

# The management of hypertension in Canada: a review of current guidelines, their shortcomings and implications for the future

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## Abstract

CLINICIANS ARE EXPOSED to numerous hypertension guidelines. However, their enthusiasm for these guidelines, and the impact of the guidelines, appears modest at best. Barriers to the successful implementation of a guideline can be identified at the level of the clinician, the patient or the practice setting; however, the shortcomings of the guidelines themselves have received little attention. In this paper, we review the hypertension guidelines that are most commonly encountered by Canadian clinicians: the "1999 Canadian Recommendations for the Management of Hypertension," "The Sixth Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure" in the United States and the "1999 World Health Organization–International Society of Hypertension Guidelines for the Management of Hypertension." The key points of these guidelines are compared and the shortcomings that may impede their ability to influence practice are discussed. The main implications for future guideline developers are outlined.

**H**ypertension, which affects more than 20% of all Canadian adults, is an important modifiable risk factor for cardiovascular disease.<sup>1,2</sup> Despite evidence that lowering blood pressure lowers the risk of cardiovascular events and death,<sup>3-5</sup> the management of hypertension remains suboptimal (both in Canada and abroad).<sup>2,6-8</sup> In particular, there is inconsistent application of the clinical trial evidence and substantial interphysician variability in the initial management of individuals with hypertension.<sup>9-12</sup>

Clinical practice guidelines (CPGs) have become increasingly popular in the literature and are commonly cited as a potential means to close such gaps between the evidence and usual practice.<sup>13</sup> However, surveys of Canadian physicians reveal limited enthusiasm for CPGs;<sup>14,15</sup> indeed, only 32% reported that their practice had changed even once in the past year as a result of a set of guidelines.<sup>14</sup> In keeping with this limited enthusiasm, the evidence is mixed as to whether guidelines affect physicians' prescribing patterns.<sup>16,17</sup> The only study evaluating physicians' use of antihypertensives directly before and after the publication of a guideline ("The Sixth Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure"<sup>18</sup> [JNC-VI] in the United States) demonstrated a decline in the prescription of the CPG-recommended drugs ( $\beta$ -blockers and thiazide diuretics) and a concomitant increase in the prescribing of newer agents.<sup>9</sup> Although such a study has not been done in Canada, the patterns observed in practice audits<sup>10-12</sup> carried out in the mid-1980s and the mid-1990s and the resistance to change in antihypertensive prescribing preferences that was demonstrated in a recent study from British Columbia<sup>19</sup> suggest that the Canadian data are similar.

In this paper, we review the key recommendations outlined in the 3 hypertension guidelines most commonly encountered by Canadian clinicians, discuss their shortcomings and outline the implications for future guideline developers with the goal of improving the utility of such CPGs for clinicians.

## Review

## Synthèse

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## A summary of current hypertension guidelines

Most Canadian clinicians encounter several different versions of hypertension guidelines. In addition to the 3 national and international ones considered here, the “1999

Canadian Recommendations for the Management of Hypertension,”<sup>20</sup> the “1999 World Health Organization–International Society of Hypertension Guidelines for the Management of Hypertension” (WHO/ISH)<sup>21</sup> and the JNC-VI in the United States,<sup>18</sup> we also receive provincial and, in

**Table 1: Comparison of key points in 3 current hypertension guidelines**

	CAN <sup>20</sup>	JNC-VI <sup>18</sup>	WHO/ISH <sup>21</sup>
<b>Periods of observation prior to diagnosis or intervention</b>	<ul style="list-style-type: none"> <li>If hypertensive urgency or emergency, diagnose and intervene at first visit</li> <li>If BP 140–180/90–105 mm Hg with target organ damage, diagnose after 3 visits</li> <li>If BP 140–180/90–105 mm Hg without target organ damage, diagnose after 5 visits in 6 mo</li> </ul>	<ul style="list-style-type: none"> <li>If BP <math>\geq</math> 180/110 mm Hg, diagnose and intervene after 2 visits within 1 wk</li> <li>If BP 160–179/100–109 mm Hg, diagnose and intervene after 2 visits within 1 mo</li> <li>If BP 140–159/90–99 mm Hg, diagnose after 2 visits within 2 mo</li> <li>If BP 130–139/85–89 mm Hg, check again in 1 yr</li> </ul>	<ul style="list-style-type: none"> <li>“Multiple blood pressure measurements taken on several separate occasions.” No specific time thresholds before diagnosis, but time thresholds before intervening specified, as follows: <ul style="list-style-type: none"> <li>If BP <math>\geq</math> 180/110 mm Hg (or <math>\geq</math> 140/90 mm Hg and multiple risk factors, renal disease or established atherosclerotic disease), intervene within a few d</li> <li>If BP 160–179/100–109 mm Hg (or 140–159/90–99 mm Hg with 1 or 2 risk factors), intervene after 3 mo</li> <li>If BP 150–159/95–99 mm Hg and no risk factors, intervene after 6 mo</li> </ul> </li> </ul>
<b>Initial investigations</b>	Complete blood count; serum sodium, potassium and creatinine; fasting lipids and glucose; electrocardiogram and urinalysis	Complete blood count; serum sodium, potassium and creatinine; fasting lipids and glucose; electrocardiogram and urinalysis	Serum potassium and creatinine; fasting lipids and glucose; electrocardiogram and urinalysis
<b>Role of lifestyle advice</b>	3–6-mo trial in all patients, unless hypertensive urgency or emergency	6–12-mo trial in all patients with BP < 160/100 mm Hg	3–12-mo trial in all patients, including those who require drug treatment
<b>Drug treatment thresholds</b>			
1. No target organ damage or risk factors	1. BP $\geq$ 160/100 mm Hg (or $\geq$ 160/105 mm Hg if $\geq$ 60 yr)*	1. BP $\geq$ 140/90 mm Hg*	1. BP $\geq$ 150/95 mm Hg*
2. With risk factors (other than diabetes mellitus)	2. BP $\geq$ 160/90 mm Hg	2. BP $\geq$ 140/90 mm Hg*	2. BP $\geq$ 140/90 mm Hg*
3. With target organ damage	3. BP $\geq$ 160/90 mm Hg	3. BP $\geq$ 130/85 mm Hg	3. BP $\geq$ 140/90 mm Hg
4. With diabetes mellitus or renal disease	4. BP $\geq$ 140/90 mm Hg	4. BP $\geq$ 130/85 mm Hg	4. BP $\geq$ 130/85 mm Hg
<b>Choice of initial drugs</b>			
1. Subjects < 60 yr	1. Thiazides, $\beta$ -blockers or ACEIs	1. Diuretics or $\beta$ -blockers	1. All available drug classes
2. Subjects $\geq$ 60 yr	2. Thiazides, long-acting CCBs  • Comorbidities should “strongly influence” treatment decisions	2. Thiazides, $\beta$ -blocker/ thiazide combinations or long-acting CCBs • Unless there are “compelling indications for specific agents in certain clinical conditions”	2. Diuretics or CCBs  • Choice should be influenced by cost, patient preferences and concomitant conditions
<b>Treatment targets</b>	DBP < 90 mm Hg, SBP < 140 mm Hg (lower in patients with diabetes mellitus or renal disease)	DBP < 90 mm Hg, SBP < 140 mm Hg (lower in patients with diabetes mellitus or renal disease)	DBP < 90 mm Hg, SBP < 140 mm Hg (lower in patients with diabetes mellitus or renal disease)

Note: CAN = 1999 Canadian Recommendations for the Management of Hypertension,<sup>20</sup> JNC-VI = The Sixth Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure,<sup>18</sup> WHO/ISH = 1999 World Health Organization–International Society of Hypertension Guidelines for the Management of Hypertension,<sup>21</sup> BP = blood pressure, ACEI = angiotensin-converting-enzyme inhibitor, CCB = calcium channel blocker, DBP = diastolic blood pressure, SBP = systolic blood pressure.

\*After trial of lifestyle modifications (specific length of trial varies in guidelines by severity of blood pressure elevations and concomitant risk factors/conditions).

some cases, regional guidelines. This is not surprising because “the central component of clinical assessment (measurement of blood pressure) is, if carried out correctly, reproducible and accurate [and] the benefits of treatment have been unequivocally demonstrated by large trials.”<sup>22</sup>

The 3 guidelines considered here<sup>18,20,21</sup> concur on such issues as the use of nonpharmacological therapy as first-line treatment, varying the pretreatment observation period depending on the severity of hypertension and treating those hypertensive patients with target organ damage or other cardiovascular risk factors more aggressively. On the other hand, these guidelines disagree on other key issues, such as the indications for ambulatory blood pressure monitoring or echocardiography, thresholds for the initiation of anti-hypertensive therapy and the choice of agents. The central recommendations of the 3 national and international guidelines<sup>18,20,21</sup> are outlined in Table 1.

### Shortcomings of current hypertension guidelines

Many potential barriers may interfere with the application of a guideline in clinical practice. Indeed, a systematic review of 76 studies identified 293 potential barriers; those relevant to the current hypertension guidelines are summarized in Table 2.<sup>23,24</sup> A full discussion of all of these barriers is beyond the scope of this paper and, instead, we will restrict our comments to problems with the guidelines themselves (a comprehensive review of the other barriers relating to clinician, patient and practice environment has been published recently).<sup>25</sup>

First, as alluded to earlier, hypertension is one of the conditions for which disease-specific guidelines generated by different organizations offer discordant recommendations. Although this may be because different values may be placed on the prevention of certain outcomes by different organizations, concerns have been raised that inter-guideline variability may reflect methodological deficiencies during their development.<sup>26–28</sup> Because guidelines generated without a systematic review of the literature and without critical appraisal of the supporting evidence would be more likely to reflect the biases of participants, it would not be surprising if they were not congruent with other guidelines in the same area developed by different individuals. Reviews of published guidelines (even those produced by national specialty societies) confirm that adherence to methodological standards is generally poor.<sup>28,29</sup> In particular, substantial deficiencies were noted in the identification, evaluation and synthesis of the scientific evidence. Applying the scale developed by Shaneyfelt and colleagues<sup>29</sup> to the most recent Canadian guidelines,<sup>20</sup> the JNC-VI<sup>18</sup> and the WHO/ISH guidelines<sup>21</sup> confirms marked deficiencies in the evalu-

ation and synthesis of the evidence (Fig. 1).

Second, until recently, hypertension guidelines have tended to emphasize blood pressure levels and have neglected the role of the other risk factors that define an individual's absolute cardiovascular risk. Atherosclerotic risk factors tend to cluster in hypertensive individuals (over 75% of hypertensive individuals have other cardiovascular risk factors, most commonly hyperlipidemia), and cardiovascular risk increases exponentially with the number of risk factors.<sup>1,30,31</sup> Because most clinicians tailor their treatment recommendations according to each patient's associated risk factors and absolute cardiovascular risk,<sup>32</sup> guidelines that emphasized treatment at specific blood pressures without consideration of other risk factors were likely to be perceived as failing to address clinically relevant issues. It remains to be seen whether the latest guidelines,<sup>18,20,21</sup> with their emphasis on absolute risk profiles, are better received than earlier versions.

Third, the format and the local applicability of a guideline are crucial to its success. Clinicians consistently identify endorsement by a respected colleague or organization and the user-friendliness of a guideline as the most important factors in determining its acceptability, with short and concise formats being favoured.<sup>14,33</sup> Given this, it is not surprising that multipage publications produced by national panels far removed from the local setting may have limited impact; the current Canadian guidelines are substantially shorter than the previous version, but still

**Table 2: Potential barriers to hypertension guideline implementation**

Source of barrier	Examples of barriers
Guideline	Discordance between guidelines produced by different organizations Failure to address clinically relevant issues Formats that are not user-friendly Lack of local involvement Lack of implementation strategy Failure to incorporate patient-clinician values Poor methodological quality
Clinician	Lack of awareness Lack of familiarity Lack of agreement – with guidelines in general or with specific guideline(s) Lack of motivation Lack of self-efficacy* Lack of outcome expectancy†
Environment/practice setting	Lack of time Lack of resources Lack of incentives to change Lack of opinion leaders
Patient	Patient preferences contrary to guideline Questionable applicability of recommendation(s) to the individual patient

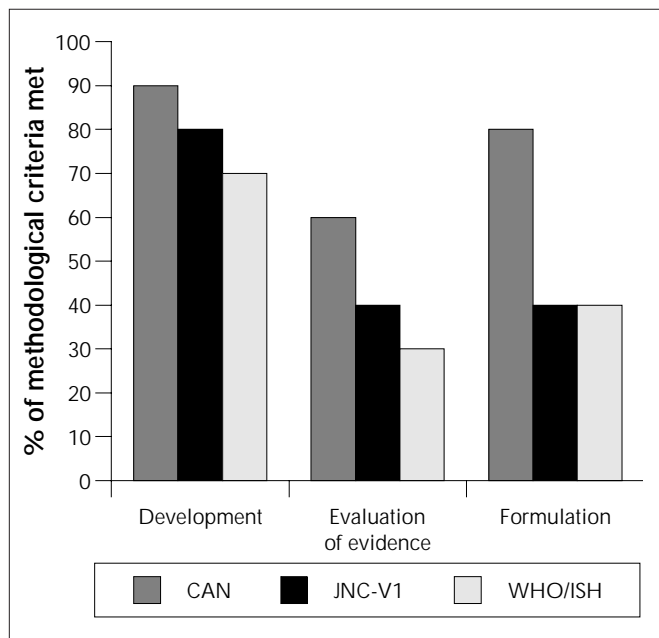
\*The belief that one cannot perform a recommendation (commonly seen with preventive counselling guidelines).

†The belief that an intervention has a low likelihood of success in a particular patient (e.g., smoking cessation).

Source: Adapted from Cabana et al<sup>23</sup> and Davis and Taylor-Vaisey.<sup>24</sup>

extend to 17 journal pages,<sup>20</sup> whereas the US<sup>18</sup> and the WHO/ISH<sup>21</sup> guidelines occupy 34 and 33 journal pages respectively.

Finally, the emphasis in hypertension guidelines up until now has been on diffusion rather than implementation. Diffusion of a guideline refers to the simple distribution of information such as publication in a peer-reviewed journal. On the other hand, implementation is the process of actually putting a guideline into practice and involves overcoming specific barriers to change. In particular, implementation strategies are designed to deal with the clinician, environmental and patient barriers listed in Table 2. Current hypertension guidelines from the United States and the WHO/ISH continue to neglect implementation, although recent steps taken by a multidisciplinary team headed by Health Canada are designed to remedy this situation in Canada.<sup>34</sup> Specific implementation strategies are of vital importance because we know that practice is unlikely to be influenced by traditional continuing medical education seminars and conferences, publication in peer-reviewed journals or unsolicited mailings of guidelines.<sup>35</sup>



**Fig. 1: Adherence to methodological standards by hypertension guidelines.** Criteria for fulfillment of methodological standards are outlined in Shaneyfelt et al.<sup>29</sup> Development = the process of assembling the guideline developers and generating, formatting and targeting the guideline, Evaluation of evidence = the process of identifying, grading and summarizing the evidence, Formulation = the process of making and grading specific recommendations. CAN = 1999 Canadian Recommendations for the Management of Hypertension,<sup>20</sup> JNC-VI = The Sixth Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure,<sup>18</sup> WHO/ISH = 1999 World Health Organization–International Society of Hypertension Guidelines for the Management of Hypertension.<sup>21</sup>

**Key points**

- Barriers to the successful implementation of hypertension guidelines can be identified at the level of the clinician, the patient or the practice setting.
- In addition, current guidelines exhibit numerous shortcomings that may account for their limited impact. The most significant of these are discordance between guidelines, failure to address clinically relevant issues, format deficiencies, lack of implementation strategies, poor methodological quality and failure to incorporate patient–clinician values.
- The most important issue to emphasize in future hypertension guidelines is the current undertreatment of patients at risk.

**Implications for future hypertension guidelines**

Although some of the shortcomings listed above have been at least partially dealt with in the most recent versions of the hypertension guidelines, there are still a number of areas requiring increased attention from guideline developers.

First, specific implementation strategies that address the barriers peculiar to the adoption of hypertension guidelines must be developed. In this case, academic detailing (one-on-one educational sessions) with local opinion leaders or face-to-face educators, multifaceted interventions (involving reminder systems at the point of care and audit with feedback) and patient-mediated methods (such as decision aids) appear to hold significant promise for improving guideline implementation.<sup>16,24,36–38</sup>

Second, attempts must be made to incorporate patient and clinician values in CPGs, particularly in the setting of treatment thresholds (only 3% of 431 guidelines generated by specialty societies even included patient representatives in the process).<sup>28</sup> Until now, thresholds in hypertension guidelines have tended to be set by expert consensus. However, there is marked individual variation in treatment preferences, and preliminary evidence suggests that expert panels do not accurately reflect the preferences of patients or front-line clinicians.<sup>39</sup> Thus, we would propose that treatment thresholds be derived after evaluation of the values and preferences of patients, front-line clinicians and the general public. Whether the last step of actually specifying the thresholds should be done by expert consensus panels or by government or third-party payers is a question open to debate and outside the scope of this paper.<sup>40</sup>

Third, those recommendations that are vital from a public health perspective must be clearly outlined. The bottom line that must be emphasized in future guidelines is that lowering blood pressure and other atherosclerotic risk factors will provide clinical benefits in the management of hypertension. For too long, arguments about which drugs are more efficacious have obscured the most important is-



sue in hypertension management, namely, the undertreatment of patients at risk. Whereas many hypertensive patients are either unaware of their diagnosis or untreated, only a minority of those prescribed treatment achieve target levels.<sup>2,7</sup> Furthermore, even those with well-controlled blood pressure exhibit higher rates of cardiovascular events than age-matched controls because of the undertreatment of their other atherosclerotic risk factors (particularly hyperlipidemia).<sup>41-43</sup>

Fourth, just as increased attention to the methodological shortcomings of randomized trials or meta-analyses led to improvements in their conduct and reporting,<sup>44</sup> it is hoped that recognition of the poor quality of many of the existing guidelines will inspire improvement. As pointed out by Shaneyfelt and colleagues, improvements in the methodological quality of guidelines "would be an important step to helping guidelines live up to their potential as a means of improving patient care and health outcomes."<sup>29</sup> Finally, because hypertension CPGs are only updated every 5-7 years, there may be substantial delays in the inclusion of new evidence in guidelines, as witnessed by the inability of the current versions of the CPGs to include late-breaking information about the efficacy of some of the newer antihypertensive agents.

In order to address these last 2 problems, a group of stakeholders (consisting of representatives from the Canadian Hypertension Society, the Canadian Coalition for High Blood Pressure Prevention and Control, the Heart and Stroke Foundation of Canada, Health Canada and the College of Family Physicians of Canada) has initiated a process to provide continuously updated evidence-based hypertension guidelines. This process involves the conducting by content experts of annual systematic reviews of the relevant literature in cooperation with clinical epidemiologists charged with applying consistent methodological rigour to the process. These updated recommendations will be presented annually at the Canadian Cardiovascular Congress and published broadly in Canadian journals for health care professionals and on the Web sites of the organizations listed above. Moreover, a multidisciplinary implementation strategy is being developed.<sup>45</sup>

## Conclusion

Canadian clinicians are exposed to a plethora of hypertension guidelines. However, their enthusiasm for these guidelines, and the guidelines' impact, appears modest at best. Barriers to the successful implementation of a CPG can be identified at the level of the clinician, the practice setting or the patient; however, the shortcomings of the guidelines themselves have received little attention.

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