 558)                            |                                      |         |
| Heart disease <sup>‡</sup>  |  |                                      |         |
| • Yes   | 90 (386 of 428)                            | 2.0 (1.4-3.0)                        | .03     |
| • No  | 82 (905 of 1104)                           |                                      |         |
| Stroke or transient ischemic attack   |  |                                      |         |
| • Yes   | 91 (92 of 101)                             | 2.0 (0.9-4.2)                        | .07     |
| • No  | 84 (1200 of 1432)                          |                                      |         |
| Diabetes  |  |                                      |         |
| • Yes   | 92 (238 of 258)                            | 2.5 (1.4-4.3)                        | .04     |
| • No  | 83 (1056 of 1276)                          |                                      |         |
| Nephropathy   |  |                                      |         |
| • Yes   | 90 (45 of 50)                              | 1.7 (0.8-3.6)                        | .8      |
| • No  | 84 (1245 of 1481)                          |                                      |         |
| Retinopathy   |  |                                      |         |
| • Yes   | 100 (10 of 10)                             | Could not be calculated <sup>§</sup> | .5      |
| • No  | 84 (1282 of 1523)                          |                                      |         |
| No. of visits to family physician during 12 months for any reason <sup>  </sup> |  |                                      |         |
| • >5  | 95 (615 of 650)                            | 5.6 (3.6-8.7)                        | <.001   |
| • 2-5   | 82 (628 of 766)                            | 2.2 (1.3-3.7)                        | <.001   |
| • 1   | 45 (54 of 121)                             |                                      |         |

\*Mean age 74.3 y, standard error 0.2.

<sup>†</sup>Documented prescription for antihypertensive medication recorded during 12-month audit period.

<sup>‡</sup>Heart disease also included peripheral vascular disease and aortic aneurysm.

<sup>§</sup>One cell had 0 observations, so no odds ratio could be calculated.

<sup>||</sup>Mean no. of visits 5.9, standard error 0.1.

92/101) than those who had not (84%, 1200/1432). The likelihood of any patient having a BP measurement recorded by a family physician increased with the number of office visits. Only 5% of patients (35/650) who visited their physicians more than 5 times had had no BP recorded. Current smokers were less likely to have had their BP recorded during the 12-month period than those who were not currently smoking (23%, 28/123 vs 13%, 137/1076). For all other recorded patient characteristics, age, sex, family history of cardiovascular disease, retinopathy, and nephropathy, there were no significant differences in BP recording.

In the reduced multivariate model (Table 3), the odds of having had BP recorded increased significantly if a patient had made 2 to 5 visits to a physician during the 12-month review period compared with 1 visit (OR 5.1, 95% CI 3.4 to 7.7) or more than 5 visits compared with 1 visit (OR 13.5, 95% CI 8.0 to 22.8). Being diagnosed with hypertension or taking antihypertensive medication increased the likelihood of having had BP recorded (OR 4.6, 95% CI 3.3 to 6.3). The only physician characteristic significantly associated with BP recording was having graduated from medical school 24 or fewer

years ago compared with more than 24 years ago (OR 0.6, 95% CI 0.4 to 1.0).

A sensitivity analysis comparing the full multivariate model with a model that also included patients' age and sex did not substantially change estimates. A sensitivity analysis comparing the full multivariate model (n=1494) with a model that excluded smoking status (n=1161) was also conducted owing to the large amount of missing data on smoking status (22%). The model excluding smoking status did not substantially change estimates of the effects of other variables.

## DISCUSSION

The results of this study should be generalizable to other non-academic, urban practices in Ontario. Mean age of family physicians in Ontario is 47.7 years<sup>13</sup> compared with 53.2 years in this study. About 33% of family physicians in Ontario are female<sup>14</sup> compared with 24% in this study. Also, 50% of patients in this study were hypertensive, which is comparable to what has been reported in other studies of Canadian patients.<sup>7</sup> About 56% of patients were taking antihypertensive medications, which is similar to the proportion (46%) found in a family practice study in the United Kingdom.<sup>15</sup>

### Factors that influence BP recording

Similar to a study of psychiatrists' adherence to guidelines, our study showed that a greater number of years in practice predicted less adherence to guidelines.<sup>16</sup> Many studies of the influence of years in practice on patient management and physicians' adherence to guidelines, however, have had inconsistent findings. Family physicians who have been practising for longer periods of time might be less familiar with current evidence-based health care and guidelines for monitoring BP than their younger counterparts<sup>17</sup> or might simply be less likely to record BP readings.

A randomized controlled trial examining referral for mammography found that solo practitioners were less likely than those working in group practices to refer.<sup>18</sup> This contrasts with our results, which showed that BP recording was less frequent among physicians in group practices sharing patient rosters.

Patients taking antihypertensive medications or with diagnosed hypertension were more likely to have their BP recorded, which might mean that BP control is better among already diagnosed patients.

The results of this study also show that fewer office visits during a 12-month period decreased the likelihood of BP being recorded. These results are similar to those of a survey of 1400 elderly patients in family practices in Canada, where multiple visits increased the likelihood of BP being recorded.<sup>19</sup> The average of 5.9 patient visits made during the review period was similar to that found

**Table 3. Summary of final logistic regression analysis for statistically significant variables associated with recording blood pressure during the previous 12 months after adjusting for patient and physician characteristics\***

| PATIENT AND PHYSICIAN CHARACTERISTICS                                       | ODDS RATIO (95% CONFIDENCE INTERVAL) | P VALUE† |
|---|--------------------------------------|----------|
| Years since graduation from medical school†                                 |                                      |          |
| • >24 (N=14)  | 0.6 (0.4-1.0)                        | .04      |
| • ≤24 (N=14)  |                                      |          |
| Patient diagnosed with hypertension or taking antihypertensive medications‡ |                                      |          |
| • Yes   | 4.6 (3.3-6.3)                        | <.001    |
| • No  |                                      |          |
| No. of visits to family physician during the 12 months for any reason       |                                      |          |
| • 2-5 (vs 1 visit)  | 5.1 (3.4-7.7)                        | <.001    |
| • >5 (vs 1 visit)   | 13.5 (8.0-22.8)                      | <.001    |

\*After a full multivariate model was run (including patient age and sex, hypertension, family physician visits, smoking, heart disease, diabetes, no. of years since graduation, practice type, and payment type), only statistically significant variables (P < .05) were included in this reduced model (no. of years since graduation, hypertension, no. of office visits).

†P values were calculated from logistic regression analyses that accounted for clustering within practices.

‡Median of 24.0 (mean 25.8, standard error [SE] 1.4); years since graduation were calculated by subtracting age at graduation (mean 26.5, SE 0.4) from age at audit (mean 52.3, SE 1.2); median years since graduation (24.0) was used to dichotomize the variable.

§Documentation of prescription for antihypertensive medication during 12-month audit period.

||Mean no. of visits was 5.9, SE 0.1.

in other studies in Canada that show the average number of visits to family physicians' offices in 1 year varies from 4.2 to 5.4 among those 65 years old and older.<sup>19,20</sup>

In a study in the United Kingdom, 80% of patients were found to have at least 1 BP measurement recorded during a 5-year period.<sup>15</sup> This study also found that almost 84% of seniors who visited their family physicians at least once in a 12-month period had had their BP recorded. Blood pressure was not recorded for about 16% of elderly patients, a population at high risk of developing hypertension or having uncontrolled BP. Family physicians not measuring and recording elderly patients' BP levels are missing opportunities to identify elevated BP, begin treatment, and reduce the risk of cardiovascular disease in these patients.

### Interventions

Interventions to improve BP recording and patient management include reminder systems,<sup>21-23</sup> use of medical assistants,<sup>24</sup> community-wide cardiovascular health awareness programs,<sup>12,25</sup> and educational and organizational initiatives.<sup>26,27</sup> Two randomized controlled trials concluded that reminder systems result in improved BP recording.<sup>21,23</sup> In these studies, a combination of letters, telephone calls from nurses to patients, and computerized reminders improved BP recording in family practice. Cost and the need to have a computerized health-record system might be barriers for many established family practices.


Another intervention is use of a team-oriented approach to measuring BP and managing hypertensive patients. A randomized controlled trial of 34 family physicians in Ontario assessed use of medical assistants for screening patients for high BP.<sup>24</sup> This study concluded that the number of BP measurements increased in practices using a team approach. Drawbacks to this protocol include the cost of training assistants and the organizational challenges of having more staff. Some initiatives are under way to establish a more organized approach to chronic disease prevention and management in Canada. For example, primary care reform initiatives, such as the introduction of multidisciplinary teams of physicians, pharmacists, and other health care professionals currently under way in several provinces in Canada, show great promise over traditional approaches to chronic disease management.

Another promising strategy is having community-wide BP programs. The Calgary firefighter program<sup>25</sup> and the Cardiovascular Health Awareness Program<sup>12</sup> are examples of such programs that might improve BP management by providing family physicians and their patients with additional, accurate BP recordings taken outside physicians' offices.

Finally, initiatives to encourage self-management of hypertension are also important in improving BP control. Greater patient involvement in BP control should be fostered; patients should be encouraged to

use websites to record and track BP and develop personal skills to support self-assessment practices. Primary care organizations should do more to promote self-monitoring of BP. Studies on using a combination of these interventions, placing emphasis on their ability to improve BP control and management while maintaining cost effectiveness, are needed.

### Conclusion

Hypertension guidelines recommend that patients at risk should have their BP measured and recorded during each visit to their family physicians' offices. In our study, patients already diagnosed with hypertension or who made many visits to the office were more likely to have had their BP measured. More systematic approaches to monitoring elderly patients who visit their family physicians less frequently or who are not currently diagnosed with hypertension are needed. Initiatives to establish a more organized approach to chronic disease prevention and management should be encouraged. 

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### Contributors

*Dr Chambers and Dr Kaczorowski were responsible for conception and design of this study. Ms Karwalajtys was responsible for acquisition of data. Ms Sullivan, Dr Broomfield, and Dr Schieda were responsible for analysis and interpretation of data. All the authors participated in drafting and revising the manuscript and gave final approval to the text submitted for publication.*

### Competing interests

*None declared*

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