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Review

The History of Hypertension Guidelines in Canada

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ABSTRACT

Hypertension guidelines have evolved significantly over the past 40 years and have become a key element in a multipronged strategy to reduce the morbidity and mortality associated with hypertension in Canada. According to many measures, Canada's guidelines have been effective, and have likely been a significant factor in improving population hypertension awareness and control rates and reducing cardiovascular mortality. Canada has created a successful template for guideline creation, implementation, and outcome surveillance that has been adopted by jurisdictions throughout the world. This review provides a history of hypertension guidelines in Canada, along with a reflection on the changing clinical environment in which guidelines are used and how guidelines need to continue to evolve to remain impactful and effective.

RÉSUMÉ

Les lignes directrices sur l'hypertension ont considérablement évolué au cours des 40 dernières années et sont devenues un élément clé d'une approche à plusieurs volets visant à réduire la morbidité et la mortalité associées à l'hypertension au Canada. Selon de nombreux critères de mesure, les lignes directrices canadiennes ont été efficaces et ont probablement joué un rôle important dans la sensibilisation accrue de la population à l'hypertension, l'amélioration des taux de contrôle et la réduction de la mortalité cardiovasculaire. Le Canada a créé un modèle efficace pour la création et la mise en œuvre de lignes directrices et la surveillance des résultats, qui a été adopté par de nombreuses administrations partout dans le monde. Cet article de synthèse présente un historique des lignes directrices sur l'hypertension au Canada et une réflexion sur l'évolution du contexte clinique dans lequel elles sont utilisées et sur la manière dont elles doivent continuer à évoluer pour continuer à atteindre leur but de façon efficace.

Hypertension remains the most prevalent cardiovascular risk factor worldwide, affecting > 40% of adults older than the age of 25 years.[1,2] In Canada, hypertension-related costs are in excess of CAD$13 billion per year.[3,4]

In the global context Canada has done well with blood pressure control. Although hypertension control globally is estimated to be around 32.5%, in Canada, substantial improvements have been noted in blood pressure control rates over the years (ie, from 13.2% in 1992 to 68.1% in 2012-2013).[5,6] Moving the needle on population blood pressure-lowering in Canada required development and implementation of multiple strategies including clinical practice guidelines, healthy policy, public health education, and improving access to primary care and preventative health. However, it is worthwhile to critically examine the role of knowledge translation of best practices in the management of hypertension—specifically in the development of hypertension guidelines in Canada and its role in the improvements in blood pressure control over the past 40 years. Further, it is timely to consider the ongoing potential of this approach as a means for further improvements in the control of hypertension and in hypertension-related complications.

The Birth of Hypertension Societies and the Genesis of Guidelines in Canada

The rise of evidence-based medicine and clinical decision-making in the 1980s coupled with an increasing awareness of the prevalence and burden of hypertension in Canada spurred the creation of the Canadian Hypertension Society (CHS). This group largely consisted of clinician scientists who were viewed as experts in hypertension, and they identified the translation of

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evidence-based hypertension management as an important part of their mandate. Despite having a respected group of hypertension experts, it was soon realized that their recommendations would not auto-implement and that thoughtful approaches to the education of health care practitioners and broader dissemination efforts would be important for effective clinical practice guidelines. To achieve these goals, a collaboration between the CHS and the Canadian Coalition for the Prevention and Control of Hypertension (which later became Blood Pressure Canada) was formed to broaden the reach and impact of guidelines. Last, the involvement of excellent clinical epidemiologists and outcomes researchers in the CHS led to the development of the rigourous criteria for grading the evidence underlying recommendations, as well as the early incorporation of an outcomes research task force into the Canadian Hypertension Education Program (CHEP), whose mandate was to critically evaluate the effect of the CHEP. These 3 entities—the CHS, the Canadian Coalition for the Prevention and Control of Hypertension, and CHEP—comprised the forerunner organizations that merged to become Hypertension Canada.[7]

A Short History of Canada's Hypertension Guidelines

Although the first recommendations for the management of hypertension in Canada were released back in 1977 (Report of the Ontario Council of Health, Hypertension 1977, Ontario Council Health, Toronto, 1977), recommendations from the CHS were not introduced until 1984. The latter document, entitled "Report of the Canadian Hypertension Society's consensus conference on the management of mild hypertension,"[8] included recommendations from an expert panel and predated the development of the currently used criteria for evaluating evidence. Over the next several years, the CHS published consensus recommendations on the management of hypertension in elderly patients, in patients with diabetes, and on the pharmacologic and nonpharmacologic treatment of hypertension.[9-12]

It was not until 1993 that a formalized process was introduced that distinguished the Canadian guidelines, and included expert topic committees, grading of evidence on the basis of uniform criteria, and formalized dissemination and education activities. Dissemination activities materialized through the introduction of a simplified guide to the recommendations for easy reference in clinical environments and an accompanying slide deck for continuing medical education.[13-17] The introduction of an impartial adjudicator to ensure that the evidence was reviewed objectively and recommendations were graded fairly emerged in 1999 and laid the foundation for the current Central Review Committee that continues to operate today.[18,19] The same year a broader implementation plan was also introduced, and a range of industrial partnerships were formed to help disseminate the new recommendations and key messages.

A timeline outlining the history and evolution of hypertension guidelines in Canada is presented in Figure 1.

Hypertension Canada's Core Principles

The first 2 decades of hypertension guideline experience in Canada illustrated that the existence of guidelines alone was insufficient to promote changes in care quality or clinical outcomes. The Canadian Heart Health Survey conducted between the years of 1986 and 1990 illustrated that despite the presence of guidelines for nearly a decade, only 42% of Canadians with hypertension were appropriately diagnosed and effectively treated.[20] To substantively improve hypertension outcomes in Canada it would be necessary to create a program that would promote continued education around best practices in hypertension and include a process of outcome evaluation for purposes of population-level quality improvement. CHEP was launched to address the shortcomings of the first generation of hypertension guidelines and was guided by 6 core principles[21]: (1) endorsement and inclusiveness; (2) periodic updates; (3) transparent and rigourous methods; (4) mitigation of bias and conflicts of interest; (5) thoughtful dissemination and implementation; and (6) outcome evaluation (Table 1).

Influence of CHEP

In many ways, CHEP was structured as a hypertension quality improvement initiative with national scope. According to almost any measure, CHEP contributed to the reduction in the prevalence and burden of hypertension in Canada. There is also strong evidence to suggest that CHEP influenced point of care practice in a favourable way, illustrating that changes in care process influenced by CHEP recommendations likely resulted in population health benefits.

CHEP's influence on hypertension management and blood pressure control was shown through a series of cross-sectional nationally representative surveys (between 1994 and 2003) that revealed substantial increases in awareness and diagnosis of hypertension among Canadian adults—improvements that temporally paralleled the introduction of CHEP.[22] Physical measures surveys[23-25] and administrative database analyses[26] provided further supportive evidence linking the increases in awareness of hypertension diagnosis in Canadians (within all age groups) with the initiation of CHEP. Analyses of the same surveys also revealed marked increases in the rate of pharmacologic treatment among hypertensive individuals. There are streams of evidence to suggest that these trends in diagnosis and treatment are at least in part a consequence of the CHEP initiative. First, these increases were temporally related to initiation of CHEP.[27-29] Second, the drug classes being prescribed aligned with classes explicitly recommended by CHEP. Third, prescriptions for antihypertensive therapy in Canada exceeded the increases seen in the United States over the same time frame, suggesting that Canadian providers were being influenced by national guidelines.[30] Fourth, analyses of patient-level prescribing data revealed a near doubling in the concurrent use of 2 or more drugs (a key CHEP recommendation) and marked improvements in persistence with antihypertensive drug therapy after the initiation of the CHEP processes.[31,32]

These improvements in awareness and treatment were accompanied by better hypertension control rates in Canada. By 2007, the rate of individuals who had been diagnosed with hypertension and had achieved recommended target blood pressure had risen to 64.6%. This level of population hypertension awareness and control were substantially higher than those reported from the United States or Western

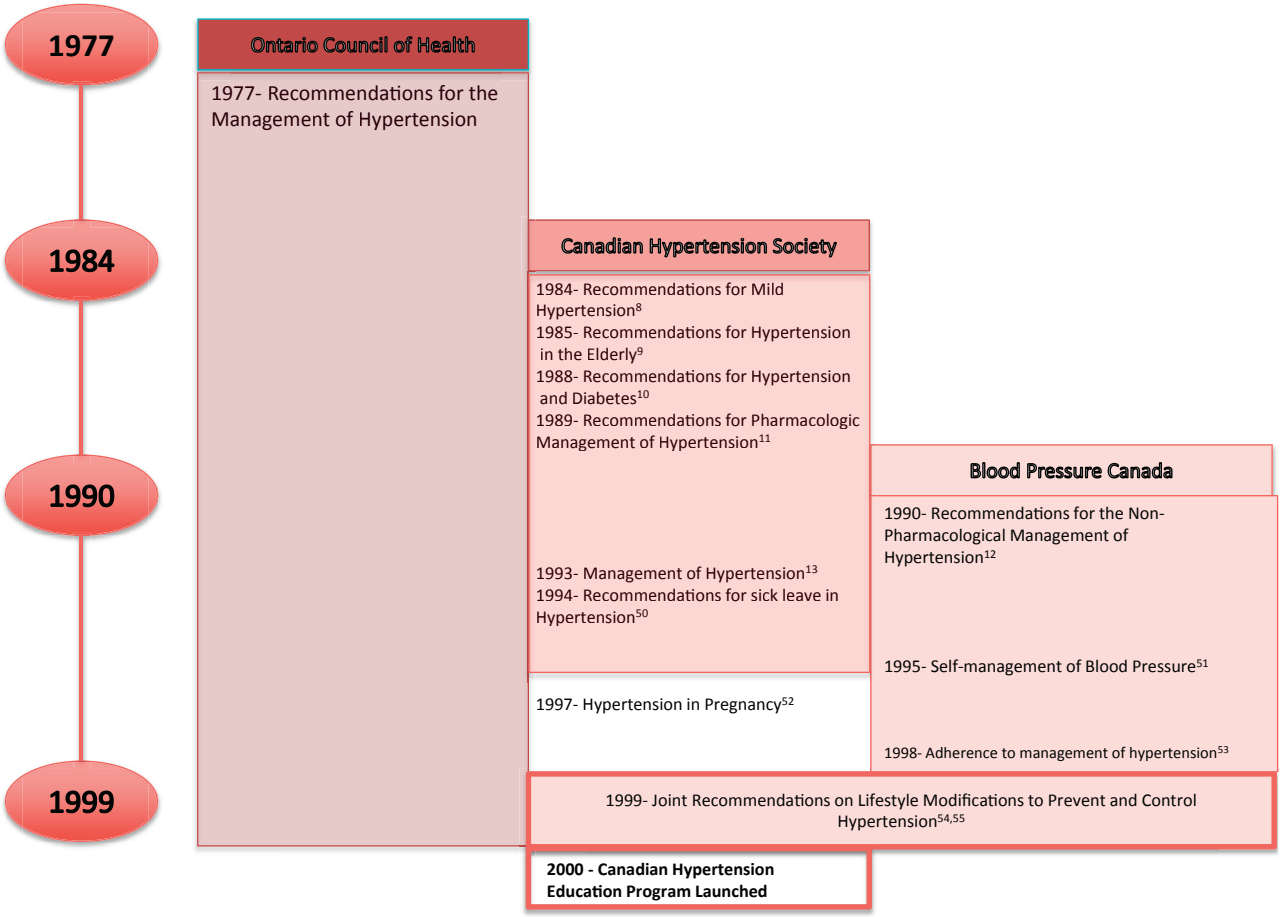

Figure 1. Timeline of hypertension guideline development in Canada.

Europe, and distinguished Canada as a leader in hypertension control.[33,34]

In addition to effectively lowering blood pressure at a population level, there was a suggestion that CHEP might have also played a role in reducing vascular complications of hypertension. Between the mid-1990s and the mid-2000s an inverse correlation was noted between prescription of anti-hypertensive regimens (which increased) and age- and sex-adjusted mortality rates from stroke, heart failure, and acute myocardial infarction in Canada (which all decreased). Of note, the increase in prescription and reduction in events appeared to accelerate at the time the CHEP initiative was launched.[35] These favourable effects were achieved despite worsening rates of obesity, diabetes, and sedentary lifestyles documented in various population health surveys in Canada.[36,37]

CHEP's Effect on Policy and Practice

CHEP promoted a galvanization of hypertension experts from multiple disciplines and provided a platform for collaborative work that further informed hypertension care and therapeutic innovations. CHEP contributors have provided new knowledge on the efficacy of nurse, pharmacist, and community-led initiatives in hypertension surveillance and treatment.[38-40] The CHS created the Canadian Chair in Hypertension Prevention and Control[41] in partnership with key stakeholders (including the Public Health Agency of Canada, and professional organizations from family medicine, nursing, nutrition, and heart and stroke) to translate public health-relevant guidelines to healthy policy. This in turn led to the formation of the Hypertension Advisory Committee to coordinate efforts on healthy policy to reduce the burden of hypertension nationally, expanding the reach of the guidelines to places beyond the clinic.

Current State of Hypertension Canada's Guidelines

In 2016, after the creation of Hypertension Canada as the single Canadian professional organization focused on reducing the burden of hypertension and its complications in Canada, an organizational decision was made to rebrand the CHEP recommendations as the "Hypertension Canada Guidelines." As of 2018, the Hypertension Canada guidelines include recommendations for the management of adults, children, adolescents, and pregnant women.[42,43] There are 14 expert subgroups that have contributed to the 144 recommendations that are presented in 23 different sections in the guideline documents.[44] There is a well-articulated process for updating the guidelines, which includes annual systematic reviews of evidence, drafting new/revised guidelines, and independent

Table 1. Core principles of the Canadian Hypertension Education Program

Core Principle	Rationale	Action
Endorsement and inclusiveness	Including clinical and research experts builds community, shores support, and ensures "buy-in"	CHEP encouraged pan-Canadian representation of clinical and research experts in hypertension
Periodic updates	Short and defined review cycles would ensure continuity and efficiency in process. Important for care providers to know when to expect updates and anticipate changes in practice recommendations	CHEP instituted an annual review cycle, defining the Canadian guidelines as the most current internationally
Transparent and rigourous methods	Clinical recommendations must be evidenced-based	All CHEP recommendations are reviewed for rigour and fidelity by experts in research methodology
Mitigation of bias and conflicts of interest	Hypertension experts may receive educational, research, or consultation support from industry. These relationships might lead to conflicts of interest and introduce bias	All CHEP committee members must declare and report conflicts of interest and must follow procedures to mitigate risk of conflict in recommendation development process
Thoughtful dissemination and implementation	Academic publication of guidelines alone leads to limited awareness of the guidelines	CHEP created a dedicated Dissemination and Implementation team to create user-friendly tools and credited educational opportunities to ensure maximal awareness and effect
Outcome evaluation	Population health survey data provides an opportunity to understand trends in hypertension awareness, treatment, and outcomes	CHEP developed an Outcomes Task Force, to evaluate if recommendations are effective in reducing hypertension burden

CHEP, Canadian Hypertension Education Program.

and critical review of the proposed guidelines by the Central Review Committee, which is followed by a robust discussion of the evidence supporting the proposed guidelines and the value they add to the existing guidelines. Subsequently, a 2-step voting process by all members of the Hypertension Canada guidelines committee to accept or modify, and ratify the proposed guidelines occurs. Over the past 20 years, the scope of the guidelines has grown significantly but the process followed remains true to the one established by CHEP in 2000.

As we now stand nearly 40 years since the first hypertension guidelines in Canada, and 20 years after the very successful introduction of CHEP we have an opportunity to reflect on the current process of guidelines generation and assess whether existing guidelines are still relevant to our users. The context in which the guidelines are used has changed significantly over the past 40 years. Hypertension is largely diagnosed and managed in communities by an increasingly diverse set of primary care providers, with hypertension specialists only managing a small proportion of adults with hypertension. Throughout Canada, primary care is often structured in medical homes that allow family physicians to work with an interprofessional team aiming to provide comprehensive, coordinated, and continuous care. This of course means that hypertension care for any given patient is distributed across a number of primary care professionals, including the family physician (and/or a hypertension specialist), clinic nurses, registered dieticians, health coaches, and community pharmacists. Modern hypertension guidelines need to ensure that the guidance they provide is valuable to these varied providers. The Hypertension Canada guidelines have long recognized the valuable role non-MD clinicians play in providing high-quality care for hypertension and have a diverse guidelines committee membership (formerly the recommendations task force) to ensure the perspectives of these varied health professionals are incorporated. Furthermore, Hypertension Canada has a formalized advisory committee that includes representation from nursing, pharmacy, and primary care professional organizations to achieve the goal of having a highly engaged community of primary care providers in hypertension care delivery. An area for growth at Hypertension Canada is the development of tools that can facilitate team-based hypertension care in communities. It is also within Hypertension Canada's scope to create system-directed guidelines, which advocate for quality improvement processes that have been proven to be effective in getting more patients with hypertension to evidence-based targets.[44-46]

Guidelines also need to acknowledge that patients are active members of their care team with an increasing emphasis on patient engagement and shared decision-making (SDM). SDM involves health care providers and patients working collaboratively on health-related decisions, weighing the evidence of benefit, potential harms, and costs along with patient preferences and values.[47] SDM is tightly aligned with the philosophy of person-centred care, because it promotes highly informed, collaborative care planning that is specific to individual patients. To date, Canadian hypertension guidelines could legitimately be criticized for viewing patients with hypertension as a key stakeholder, but not a key user. However, in 2016, Hypertension Canada conducted a study to document patient preferences and priorities with respect to hypertension care.[48] The primary purpose of this endeavour was to identify priority research areas for our network of hypertension academic researchers, but this work was also revealing for the guideline committee and has provided insights and direction on how the guidelines can evolve to better support SDM. The patients who participated in this study articulated a desire for more specific guidance on health behaviour change, stress management, and alternative therapies in hypertension management. They also requested more information on how age, ethnicity, and sex influence risk and treatment response. The Hypertension Canada guidelines committee has long held the position that guidance in the absence of evidence is fraught with potential risk. However, being silent on areas that those living with hypertension have identified as important is also problematic. Modern guidelines must recognize the complex factors that drive SDM in primary care, and provide information and tools to support this process.

The annual updates completed by Hypertension Canada are widely viewed as a process strength, however potential

risks in maintaining this ambitious schedule have been increasingly recognized. Systematically reviewing evidence each year ensures an internal continuity in method and quality, and also allows Canada to be ahead of the curve in incorporating new knowledge into clinical care. However, the annual updates have the potential drawback of creating new guidelines at a rate that outpaces the ability to effectively implement them. Being at the leading edge of new knowledge use means that new Canadian guidelines might not align well with existing guidelines in other jurisdictions, creating the appearance of discordance in diagnostic and treatment recommendations. Consistency and stability in messaging helps cultivate confidence around the recommended clinical actions, and a rapidly evolving or shifting guideline environment might undermine the benefits of being highly responsive and current. These considerations led to the decision to move from an annual to a biannual update schedule beginning in 2020—a decision that will continue to allow timely updates to promote best practices in Canada, but also affords more time for effective education and implementation. Although formal reports will be produced biennially, reviews of the literature by the subgroups will continue to be performed on an annual basis, and intermediate reports might be published as needed.

The Hypertension Canada Guidelines committee (and CHEP before it) relied on expert subgroups to develop guidelines within 23 distinct topic sections. As this review illustrates, the expansion of the guidelines has been additive and not integrative in nature. This has led to a somewhat siloed approach to guideline development that might not align well with a clinical world often defined by complex comorbidity. There is an attempt to address this with a new organizational structure for the 2020 guidelines that places expert subgroups in thematic sections and will be led by a section chair (Fig. 2). The goal of this new structure is to improve internal harmonization and reduce internal inconsistencies. We also hope this will create a more usable document because providers will now have only 7 thematic sections to refer to for guidance instead of 23. These sections are: (1) diagnosis and measurement; (2) cardiovascular health promotion; (3) management, uncomplicated; (4) management, special populations/complex comorbidity; (5) resistant hypertension; (6) care delivery; and (7) women and children.

Toward 2020: Innovating Hypertension Guidelines in Canada

For the first time in 20 years, Hypertension Canada is not releasing an annual update to the guidelines in 2019 but will be releasing innovated guidelines and implementation tools in the spring of 2020. Key changes to the 2020 guidelines process (beyond adoption of a 2-year cycle) include the following.

1. Enhanced focus on inclusivity and interprofessional partnerships

Broad stakeholder consultation and engagement will continue to be a priority for the guidelines committee, and will be formalized with the creation of a patient and primary care advisory group that will inform scope and create value in the guidelines. This advisory board will work closely with the Hypertension Canada guidelines committee members to ensure that guideline creation achieves the right balance between scientific evidence, implementation of new knowledge, and the need for guidance in user-defined priority areas.

2. Methodology

In addition to systematically reviewing new evidence, guideline authors will need to systematically re-evaluate existing guidelines for relevance and value. This review will be performed in cooperation with the patient and primary

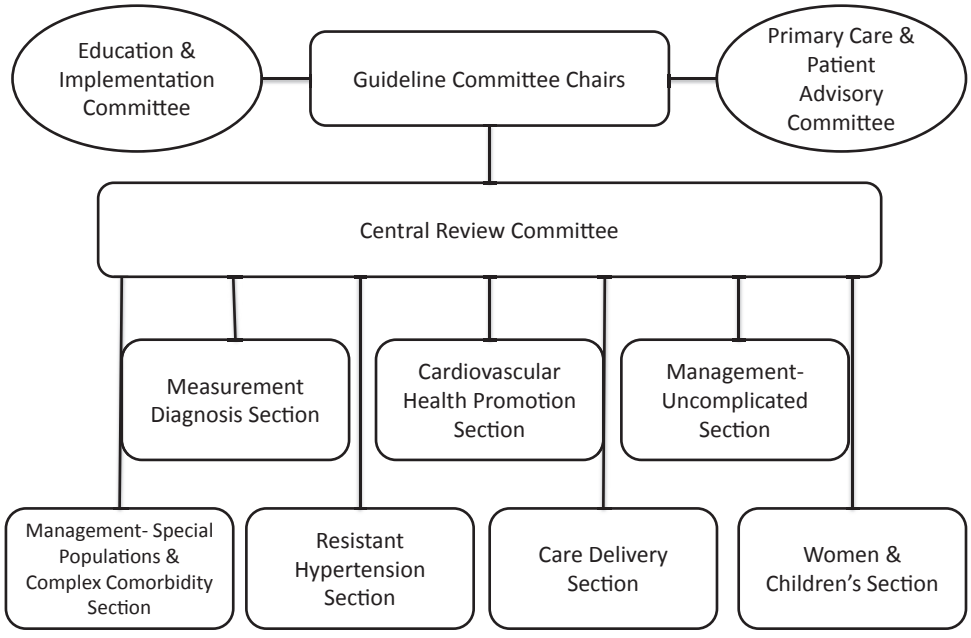

Figure 2. Revised organizational structure for the 2020 Hypertension Canada guidelines.

care advisory group. Furthermore, committee membership will be reviewed at every cycle and fueled with new members as needed to remain current and multidisciplinary. Hypertension Canada will continue to use the well-established methods to review new evidence, and formulate and grade new recommendations, with the Central Review Committee playing a pivotal role in the process.

3. Transparency, bias mitigation, and conflict management

An additional level of oversight has been incorporated into the evidence review process to ensure consistency in methods and quality in process across all expert subgroups, at each stage of guideline development. This oversight will also reduce the risk of internal inconsistencies and limit redundancy. There will be a continued commitment to archiving all systematic reviews and to be highly transparent and accountable to guideline users. The introduction of the patient and primary care advisory group will promote guidelines that best serve the needs of the users and will minimize bias in focus that can arise from entirely expert authors. The Central Review Committee—a group of academic methodologists without financial or intellectual conflict—will continue to be a significant safeguard from duality of interests influencing guideline creation or evaluation.

4. Implementation

Historically the development of the guidelines and strategies to implement them was done sequentially. In 2020, this process will be done in parallel so that the guidelines are developed with an awareness of potential facilitators and barriers to effective implementation. Heightening awareness of the needs and realities of the end users during the guideline creation process should lead to a more valuable and usable product.

5. Harmonization

Hypertension Canada (and CHEP before it) is a contributing partner to the **C**anadian **C**ardiovascular **Har**monization of **N**ational **G**uidelines **E**ndeavour (C-CHANGE).[49] This will continue in 2020. This national effort not only produces a comprehensive set of guidelines focused on global cardiovascular risk reduction, C-CHANGE also creates a framework for interorganizational cooperation and coordination of guidelines relevant to cardiovascular health promotion.

Although these are important changes to ensure the greatest effect of the guidelines, Hypertension Canada is committed to continue producing evidence-based, scientifically sound guidelines for diagnosis, risk assessment, prevention, and management of hypertension in adults, children, and special populations. The guideline documents have traditionally been used as teaching materials for medical students, residents, and other trainees in health care, including pharmacy and nursing, and the intention is to remain the reference document in hypertension with high scientific merit, while ensuring optimal implementation strategies.

Hypertension Canada has consistently been recognized for its rigourous and dynamic process in developing guidelines and has set an example for other international guidelines. As a result, there should be incredible pride in the contribution Canadians have made to global knowledge on effective strategies to lower blood pressure, and it is anticipated that the revisions that are being made to the existing processes and outputs will be highly relevant to a diversity of users.

There is some indication that the advances in blood pressure control made in the first decade of CHEP have plateaued. In 2016, an analysis of 5 population-representative data sources revealed that the degree to which hypertension is effectively treated and controlled in Canada has been stable for well over a decade, and the proportion of persons unaware of hypertension remains unchanged at 16.7%.[5] These findings would suggest a need to amplify our efforts to continue developing innovative strategies to further improve blood pressure control. Resting on a successful history will not do; Canadians cannot be complacent about hypertension. We argue that challenging ourselves to refine, even redefine the Hypertension Canada Guidelines process will have an important role in keeping the needle moving.

Disclosures

The authors have no conflicts of interest to disclose.

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