

Clinical Research

Perceptions of Canadian Primary Care Physicians Towards Cardiovascular Risk Assessment and Lipid Management

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ABSTRACT

Background: Cardiovascular (CV) risk stratification remains the cornerstone of preventive cardiology. This study was performed to gain insight into how Canadian primary care physicians (PCPs) incorporate traditional and emerging risk factors in determining risk.

Methods: Using a tested questionnaire, this cross-sectional survey evaluated the perceptions of 846 PCPs (38% response rate) on CV risk assessment, treatment thresholds, and novel biomarkers of vascular risk.

Results: Most physicians (74%) perform CV risk assessment in eligible patients annually with 69% using the Framingham Risk Score (FRS). Although 89% of the physicians knew that FRS estimates 10-year risk of coronary heart disease death and myocardial infarction, 30% could not characterize FRS thresholds for high risk. Only 44% correctly used a positive family history to double the FRS. Waist circumference was considered by 79% of the physicians as a vital sign but only 6% reported measuring this routinely. Carotid ultrasound was identified by 55% as the preferred imaging technique for screening in

RÉSUMÉ

Introduction : La stratification du risque cardiovasculaire (CV) demeure la pierre angulaire de la cardiologie préventive. Cette étude a été réalisée pour avoir un aperçu de la manière dont les médecins en soins primaires (MSP) du Canada incluent les facteurs de risque traditionnels et émergents dans la détermination du risque.

Méthodes : En utilisant un questionnaire éprouvé, cette enquête transversale évaluait la perception de 846 MSP (taux de réponse de 38 %) sur l'évaluation du risque CV, les seuils de traitement et les nouveaux biomarqueurs du risque vasculaire.

Résultats : La plupart des médecins (74 %) réalisent l'évaluation du risque CV annuellement chez les patients admissibles en utilisant le score de risque Framingham (FRS : Framingham Risk Score) dans 69 % des cas. Même si 89 % des médecins savaient que le FRS estime le risque de mort lié à la maladie coronarienne et à l'infarctus du myocarde à 10 ans, 30 % ne pouvaient déterminer les seuils du FRS à risque élevé. Seulement 44 % utilisaient correctement des antécédents familiaux positifs pour doubler le FRS. La circonférence de la

Cardiovascular (CV) risk stratification remains the cornerstone of preventive cardiology, yet the optimal method of such risk stratification remains controversial. Several risk scores have been validated in North American and European populations. In North America, the Framingham Risk Score (FRS) has been

most widely used in primary care, and represents a well-validated risk-assessment tool.¹ Use of the FRS for risk stratification was endorsed in the 2006 Canadian Cardiovascular Society (CCS) position statement on the diagnosis and treatment of dyslipidemias,² and use of the modified FRS for total CV risk has been endorsed in the 2009 Canadian Lipid Guidelines.³ However, the FRS has also been criticized for underestimating risk in certain populations, including women and certain ethnic groups and overestimating in others such as Europeans. Recently, the Reynolds Risk Score has been proposed which includes the usual Framingham risk factors, yet also incorporates family history and measurement of high sensitivity

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primary prevention. Although 99% had heard of high sensitivity C-reactive protein (hs-CRP), only 49% measured it for the purposes of assessing CV risk and 27% were unsure under what clinical scenarios the test is indicated.

Conclusions: Our survey suggests that FRS is employed by approximately 2/3 of Canadian PCPs for risk stratification. Family history and central obesity are considered important additional CV risk markers. There are substantial knowledge gaps on the appropriate use of family history and hs-CRP in risk stratification, particularly in patients who may not present with hyperlipidemia.

C-reactive protein (hs-CRP) into the algorithm. Other screening guidelines consider noninvasive imaging, with either carotid ultrasound, carotid intimal medial thickening, or coronary calcium score assessment by computed tomography, in the process of risk stratification.⁴ However, many clinicians remain reluctant to incorporate formal risk algorithms into daily practice because they are perceived to be cumbersome and time-consuming. In addition, guidelines themselves have come under debate due to conflict of interest concerns, multiplicity of guidelines, and the high number of level C (consensus) recommendations.⁵

Despite guideline recommendations regarding the use of validated risk scores, it is unclear how primary care physicians (PCPs) actually estimate CV risk in clinical practice, particularly in primary prevention. We therefore conducted a national survey to gain insight into how Canadian PCPs assess the risk for CV disease in primary prevention, as well as to better understand their approaches to managing dyslipidemia in this population.

Methods

A total of 2225 PCPs with a self-expressed clinical interest in cardiometabolic disease were randomly identified across the 10 Canadian provinces through an invitation letter using the online Canadian Medical Directory and through a prescription database. Physicians who were investigators in the Justification for the Use of Statins in Prevention: An Intervention Trial Evaluating Rosuvastatin (JUPITER)⁶ study were excluded on the basis that they might have enhanced knowledge of the role of hs-CRP testing⁷ in clinical practice and thus not be representative of the general physician population. Physicians were invited by mail between October 2008 and May 2009 to complete a 32-question survey aimed at determining their current practice of global CV risk assessment and the subsequent treatment algorithms that they employ in clinical practice. This survey was developed by the authors, and reviewed by a focus group comprised of 5 experienced family physicians from various regions across Canada. Physicians who did not respond to the original invitation to participate in the survey were contacted with 3 additional mailings, and thereafter were deemed to be nonresponders. A small honorarium of \$50 was offered for completion of the survey.

Completed surveys were returned by mail or fax to the Canadian Cardiovascular Research Network where the entries

taille était prise en compte par 79 % des médecins comme un signe vital, mais seulement 6 % rapportaient la mesurer de manière routinière. L'échographie carotidienne était définie par 55 % des MSP comme la technique d'imagerie préférée pour le dépistage en prévention primaire. Même si 99 % connaissaient la protéine C-réactive à haute sensibilité (hsCRP : *high sensitivity C-reactive protein*), seulement 49 % la mesurait aux fins de l'évaluation du risque CV et 27 % étaient incertains de savoir dans quels scénarios cliniques l'analyse était indiquée.

Conclusions : Notre enquête suggère que le FRS est utilisé pour la stratification du risque par approximativement les 2/3 des MSP du Canada. Les antécédents familiaux et l'obésité centrale sont considérés comme des marqueurs additionnels importants de risque CV. Il y a des lacunes considérables en matière de connaissance sur l'utilisation appropriée des antécédents familiaux et de la hsCRP dans la stratification du risque, particulièrement chez les patients qui n'auraient pas d'hyperlipidémie.

were read with Data Fax 3.9 software (Clinical Data Fax Systems Inc, Hamilton, ON), and reviewed for accuracy by trained personnel. The data were analyzed by 2 investigators (H.T. and A.Q.), both of whom were blinded to the identities and regional location of the responding physicians.

Results

Traditional risk assessment

A total of 846 physicians (38% response rate) completed the survey. Responses from all 10 provinces were obtained with a response distribution similar to the provincial physician distribution (Fig. 1). The distribution of nonresponders by province was also similar. Slightly higher response rates were obtained from Ontario (45%) and British Columbia (50%) and slightly lower response rates were noted from Quebec (31%) and Saskatchewan (25%). A majority of the physicians (76.1%) had been in practice for at least 15 years, and most (74.2%) engaged

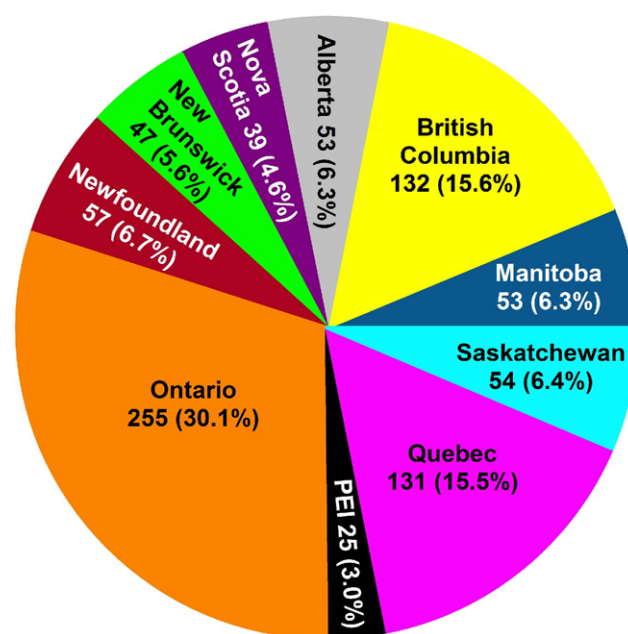


Figure 1. Provincial distribution of 846 Canadian primary care physicians who provided completed surveys. PEI, Prince Edward Island.

in ≥ 2 hours of continuing medical education per month. In general, these were physicians with high volume practices and 32.5% of these physicians assess CV risk in at least 50 patients per month.

When asked how frequently they estimate CV risk in their patients, 73.8% of the physicians indicated that they performed a risk assessment annually. As shown in Figure 2, A, the

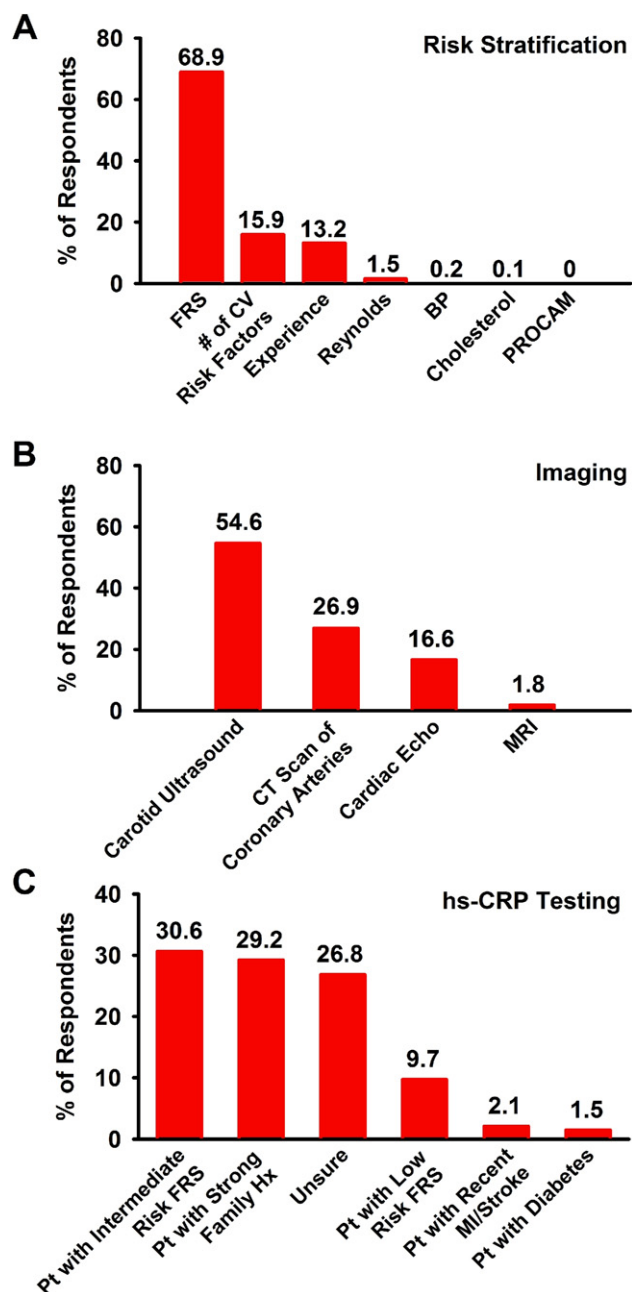


Figure 2. Perceptions of Canadian primary care physicians towards (A) use of risk stratification tools, (B) noninvasive screening imaging methods, and (C) appropriate high sensitivity C-reactive protein (hs-CRP) use for cardiovascular risk assessment. BP, blood pressure; CT, computed tomography; CV, cardiovascular; FRS, Framingham Risk Score; Hx, history; MI, myocardial infarction; MRI, magnetic resonance imaging; PROCAM, Prospective Cardiovascular Münster study; Pt, patient.

majority of the physicians reported using the FRS as their primary method of CV risk assessment (68.9%). Of note, 15.9% reported that they rely on counting the number of CV risk factors for CV risk assessment, and 13.2% indicated reliance on clinical experience and judgement. The utilization of other risk calculators such as **P**rospective **C**ardiovascular **M**ünster (PROCAM) study or the Reynolds Risk Score was negligible.

The vast majority of respondents (89%) correctly identified the FRS as predictive of 10-year risk of hard events related to coronary disease. However, 29.5% were unaware of the cutoff points for defining high risk by the FRS (10-year risk of $> 20\%$). Most of the physicians (77.8%) recognized that the FRS provides little insight into lifetime risk of CV disease, as opposed to shorter-term risk.

When asked to identify the single most important CV risk factor in their opinion, a family history of premature disease was most often indicated by respondents (25.7%), followed by increasing age (22.4%), and hypertension (15.3%). When asked if and how family history should be incorporated into risk assessment when using the FRS, only 44.4% of respondents correctly suggested doubling the FRS in subjects with a positive family history, as recommended in the 2006 and 2009 Canadian Lipid Guidelines. People of South Asian and Aboriginal origin were identified as particularly high risk populations by 46.2% of the physicians.

New risk-assessment tools

Although 79.2% of the physicians considered waist circumference to be a vital sign, only 5.7% routinely measured it when assessing their patients. These findings were consistent across the provinces. When asked how the presence of the metabolic syndrome influences risk assessment, 44.9% of the respondents felt that the metabolic syndrome is equated with a high FRS, and 13.4% with intermediate risk.

When asked to select the optimal imaging technique for screening for CV risk, 54.6% of the physicians selected carotid ultrasound and 26.9% chose coronary calcium scoring by computed tomography (Fig. 2, B). However, when asked how an abnormal imaging test would influence risk assessment, a minority (34.6%) believed that the documentation of carotid atherosclerosis by ultrasound predicted a higher future vascular risk than the presence of multiple risk factors without overt atherosclerosis.⁸

Almost all of the physicians (99.3%) surveyed had heard of hs-CRP in the context of CV disease and risk stratification but only 51.2% had ever measured hs-CRP in a patient. There was considerable between-province variation in the frequency of hs-CRP measurement (lowest at 20.5% in Nova Scotia and highest at 69.7% in Ontario). Furthermore, 26.8% of the physicians surveyed were unsure of the type of patient profile whereby hs-CRP measurements would aid risk assessment, and 69.4% were unable to identify the intermediate risk patient as being most appropriate for further risk refinement with hs-CRP (Fig. 2, C).

Three-quarters (75.3%) of the physicians surveyed were unsure of, or erroneously, defined the relationship between hs-CRP levels and cholesterol levels believing that they correlated with low-density lipoprotein (LDL)-cholesterol levels. When provided with a hypothetical intermediate risk patient with elevated hs-CRP, less than half (45.4%) correctly reclassified the patient as being at higher risk. More than half (56.8%)

would not measure hs-CRP in an intermediate risk patient whose LDL-cholesterol was below treatment thresholds, regardless of age. Of those who would not measure hs-CRP in such a patient, 21.0% felt it was of limited value and 67.4% were uncertain of the utility of hs-CRP testing. Amongst those who would measure hs-CRP, less than a third (29.8%) would initiate statin therapy for hs-CRP > 2 mg/L, while 40.7% considered a value of > 3 mg/L and 25.6% considered a value > 5 mg/L the trigger to prescribe statin therapy.

Treatment of risk

Accepting that there are often multiple mechanisms at work, when asked to select the primary pathogenesis of atherosclerosis, almost half (48.5%) felt that atherosclerosis was primarily an inflammatory disease, while a third of the physicians (33.7%) selected a LDL-cholesterol-mediated pathway.

PCPs acknowledged that achieving LDL-cholesterol targets through lifestyle interventions alone was challenging, and estimated that only 14.7% of their patients could do so. However, when probed regarding the appropriateness of statin therapy for risk reduction in primary prevention, only 58.6% suggested that lipid lowering therapy was indicated in low risk patients with LDL-cholesterol levels persistently > 5.0 mmol/L (193 mg/dL). Almost three-quarters of the physicians (72.5%) were aware of the guidelines recommendation for lipid-lowering therapy in intermediate risk patients with LDL-cholesterol levels > 3.5 mmol/L (135 mg/dL). However, in intermediate risk individuals with LDL-cholesterol levels at target while on statin therapy, there was considerable variation of opinion regarding an elevated total cholesterol (TC)/high density cholesterol (HDL) ratio as a secondary target of therapy. Approximately one-third of the respondents (31.8%) recommended further lifestyle changes alone, 28.8% recommended an increased statin dose, 15.4% the addition of niacin, and 10.6% the addition of a fibrate.

The 69% of physicians who used the FRS score to assess risk were significantly more likely to recommend appropriate guideline-based therapy in both low risk (66% vs 41%, $P = 0.0021$) and intermediate risk (78% vs 59%, $P = 0.0019$) patients.

In statin-treated patients experiencing muscle aches without any rise in serum creatine kinase, 38.1% of the physicians would consider trying a different statin, while 27.7% would provide reassurance, but still continue the statin without any dose change. One-third (30.7%) of the physicians however would reduce or discontinue a statin in asymptomatic patients with a mild rise in creatine kinase (> 400 IU/L), and two-thirds (64.7%) for an asymptomatic creatine kinase rise above 800 IU/L.

Discussion

This is one of the largest contemporary surveys of physician attitudes and knowledge evaluating CV risk stratification and lipid management in primary prevention. Despite the wide dissemination of national guidelines, our study suggests that significant knowledge gaps persist regarding risk assessment and dyslipidemia management in primary prevention.

These results suggest that despite the refinement of risk stratification tools such as the Reynolds Risk Score, older methods such as FRS, traditional risk factors summation, and experience play a greater role in the minds of clinicians. While

awareness of important modulators of risk such as family history and ethnicity clearly exists, translating that knowledge into more appropriate risk stratification is underutilized. It is concerning that less than half the physicians surveyed knew to double FRS score in the presence of a positive family history.

While physicians are generally aware of the enhanced risk associated with the metabolic syndrome and with central obesity, remarkably few physicians routinely measure waist circumference in clinical practice. Thus, it is likely that identification of the features of metabolic syndrome is suboptimal in primary prevention. This is further supported by a recent position statement which suggests that confusion exists regarding terminology and proposes that a global cardiometabolic risk assessment be performed on appropriate individuals.⁹

PCPs in general, appropriately identify the need for statin therapy in intermediate risk patients with LDL-cholesterol > 3.5 mmol/L (135 mg/dL). However, they are much less likely to correctly identify the LDL-cholesterol threshold of 5.0 mmol/L (193 mg/dL) needed for statin treatment in low-risk individuals. While physicians who used the FRS were more likely to treat guideline-recommended low and intermediate risk patients, they still avoided treatment in 1/3 and 1/5 of patients respectively. The reasons for this are unclear, but may reflect an inherent reluctance to prescribe lipid-lowering therapy in seemingly low risk individuals, a true lack of awareness of the guidelines, or controversy regarding the magnitude of absolute benefit of lipid lowering in lower risk individuals.¹⁰

This raises a broader issue of why guidelines are in general underutilized. Recently, following abstraction review of 53 American College of Cardiology/American Heart Association practice guidelines on 22 topics between 1984 and 2008, Tricoci and colleagues determined that there has been a 48% increase in the number of recommendations, with the largest increase occurring amongst class II recommendations, which are often perceived to be weak recommendations.⁸ Notably, these authors also reported that among the 16 current guidelines reporting levels of evidence, 1246 of the 2711 recommendations were based upon expert opinion (level of evidence C) rather than upon randomized controlled clinical trials.¹¹ The issue of guidelines being too long, complex, and containing recommendations based on relatively weak evidence likely applies to guidelines by other societies and in other disciplines as well, and may contribute to clinical care gaps.¹²

In November 2008, the results of the JUPITER study were published⁵ confirming the hypothesis that elevated hs-CRP is an appropriate and independent threshold beyond LDL-cholesterol for the initiation of statin therapy in specific patient populations. Since that publication (and after this survey), directed measurement of hs-CRP has been incorporated into the revised Canadian Lipid guidelines.³ Based on our findings, it is clear that a substantial knowledge gap exists with respect to the appropriate use of hs-CRP for CV risk stratification. Only half of the PCPs consider atherosclerosis as an inflammatory disease and accordingly, only 50% of the physicians have ever utilized hs-CRP measurements in their practice. This modest level of experience may be due to the perception that hs-CRP is not helpful in risk stratification, but may also be related to widespread variation in provincial reimbursement for hs-CRP testing. These findings are concordant with the *New England Journal of Medicine* online survey performed shortly after the publication of the JUPITER trial in which only 49% of respon-

dents felt that the study should change how we screen healthy adults.¹³ In the current study, only 29.8% of the PCPs indicated that they would initiate statins for a level of hs-CRP > 2 mg/L in an intermediate risk patient, whereas in the online survey 48% felt that the trial results should affect the therapeutic use of statins. Reluctance on the part of the PCPs to more fully incorporate hs-CRP measurements into their practices is likely multifactorial. In addition to a lack of knowledge, other concerns such as cost of testing, cost of drugs, prolonged drug exposure in relatively low risk individuals, and risk of statin-induced diabetes, have been previously identified as possible barriers to the utilization of this measure.¹⁴

The role of imaging in screening large populations for CV risk remains a controversial topic.⁸ In our survey, physicians felt that carotid imaging and coronary computed tomography calcium scoring were best suited as screening techniques. However, their interpretation of an abnormal imaging test with respect to modifying CV risk was somewhat inaccurate, suggesting that current guidelines do not adequately address this topic. The survey highlights an interesting dichotomy. There appears to be early acceptance of noninvasive imaging modalities for risk stratification, in the absence of guideline recommendations advocating this, yet fairly simple guideline-recommended risk algorithms are underutilized. This early adoption of noninvasive imaging modalities likely contributes to the rising utilization and thereby screening costs associated with imaging across North America. This survey shows a need to better understand physician perceptions regarding the added utility of these technologies.

Although statin side effects are well known, and creatine kinase thresholds for discontinuation are documented in product monographs, the surveyed physicians were in general hesitant to continue patients on statin therapy in the setting of asymptomatic and mild increases in serum creatine kinase. This physician attribute may contribute to the frequently documented problem of suboptimal patient adherence to statin therapy noted in large observational studies. Guidelines support ongoing statin therapy in asymptomatic individuals with creatine kinase elevations up to 10 times normal.¹⁵

Our study design and results are not without limitations. Our 846/2225 response rate (38%) was not ideal but still higher than most physician surveys in Canada.¹⁶ Despite enhanced attempts that included a shorter survey and honoraria the National Physician Survey in 2007 conducted jointly by multiple Canadian organizations was unable to improve upon its 2004 response rate of 35%. The authors conclude that even with a response rate of 32% the survey findings have validity albeit with limitations. We were unable to perform a survey sensitivity analysis. There is the potential that nonresponding physicians have a different knowledge base, practice patterns, and perceptions than our responding physicians. However, the large sample size and the similar regional distribution of nonresponders help mitigate some of this concern. This survey did not allow for multiple responses to some questions, forcing the respondent to choose a best answer. Real world practice is never as clear cut. Finally, clinical vignettes can never supplant a complete history and physical when determining a course of action.

Recent observational Canadian data confirms the need for more intensive lipid treatment both with respect to initiation and dose titration of therapy.¹⁷ Using an algorithm for dose

selection and titration allows patients to achieve targets more frequently and more rapidly.¹⁸

Results from this survey pose some challenging issues for societies that develop and disseminate guidelines. In primary prevention, our survey suggests a pressing need for further physician education regarding optimal risk stratification, hs-CRP utility, use of imaging modalities, and appropriate lipid targets in primary prevention. In order to realize these goals, learned professional societies need to better understand the professional and clinical attributes facilitating the translation of science into practice. Although a great deal has been written about the learning cycle of physicians, models for effectively changing physician behaviour clearly need refining.¹⁹ With respect to clinical practice guidelines, the “one size fits all mentality” of patient care that some guidelines seem to promote, requires amending to embrace the complexity of patient care experienced clinicians instinctively understand. When guidelines successfully incorporate patient complexity without sacrificing clinical utility, clinicians are much more likely to embrace guidelines.

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