



III. Assessment of Overall Cardiovascular Risk in Hypertensive Patients

DIAGNOSIS AND ASSESSMENT

<http://guidelines.hypertension.ca/diagnosis-assessment/assessing-cv-risk/>

Subgroup Members: Steven Grover, MD, MPA; Guy Tremblay, MD; Alain Milot, MD, MSc

Central Review Committee: Doreen M. Rabi, MD, MSc; Stella S. Daskalopoulou, MD, PhD; Kelly B. Zarnke, MD, MSc; Kaberi Dasgupta, MD, MSc; Kara Nerenberg, MD, MSc

Chair: Doreen M. Rabi, MD, MSc

Editor: Raj Padwal, MD, MSc

This information is based on the Hypertension Canada guidelines published in Leung, Alexander A. et al. Hypertension Canada's 2016 Canadian Hypertension Education Program Guidelines for Blood Pressure Measurement, Diagnosis, Assessment of Risk, Prevention, and Treatment of Hypertension. *Can J Cardiol* 2016; 32(5): 569-588.

Recommendations

1. Global cardiovascular risk should be assessed. Multifactorial risk assessment models can be used to predict more accurately predict an individual's global cardiovascular risk (Grade A) and to use antihypertensive therapy more efficiently (Grade D). In the absence of Canadian data to determine the accuracy of risk calculations, avoid using absolute levels of risk to support treatment decisions (Grade C).
2. Consider informing patients of their global risk to improve the effectiveness of risk factor modification (Grade B). Consider also using analogies that describe comparative risk such as "cardiovascular age," "vascular age," or "heart age" to inform patients of their risk status (Grade B).

Background

1. Global cardiovascular risk should be assessed. Multifactorial risk assessment models can be used to more accurately predict an individual's global cardiovascular risk (Grade A) and to use antihypertensive therapy more efficiently (Grade D). In the absence of Canadian data to determine the accuracy of risk calculations, avoid using absolute levels of risk to support treatment decisions (Grade C).

Elevated systolic and diastolic blood pressure have long been recognized as important modifiable risk factors for the future development of coronary artery disease, stroke and other cardiovascular events (1,2). Not unexpectedly, there is increasing interest in focusing antihypertensive therapy toward individuals deemed to have the highest risk of cardiovascular events and, thus, who will presumably benefit the most from such therapy (3-7).

Approximately 50% of Canadian patients will stop taking prescribed medications for hypertension or dyslipidemia during the first year of starting therapy. Adherence to healthy lifestyle behaviours is also sub-optimal with less than 50% of individuals maintaining a healthy body weight and exercising regularly for at least 30 minutes daily. Calculating an individual's "Cardiovascular Age" before and after starting therapy has been shown to improve the management of dyslipidemia and hypertension among Canadians.

Numerous methods to estimate an individual's global cardiovascular risk have been described; these are usually based on multivariable risk equations from prospective cohort studies such as the Framingham Heart Study, the Lipid Research Clinic Follow-up Cohort (The Cardiovascular Life Expectancy Model), the Dundee Cohort, the British Regional Heart Study, the Munster (Procam) Cohort and the Systematic Coronary Risk Evaluation (SCORE) (8-11).

While there are a variety of available prediction models, the optimal risk assessment method to use in a specific patient population is uncertain. Model validation among Canadians is uncommon. To date, only the Framingham Heart Study Model and the Cardiovascular Life Expectancy Model have been validated and shown to accurately identify Canadian adults at increased risk. Even well-validated models developed in one patient population may only reliably discriminate relative cardiovascular risks when applied to another population, and in fact be inaccurate in estimating absolute cardiovascular risks (12-16). For this reason, we do not recommend using absolute risk estimates to guide treatment decisions surrounding the initiation of hypertension pharmacotherapy.

Risk calculators that have been validated among Canadians are available freely at: www.myhealthcheckup.com (www.monbilansante.com), <http://cvdrisk.nhlbi.nih.gov/>. The SCORE risk calculator (www.score-canada.ca), while not validated among Canadians, has been adjusted to take into account Canadian cardiovascular disease prevalence and mortality risk to produce specific estimates for the Canadian population.

2. Consider informing patients of their global risk to improve the effectiveness of risk factor modification (Grade B). Consider also using analogies that describe comparative risk such as "cardiovascular age," "vascular age," or "heart age" to inform patients of their risk status (Grade B).

Two published randomized clinical trials among individuals with dyslipidemia and/or hypertension have demonstrated that explicitly calculating a patient's cardiovascular risk and discussing the results can significantly increase the likelihood of achieving treatment targets (17,18). These studies

suggest that informed patients are more adherent to lifestyle recommendations and/or pharmacotherapy, while informed physicians are more effective at implementing treatment guidelines.

Cardiovascular risk, when explained as a percentage over a 10-year risk timeframe, is a difficult concept for many patients. To help patients reduce risk by lifestyle change or active treatment, a more effective presentation of risk is needed (19).

Randomized clinical trials among individuals with dyslipidemia and/or hypertension demonstrated that explicitly calculating a patient's cardiovascular risk compared to age- and sex- matched individuals and then communicating the risk as comparative risk analogy can significantly increase the likelihood of achieving treatment targets (18,20-22). Programs that compare risk use terms such as "cardiovascular age," "vascular age," or "heart age" were shown to improve risk perception by patients and risk factor management by physicians and can be accessed at the web sites www.myhealthcheckup.com and www.monbilansante.com.

References

1. Abbott RD, McGee D. The probability of developing certain cardiovascular disease in eight years at specified values of some characteristics. In: Kannel WB, Wolf PA, Garrison RJ, eds. *The Framingham Study: An Epidemiological Investigation of Cardiovascular Disease*. NIH 87-2284. Washington: US Department of Health, Education, and Welfare, 1987.
2. Padwal R, Straus SE, McAlister FA. Evidence based management of hypertension. Cardiovascular risk factors and their effects on the decision to treat hypertension: evidence based review. *BMJ* 2001;322:977-80.
3. Hansson L, Zanchetti A, Carruthers SG, et al. Effects of intensive blood-pressure lowering and low-dose aspirin in patients with hypertension: principal results of the Hypertension Optimal Treatment (HOT) randomised trial. HOT Study Group. *Lancet* 1998;351:1755-62.
4. Tight blood pressure control and risk of macrovascular and microvascular complications in type 2 diabetes: UKPDS 38. UK Prospective Diabetes Study Group. *BMJ* 1998;317:703-13..
5. Estacio RO, Jeffers BW, Gifford N, Schrier RW. Effect of blood pressure control on diabetic microvascular complications in patients with hypertension and type 2 diabetes. *Diabetes Care* 2000;23(Suppl 2):B54-64.
6. Neal B, MacMahon S, Chapman N. Effects of ACE inhibitors, calcium antagonists, and other blood-pressure-lowering drugs: results of prospectively designed overviews of randomised trials. Blood Pressure Lowering Treatment Trialists' Collaboration. *Lancet* 2000;356:1955-64.
7. Goldman L, Garber AM, Grover SA, Hlatky MA. 27th Bethesda Conference: matching the intensity of risk factor management with the hazard for coronary disease events. Task Force 6. Cost effectiveness of assessment and management of risk factors. *J Am Coll Cardiol* 1996;27:1020-30.
8. Siontis GCM, Tzoulaki I, Siontis KC, Ioannidis JPA. Comparisons of established risk prediction models for cardiovascular disease: systematic review. *BMJ* 2012;344:e3318.
9. Matheny M, McPheeters ML, Glasser A, Mercaldo N, Weaver RB, Jerome RN, Walden R, McKoy JN, Pritchett J, Tsai C. Systematic Review of Cardiovascular Disease Risk Assessment Tools [Internet]. Rockville (MD): Agency for Healthcare Research and Quality (US); 2011 May. Report No.: 11-05155-EF-1. Agency for Healthcare Research and Quality (US); 2011
10. Cooney MT, Dudina AL, Graham IM. Value and Limitations of Existing Scores for the Assessment of Cardiovascular risk: a review for Clinicians. *J Am Coll Cardiol* 2009; 54:1209-27.
11. Sehestedt T, Jeppesen J, Hansen TW, et al. Risk prediction is improved by adding markers of subclinical organ damage to SCORE. *Eur Heart J* 2010;31:883-91.

12. Simons LA, Simon J, Friedlander Y, McCallum J, Palaniappan L. Risk functions for prediction of cardiovascular disease in elderly Australians: The Dubbo Study. *Med J Aust* 2003; 178:113-6.
13. Bastuji-Garin S, Deverly A, Moyse D, et al. The Framingham prediction rule is not valid in a European population of treated hypertensive patients. *J Hypertens* 2002;20:1973-80.
14. Hense H-W, Shulte H, Lowe L H, Assmann G, Keil U. Framingham risk function overestimates risk of coronary heart disease in men and women from Germany – results from the MONICA Augsburg and the PROCAM cohorts. *Eur Heart J* 2003;24:937-45.
15. Yikona JINM, Wallis EJ, Ramsay LE, Jackson PR. Coronary and cardiovascular risk estimation in uncomplicated mild hypertension: A comparison of risk assessment methods. *J Hypertens* 2002;20:2173-82.
16. Broedl UC, Geiss H-C, Parhofer KG. Comparison of current guidelines for primary prevention of coronary heart disease: Risk assessment and lipid-lowering therapy. *J Gen Intern Med* 2003;18:190-5.
17. Grover SA, Lowensteyn I, Joseph L, et al. Patient knowledge of coronary risk profile improves the effectiveness of dyslipidemia therapy: The CHECK-UP study: A randomized controlled trial. *Arch Intern Med* 2007;167:2296-303.
18. Benner JS, Erhardt L, Flammer M, et al. A novel programme to evaluate and communicate 10-year risk of CHD reduces predicted risk and improves patients' modifiable risk factor profile. *Int J Clin Pract* 2008;62:1484-98.
19. Grover SA, Lowensteyn I. The challenges and benefits of cardiovascular risk assessment in clinical practice. *Can J Cardiol* 2011;27:481-487.
20. D'Agostino RB, Vasan RS, Pencina MJ, et al. General cardiovascular risk profile for use in primary care: the Framingham Heart Study. *Circulation* 2007;117:743-53.
21. Soureti A, Hurling R, Murray P, vanMechelen W, Cobain M. Evaluation of a cardiovascular disease risk assessment tool for the promotion of healthier lifestyles. *J Cardiovasc Prev Rehabil* 2010;17:519-23.
22. Grover SA, Lowensteyn I, Joseph L, et al. Patient knowledge of coronary risk profile improves the effectiveness of dyslipidemia therapy. *Arch Intern Med* 2007;167:2296-303.