Physical Activity Counseling and Prescription Among Canadian Primary Care Physicians

Robert J. Petrella, MD, PhD; Chastity N. Lattanzio, PhD; Tom J. Overend, PhD

Background: Primary care physicians are ideally positioned to affect a large population at risk for epidemics of sedentary lifestyle; however, it is unclear what type of counseling they provide.

Methods: A questionnaire was used to obtain information on primary care physicians’ behaviors with respect to counseling and prescribing physical activity, physician demographics, and practice characteristics. Registered primary care physicians in Canada were contacted in all 10 provinces and 2 territories.

Results: Of 27,980 primary care physicians, 14,319 returned usable questionnaires and 13,166 were eligible for study participation (response rate, 51.2%). Respondents were predominantly male (61.1%), practiced in private office/clinic settings (73.4%), and had graduated from medical school more than 22 years earlier. Eighty-five percent of respondents reported asking patients about their physical activity levels, whereas only 26.2% assessed patient fitness as part of a physical examination or through a fitness test and only 10.9% referred patients to others for fitness assessment or appraisal. Most physicians (69.8%) reported using verbal counseling to promote physical activity, whereas only 15.8% used written prescriptions for a physical activity promotion program. Male and female physicians responded differently. Men more frequently assessed fitness than did women, whereas women more frequently asked and provided verbal and written directions.

Conclusions: This large sample of Canadian primary care physicians regularly asked patients about physical activity levels and advised them using verbal counseling. Few respondents provided written prescriptions, performed fitness assessments, or referred patients. These results suggest possible opportunities to improve physicians’ counseling and prescription efforts.

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Regular physical activity can reduce the prevalence of chronic diseases, disability, and mortality. Evidence also indicates that tailored written physical activity prescriptions are strongly associated with significant improvements or an attenuated decline (C.N.L., R.J.P., T.J.O., and M. Speechley, PhD, unpublished data, 2002) in physical fitness with age, but this is not consistent. Nearly 80% of the population has at least 1 contact with a primary care physician per year. Hence, primary care physician–patient encounters present a major opportunity to prevent disease and to promote healthy lifestyles using tailored physical activity advice. This is supported by the public perception that primary care physicians are credible and preferred sources of preventive health information, including physical activity counseling.

Despite many studies exploring primary care physician–physical activity outcomes, most evidence supports that activity prescriptions are helpful, but few have included the use of validated tools (perhaps because few are known) that include behavior change and individualized physical activity prescriptions.

Recent studies have suggested that physicians may be providing physical activity counseling more frequently (43%-91% of physicians claiming to regularly counsel) during the past decade compared with previous decades but that many factors, including personal physician characteristics (eg, exercising regularly and age), practice characteristics (eg, spe-
cially and years in practice), and barriers (eg, perceived lack of time and inadequate skills and tools), may be independently associated with the likelihood of physicians counseling and prescribing physical activity for their patients. Furthermore, it is unclear whether the samples of physicians (eg, having large and geographically diverse samples) and the types of surveys conducted (eg, identifying specific physical activity counseling behaviors) could have resulted in a representative indication of true practice behavior. In a Canadian study, the exercise counseling behaviors, confidence, and knowledge of 362 primary care physicians from all regions of Canada were determined before delivery of an evidence-based counseling program; however, few large surveys have been conducted to close the gap regarding evidence and current physical activity practice.

To our knowledge, this is the first national study of primary care physicians in Canada and one of the largest to report physical activity counseling and prescription behaviors of primary care physicians. The primary aim of this study was to determine the distribution of primary care physician counseling activities, from simply asking patients about their activity habits to more formal assessment of physical activity capacity and written activity prescriptions. As a secondary aim we also sought to identify associated factors, such as physician demographics and practice characteristics, that might help explain the reported physical activity counseling behaviors.

**STUDY METHODS**

The College of Family Physicians of Canada (CFPC) conducted the National Family Physician Workforce Survey among 28 340 primary care physicians in all provinces and territories. Primary care physicians in Canada include those who have completed a 2-year postgraduate residency program at 1 of the 16 medical schools and received certification by the CFPC. Primary care physicians also include those who completed at least 1 year of postgraduate residency training before 1994 but are not certified by the CFPC. The primary care physician survey list was generated by IMS Health (Toronto, Ontario, Canada) and included all physicians in Canada holding medical licenses plus their identification of a principal specialty in general or primary care practice. These data are compiled and regularly updated from provincial registrar's lists, medical directories, and direct contact with physicians' offices. Eligible participants included actively practicing male and female primary care physicians; ineligibility included being retired, in full-time research, or in administration. Medical residents and fellows were also excluded.

**DESIGN**

Physicians' mailing addresses and fax information were used to conduct the survey, based on a modified Dillman approach. Briefly, during a 5-month period (February to June 2001) questionnaires (in French and English according to the physician's preference in the IMS Health database) were mailed to all 28 340 primary care physicians. A postcard-style reminder card was mailed to all primary care physicians approximately 2 weeks after the initial mailing to improve response. Two further reminder messages were sent to nonresponders via fax during the final stages of data collection in May and June 2001. Fax reminders were sent to 58% of the nonresponders for whom fax numbers were available. The Centre for Rural and Northern Health Research at Laurentian University, Sudbury, Ontario, Canada, was contracted to manage the survey mailings and to enter and validate the data.

**SURVEY INSTRUMENT**

The National Family Physician Workforce Survey was developed by the CFPC's Janus Project Coordinating Committee through a database working group. The survey consisted of 16 pages bound in booklet fashion and examined many aspects of care, such as physician demographics, practice environments, professional activities, and practice profile. Questions relating to health promotion and disease prevention addressed a variety of preventive health practices (including counseling for smoking cessation, monitoring blood pressure, performing Papanicolau tests, recommending mammography screening, and counseling about regular physical activity). Five questions specifically relating to physical activity counseling were developed by the Physical Activity Health Strategic Coordinating Committee to examine the attitudes, practice profiles, and opportunities for physical activity promotion in family practice. This committee was funded by Health Canada and was sponsored by the CFPC and included 4 CFPC members and 1 representative each from the Canadian Fitness and Lifestyle Research Institute, Health Canada, and the Canadian Society of Exercise Physiology. Specifically, in the survey, primary care physicians were asked to indicate whether they routinely (1) asked patients about their physical activity levels, (2) assessed patients' fitness themselves, (3) referred patients to other health professionals for fitness assessment, (4) provided verbal counseling to patients, or (5) provided written prescriptions to improve physical activity levels. The nature of the advice, assessment, and verbal or written prescriptions was not determined.

**STATISTICAL ANALYSES**

All analyses were performed using a software package (SPSS Version 11 for Windows; SPSS Inc, Chicago, Illinois). The main outcome variables were the proportions of family physicians asking, assessing, referring, or providing verbal or written prescriptions to improve physical activity habits among their patients. The independent variables included physician demographics (sex and age), practice characteristics (years in practice), setting (private, community, or teaching), group or solo practice, family physician or primary care physician/specialist designation, practice environment (inner city/urban/suburban, small town, or rural/remote), region (province or territory), and perceived availability of medical services. For comparison, respondents were categorized based on age (<34, 35-54, or ≥55 years old) and years in practice (<3, 3-10, 11-14, 15-19, and ≥20 years). Frequency distributions were calculated for the outcome variables, followed by χ² tests (univariate associations) to evaluate potential associations between the independent and main outcome variables. Analysis of variance was used for comparisons among groups (eg, private, community, and teaching settings). When a significant F ratio was observed, Bonferroni post hoc analyses were used to determine significance of differences between group means. A forward stepwise logistic regression model (multivariate analysis) was used to control for multiple variables simultaneously and to evaluate interactions between the independent and dependent variables. The variables in this model included those that had been statistically associated with the outcome variables in the univariate analysis to control for the confounding effect of the other independent variables. Statistical significance was predetermined at P < .05 for all analyses.
### Table 1. Response Rates of 13 166 Survey Respondents

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Sex, %</td>
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<tr>
<td>M</td>
<td>61.1</td>
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<tr>
<td>F</td>
<td>38.2</td>
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<tr>
<td>Practice setting</td>
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<td>Private</td>
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<td>Community</td>
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<tr>
<td>Teaching</td>
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<tr>
<td>Practice community</td>
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<tr>
<td>Small town</td>
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<tr>
<td>Rural/remote</td>
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<td>Prince Edward Island</td>
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<tr>
<td>Northwest Territories</td>
<td>70.3</td>
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</table>

### RESULTS

#### SURVEY RESPONSE

Of the 28 340 primary care physicians identified on the original mailing list, 360 could not be located after multiple follow-up strategies, including telephone contacts listed in the IMS Health database and searching alternate sources, such as the Canadian Medical Directory and the CFPC membership database. Of the 27 980 potential survey respondents, 14 319 replied to the survey (response rate, 51.2%). Some respondents (n=1153) were found to be ineligible for the study (retired, full-time in research or administration, or medical resident); thus, the final sample included responses from 13 166 Canadian primary care physicians.

#### CHARACTERISTICS OF PHYSICIANS

Thirty-eight percent of the respondents were female. Response rates by provincial/territorial regions are given in Table 1. Overall, respondents were middle-aged (mean±SD age, 46.6±10.5 years; age range, 24-87 years), with a mean±SD age of 42.5±8.7 years for women and 48.8±10.7 years for men. Overall, the age and sex of the sample were not different from those of nonrespondents.

#### PREVENTIVE HEALTH PRACTICES

Most primary care physicians provided a high degree of preventive services, such as taking histories of tobacco use (97.9%) and counseling for smoking cessation (90.3%), monitoring blood pressure (96.9%), performing Papanicolaou tests (93.0%), recommending mammography screening to women aged 50 to 69 years (93.9%), and counseling about regular physical activity (87.2%).

#### FREQUENCIES, ASSOCIATIONS, AND DIFFERENCES IN PHYSICAL ACTIVITY COUNSELING VARIABLES

In general, frequencies differed and associated practice characteristics were similar among the counseling variables. Most primary care physicians (85.2%) reported asking patients about their physical activity level. Six factors (sex, age, years in practice, practice setting, practice community, and availability of services) were associated with primary care physicians asking about their physical activity level (Table 2). Prince Edward Island (93.4%) had the greatest proportion of physicians who reported asking patients about their physical activity levels, whereas Quebec (78.9%) had the lowest proportion.

One-quarter of the primary care physicians (26.2%) reported assessing patient fitness as part of a physical examination or through a fitness test, with 7 factors showing association with the frequency of assessing fitness. Saskatchewan (31.9%) had the greatest proportion of physicians assessing patients’ fitness levels themselves, whereas Quebec (17.7%) again had the lowest proportion. Few physicians (10.9%) reported referring patients to others for fitness assessment, with 6 factors showing association with referral. Saskatchewan and Prince Edward Island had the greatest proportion of physicians referring patients to others for fitness assessment (15.3%), whereas Ontario (9.5%) and Yukon/Northwest Territories (5.1%) had the lowest proportions.

Most primary care physicians (69.8%) reported providing patients verbal counseling for physical activity programs. Five factors were associated with the provision of verbal counseling. British Columbia (78.4%) had the greatest proportion of physicians counseling patients about physical activity programs using verbal skills, whereas Quebec (63.0%) had the lowest proportion.

Only 15.8% of the primary care physicians reported providing their patients with written prescriptions for physical activity programs. Seven factors were associated with primary care physicians providing written prescriptions. Saskatchewan (20.4%) had the greatest proportion of physicians prescribing physical activity programs to patients, whereas Prince Edward Island (8.8%) had the lowest proportion.

#### PREDICTORS OF PHYSICAL ACTIVITY BEHAVIORS

The variables that were significantly associated with asking, assessing, referring, counseling, and prescribing physical activity in Table 2 were included in the logistic regression models in Table 3. Primary care physicians were more likely to report asking about physical activity levels if they were female, older than 35 years, in practice less than 6 years, in private clinics, and in inner-city/urban/suburban communities. Primary care physicians were more likely to assess patient fitness if they were male, older than 55 years, in private clinics, in solo practice, and in inner-
Given the evidence supporting the importance of written prescriptions for a physical activity program, P values are Pearson \( \chi^2 \).
In the 1980s, Valente et al \(^{14}\) reported that only half of the primary care physicians in Maryland (n=494) indicated that they always or regularly gathered information from their patients about physical activity was high (85.2%). This is in agreement with trends observed in the literature during the past 20 years, most from the United States. Although direct comparisons with previous studies are difficult given the differences in design and queries made, it is helpful to draw on key findings between studies in the context of gaining a better understanding of barriers and opportunities in primary care and physical activity.

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The primary care practice setting and suggest feasibility tests (including a stepping test) have been validated in primary care practice settings; however, several predictive characteristics should be considered when engaging key peer groups for community-wide primary care practice initiatives. It is encouraging that physicians' involvement in physical activity promotion assessed by the extent to which they reported asking their patients about physical activity increased between 1987 and 1991 (from 46%–56% to 83%–96%),\(^2\) whereas a greater proportion (85%) of primary care physicians from San Francisco, California (n=33), reported regularly asking their patients about exercise habits.\(^2\) Hence, although it seems that gathering physical activity information in the primary care practice setting has shown a positive trend, this has not paralleled the concomitant trends of obesity, sedentary lifestyle, and chronic lifestyle-related medical conditions, including type 2 diabetes mellitus. Furthermore, simply asking about patient activity levels as opposed to prescribing physical activity may not be enough to support improved physical activity in the population at risk.

Few primary care physicians in this survey provided written prescriptions. Although we did not explore what specific information was prescribed or whether this included referral to other professionals trained in exercise prescription or addressed behavior change, it is clear that primary care physicians may require further tools and training in physical activity prescription (in addition to time and reimbursement to do so) to effect needed health change and to engage more into using this form of counseling.

Just more than one-quarter of respondents reported determining patient fitness through a fitness test assessment. Certainly direct measurement of fitness (maximum oxygen consumption) is not feasible in most primary care practice settings; however, several predictive tests (including a stepping test) have been validated in the primary care practice setting and suggest feasibility and validity,\(^3\) and can be used as part of an effective prescription to improve fitness in primary care practice pa-
comes. Similar to a smaller Canadian study, we found that 69.8% of primary care physicians reported providing verbal counseling. Orleans et al22 reported that only 13% had staff members who routinely developed exercise prescriptions for their patients, including primarily physical therapists (68%), primary care physician colleagues (20%), or exercise physiologists or nurses (<10%). Although we also observed few referrals to exercise specialists, this was not related to physician perception of a lack of medical resources in their community. Hence, an area for further investigation is to determine barriers to engaging allied health professionals with skills in physical activity prescription by primary care physicians in the communities they serve.

Using verbal or written physical activity prescriptions has been associated with improved fitness outcomes. Similar to a smaller Canadian study,22 we found that 69.8% of primary care physicians reported providing verbal counseling. Orleans et al22 found that almost 75% of American physicians reported giving exercise advice regularly, and Williford et al18 similarly reported that most physicians in their study (91%) encouraged their patients to participate in regular exercise. Conversely, Sherman and Hershman19 reported that only 33% of physicians counseled more than 75% of their patients about exercise, and Walsh et al17 reported that only 43% of physicians counseled more than half of their patients about exercise. A common shortcoming of the present and previous studies has been the lack of detail regarding what verbal advice was given.

Several studies7,22 have reported that an important barrier to improving physical activity habits among patients is the lack of tailored, validated counseling skills and tools. In particular, it has been reported that more physicians use verbal counseling than written prescription of exercise, perhaps because it is perceived as more time and resource efficient.4,7 Bull et al3 reported that physicians were more confident in providing general advice (ie, mentioned to a patient the need to exercise more) than specific advice (ie, how much, what type, and how often) to increase their level of exercise and support their behavior change. Furthermore, although the inclusion of behavior change counseling in primary care has been described,18 it has not shown consistent impact on physical fitness or has relied on a high level of external resources.26 Less than 16% of primary care physicians reported that they regularly provided written prescriptions when appropriate despite knowledge of the supporting evidence.2,4,6,11,22 Williford et al18 reported that approximately 30% of physicians occasionally developed exercise prescriptions for their patients; however, 70% reported that this was not part of their normal practice. Identified barriers for the low rates of written physical activity prescription by primary care physicians include the lack of time available in a busy practice compared with easier activities, such as offering tests or taking blood pressure.7,12,13,19,22,23 and the inadequate knowledge, skills, and tools needed to write exercise prescriptions.7,18,23 Petrella et al25 previously described the ability of a comprehensive written exercise prescription to overcome perceived and true barriers to physical activity prescription using the principles of fitness assessment, prescription, and behavior change. The importance and impact of the written prescription has been supported further in other studies in New Zealand.6,11 Hence, the importance of the written prescription for physical activity should be a call to action for primary care physicians.

Several factors were positively associated with primary care physicians’ physical activity counseling behavior in practice, including sex, age, years in medical practice, practice setting, practice group, practice community, and availability of medical services in the practice community.

Male primary care physicians more frequently assessed physical fitness than female physicians. However, female physicians more frequently asked and provided verbal counseling or written prescriptions than male physicians. These findings support previous sex differences in practice behavior22 in Canada. In contrast, Bull et al17 found that US male primary care physicians were more confident than their female counterparts in providing patient-specific advice on exercise, whereas Sherman and Hershman19 found that there was no association between reported counseling frequency and sex. Given the growing demographic of female medical professionals, sex differences may offer an important change in future physical activity counseling trends.

We also observed that older primary care physicians asked, assessed, referred, counseled, and prescribed physical activity more frequently than their younger colleagues. Similarly, Reed et al17 found that physicians older than 40 years were more likely to prescribe exercise for their patients, whereas Sherman and Hershman19 and Walsh et al17 also showed that older physicians were more likely to counsel and prescribe exercise than were their younger counterparts. These findings are of special interest because they suggest that the demographic trends toward an older physician cohort in Canada may not necessarily mean a further challenge to low rates of physical activity counseling in primary care practice. This may suggest an opportunity to engage older physicians in the training of their younger colleagues, who receive nominal formal training in residency or undergraduate medicine.23,28 Williford et al18 reported that only 3% of physicians had ever taken a college-level course related to exercise and the development of exercise prescriptions and that 78% believed that there was a definite need in medical school for a course related to the medical aspects of exercise.

In agreement with previous studies,17 primary care physicians in this study who were in practice longer than...
6 years tended to provide more types of physical activity counseling than did more recent graduates. Possible reasons for newly practicing physicians providing less physical activity counseling and prescription may be their lack of time and resources, lack of confidence with prescribing, lack of standard formats for assessing and prescribing, lack of familiarity with their patients compared with their older colleagues, or perception of the need to focus on more active medical issues rather than on prevention.23,28

Primary care physicians who practiced solo or in teaching clinics counseled more than those in community clinics or group settings. Whether this is a reflection of practice demographics or an alternate focus of resources is unknown and requires further investigation. Similarly, practice setting location (inner city vs remote or rural) may be a reflection of access to resources, priorities of care, or even expectations among family physicians and their patients in these settings. Higher rates of lifestyle-related chronic disease are found in more remote locations and should be recognized as a challenge to future training programs.

It is likely that primary care physicians and inner-city/urban/suburban communities could have more resources for physical activity support, which could lead to favorable conditions to engage counseling among these primary care physicians. For example, we observed that primary care physicians in urban/suburban as opposed to rural settings did not report problems with availability of services in their practice community, and consequently they reported more physical activity counseling.

The main strength of this study was the large sample size, representing 13,166 primary care physicians in Canada. Hence, the data are representative and can be generalized to Canadian primary care physicians because health care delivery systems are similar. Furthermore, these findings can also be generalized to other countries with similar provision of health care services and practice settings. However, despite the large sample there were some areas where data may have been sparse. For example, few physicians would have had less than 5 years of practice experience and been older than 55 years. Hence, although statistical significance may have been reported for some associations, these may occasionally have been due to artificially produced gaps in data. The main limitation of this study was the inherent effect of self-reporting, with no means of concurrent validation. Validating physician self-reporting of counseling and prescription behaviors would be extremely time-consuming but could be performed in smaller cohorts through medical record audits, interviews with patients after visits, or the use of administrative databases if coding included preventive health activity, such as physical activity. Note that self-report may, in fact, reflect intention rather than real activity behavior, and it is not clear what is actually being provided. For example, one study20 of physicians’ counseling practices had physicians keep a log of what they did during each session. These authors found that physicians who reported counseling more also reported more frequent counseling on the questionnaire they had filled out later. Similarly, the US National Ambulatory Medical Care Survey28 also reported low rates of healthy lifestyle counseling in patients with cardiovascular risk factors, but whether reported counseling as collected in this administrative database reflects real behavior is not known. Further studies should be designed to measure practice activity rather than perceived or intended behavior. A significant limitation in the present study was the absence of specific information regarding the types of physical activity advice, assessment tests, or the content discussed or prescribed to patients. This information would have been important in the further definition of which attributes could be considered in future physical activity counseling training programs for primary care physicians. Finally, this study observed a response rate of 51%, which was lower than the rates of 54% to 76% seen in other physical activity surveys. However, these other studies used considerably smaller and less representative sample sizes (ie, 63-78 respondents)4,7,17-19,22 and, hence, the generalizability and potential impact of these previous studies compared with the present study should be considered.

In conclusion, these results suggest that Canadian primary care physicians can play a much greater role in physical activity counseling. Despite the high rate of asking patients about physical activity, low rates of physical fitness assessment, referral, or written prescription underscore the need for improved implementation and dissemination of education and training. Future studies of physical activity interventions using primary care physicians should also include standardized, validated, and tailored tools to determine the efficacy of these interventions in terms of fitness change and health outcomes.

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