

Ups and downs of hypertension control in Canada: critical factors and lessons learned

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ABSTRACT

As the leading risk for death, population control of increased blood pressure represents a major challenge for all countries of the Americas. In the early 1990's, Canada had a hypertension control rate of 13%. The control rate increased to 68% in 2010, accompanied by a sharp decline in cardiovascular disease. The unprecedented improvement in hypertension control started around the year 2000 when a comprehensive program to implement annually updated hypertension treatment recommendations started. The program included a comprehensive monitoring system for hypertension control. After 2011, there was a marked decrease in emphasis on implementation and evaluation and the hypertension control rate declined, driven by a reduction in control in women from 69% to 49%. A coalition of health and scientific organizations formed in 2011 with a priority to develop advocacy positions for dietary policies to prevent and control hypertension. By 2015, the positions were adopted by most federal political parties, but implementation has been slow.

This manuscript reviews key success factors and learnings. Some key success factors included having broad representation on the program steering committee, multidisciplinary engagement with substantive primary care involvement, unbiased up to date credible recommendations, development and active adaptation of education resources based on field experience, extensive implementation of primary care resources, annual review of the program and hypertension indicators and developing and emphasizing the few interventions important for hypertension control. Learnings included the need for having strong national and provincial government engagement and support, and retaining primary care organizations and clinicians in the implementation and evaluation.

Keywords

Cardiovascular diseases; hypertension; primary health care; education; Canada.

In Canada, the national hypertension control rate increased from 13% in the early 1990s to 68% in 2010, associated with a sharp decline in cardiovascular disease deaths and hospitalizations (1-4). The improvement to both the highest and the largest increase in control rate ever reported for a national population started around the year 2000 and was largely attributed to the initiation of a comprehensive program to implement and adapt annually updated scientific hypertension treatment recommendations for all clinicians but focused on primary care, coupled

with a surveillance system that evaluated the impact of the program (1,4). The program was overseen by a hypertension public health coalition including Blood Pressure Canada (BPC), Canadian Hypertension Society (CHS), College of Family Physicians of Canada (CFPC), Health Canada and the Heart and Stroke Foundation of Canada (HSF) (4). In addition, the national pharmacists and nursing organizations (Canadian Pharmacists Association and Canadian Council of Cardiovascular Nurses, respectively) later became key stakeholders in oversight (4). The

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steering committee organizations and their representatives were involved in knowledge translation and dissemination of the scientific recommendations into standardized tools and resources for primary care (4). The program's successes and failures were carefully evaluated each year and iterative revisions were made to improve the program (4). The evaluation arm of the program identified critical 'gaps' in hypertension care (e.g., lower control of hypertension in people with diabetes (5)) and the implementation team subsequently focused on strategies to 'close' those gaps (4,6). Between 2000 and 2010 there were approximately 350 publications on or about the program, its processes, recommendations or outcomes (4). Detailed summaries of the key success factors of the program and how other countries could adopt the program have also been published (1,2,4). Importantly, many aspects of the Canadian program have been enhanced and integrated into the HEARTS in the America's program led by the Pan American Health Organization.

In 2011, much of the government and some pharmaceutical industry support for the program and the primary care oversight was lost (7). The program emphasis shifted away from implementation and evaluation back towards a more traditional approach that focused on development of evidence-based guidelines. The resulting recommendations were often complex and difficult to implement in clinical practice (particularly within primary care). Subsequently, hypertension control rates declined to 58%, largely driven by a reduction in control rate in older women (69% in 2009-2011 to 49% in 2016-2017) (8). High rates of hypertension control in men were sustained but the rate of decline in cardiovascular disease has slowed in both men and women (3). The objective of this manuscript is to both inspire and caution other national hypertension control programs by summarizing the changes in Canadian programs to control hypertension and what were viewed as the success factors and learnings associated with the increases and decreases in hypertension control rate in Canada.

BRIEF HISTORY OF HYPERTENSION CONTROL EFFORTS IN CANADA

Around 1980, Canada recognized cardiovascular diseases (CVD) including stroke as a leading cause of death and disability and prioritized its prevention and control (3). The Canadian Heart Health Initiative (CHHI) conducted an extensive national survey of cardiovascular risks (1985-1992) as well as a large number of pilot interventions for CVD prevention and control (9). The survey estimated a hypertension prevalence rate of 21% and a control rate of 13% (at <140/90 mmHg) (10). The hypertension control rate (at <140/90 mmHg) in those with diabetes was much lower at 9% (10). Nearly all the CHHI pilot interventions were discontinued following the end of the funding in 1992. In the late 1990s, BPC developed a strategy for prevention and control of hypertension (11). Subsequently in 1998, an innovative approach to controlling hypertension was proposed by BPC and developed with the support of major Canadian health and scientific organizations (2,4,12,13). CHS had a relatively long history of strong evidence-based hypertension pharmacological treatment recommendations that were published episodically (2,12). BPC provided a mix of evidence- and opinion-based recommendations focused on lifestyle, blood pressure measurement (including home monitoring) and adherence to management (4,14). BPC had an evolving but

limited implementation plan for its recommendations (4,14). Unfortunately, the CHS and BPC recommendation processes were not associated with any marked changes in hypertension control indicators (4).

In 2000, the new annual hypertension control program was launched to 1) increase the scientific rigor of recommendations and maintain them up to date, 2) adapt the recommendations for primary care with widespread dissemination and 3) evaluate the program and hypertension control indicators (introduced in 2003) (2,12). When the Knowledge to Action framework was published in 2006, it was found to fit closely to the principles developed in this program (<https://rnao.ca/leading-change-toolkit/knowledge-to-action>, accessed July 12, 2022). The new program was launched by BPC, CHS, HSF, CFPC and Health Canada (Federal government) immediately following the 1999 release of the hypertension lifestyle and management recommendations. The new process was iterative, expanding and revising prior recommendations, based on an annual critical review of the previous year's program (1,2,16). The program was also annually refocused on a critical care gap identified through on-going program evaluation (4,6). In 2006, the primary care program oversight was expanded from primary care physicians to include national organizations for nursing and pharmacy and the target audience expanded to include the public (2,4). The evaluation system rapidly evolved to include new and revised surveys and methodologies (2,4,6). Increasing support came from federal government organizations and the pharmaceutical industry to expand the program (6). The HSF developed a parallel implementation and evaluation program in Ontario (which contains approximately one-third of the Canadian population) that collaborated with and leveraged the national program (2,4). The HSF and the federal government developed new physical measures surveys on representative samples of the Canadian population reporting hypertension indicators every 2 years (2,8,17). The surveys showed a stable prevalence of hypertension (~21% of adults) and marked improvements in rates of awareness of the diagnosis, treatment and control. Control rates (<140/90 mmHg) fluctuated from 64% to 68% between 2006 to 2010 with the control rate in people with diabetes increasing to over 80% (18,19). There were much higher control rates in patients with increased cardiovascular risk (18,20). The increase in hypertension control was not associated with an improvement in lifestyles but was strongly associated with an increase in prescriptions of antihypertensive medications (20,21).

In 2010, the hypertension control program integrated with BPC, and the CHS to form Hypertension Canada (4). Coincidentally, many of the name brand antihypertensive drugs were losing patent protection resulting in less financial support from the pharmaceutical industry, resulting in less amplification of key messages for hypertension control and the federal government withdrew its involvement and all support from the hypertension control program (4,7). Nevertheless, in 2010 Hypertension Canada retained 10-fold higher funding for hypertension control than was available in the early 2000s. However, the newly formed Hypertension Canada removed primary care and the HSF from the oversight role of the hypertension control program and put the individual components of the previously integrated recommendations, implementation and evaluation program on an operations committee that had multiple functions competing with hypertension control (7). The support for and processes of implementation and

evaluation were markedly reduced, and integrated annual program review ceased. Key clinician opinion leaders in primary care and specialties, who had participated as volunteers largely due to their passion and interest in blood pressure control, were largely replaced by or put under supervision of paid staff who had relatively little influence, hypertension expertise, or clinical training. Many clinicians disengaged from Hypertension Canada and replacements amongst the next generation of clinical leaders in hypertension had not been identified. Many of the implementation resources were no longer updated and disseminated and publications and other implementation efforts were no longer documented. The annual surveillance evaluation was no longer regularly conducted.

Given much of hypertension is attributed to dietary risks (high sodium, low potassium and obesity), in 2011 a coalition of major national health and scientific organizations reformed and developed a national strategy for prevention and control of hypertension with an emphasis on the prevention and control of hypertension through dietary policies (<https://hypertension.ca/advocacy/>, accessed Feb 15, 2022) (4). The coalition developed a broad array of evidence-based consensus positions for advocacy (https://hypertension.ca/wp-content/uploads/2018/12/Final-Call-for-healthy-Food_EN_with-supporters_April-1-2016.pdf, accessed Feb 15, 2022). Supported by the Heart and Stroke Foundation, Dietitians of Canada, Food Secure Canada, and the Childhood Obesity Network, the dietary policies were adopted by all but one federal political party. However, the implementation of the policies has been slow and limited until recently, outside of efforts to reduce dietary sodium.

When an updated evaluation of the Canadian Health Measures Survey was performed, hypertension control in women was found to have declined from 69.0% in 2009-2011 to 49.2% in 2016-2017, while the control rate in men remained relatively unchanged (65.2% and 67.4%, respectively) (8). The precise reasons for the gender difference in control rate remains unexplained but resistant hypertension is more common in Canadian women than men explaining a small proportion of the lack of control (22). Women have currently unexplained declining rates of awareness and treatment (23). Similar gender differences in hypertension control were also found in the United States (24). The Surgeon General of the United States responded with a national call to action to enhance hypertension control, while the Canadian Federal Agencies remain disengaged (3,25). New recommendations that define hypertension control as <130/80 mmHg in people with high cardiovascular risk will result in many more Canadians with hypertension being defined as 'uncontrolled', emphasizing the need for urgent action (26).

KEY SUCCESS FACTORS FOR ENHANCING HYPERTENSION CONTROL

The key success factors with enhanced control have been evaluated qualitatively and are documented more extensively in other publications (1,2,4). Table 1 shows selected learnings from the program. In Canada, primary care is relatively strong and evolving and this is considered essential for hypertension control (2).

Implementation of the recommendations is viewed as vital (1,2,4,27,28). The hypertension control program in 2000 included primary care oversight and the rapidly evolving implementation program had extensive leadership and

engagement of primary care key opinion leaders and included formal ties to their national organizations (1,2,4,12,14,29). These organizations and individuals used their communications systems to endorse and to help disseminate relevant hypertension resources (1,2,4,13,28). The adaptation of the scientific recommendations was based on important gaps in clinical care with extensive involvement of primary care to ensure relevance to their practices (6). New themes were developed based on important 'clinical gaps' in care (e.g., poor hypertension control in people with diabetes) (1). Each year implementation resources were revised by multidisciplinary and interprofessional volunteers, based on field experience and also to tailor new evidence and the new theme for local and regional needs (1,4). Hence, educational resources were optimized over time based on their usefulness in clinical practice. Standardized slide sets and educational materials were designed to align health care professionals and the public with the importance of achieving hypertension control and widely disseminated through lectures and publications (2,4). Five key messages on how to achieve control were developed and annually one or two additional key messages were added to reflect the annual themes (e.g., key messages from 2009, Table 2) (1,2,4). All implementation resources emphasized the key messages. There were approximately 30-50 mainly Canadian publications on the hypertension recommendations most years and most national primary care meetings contained sessions on the recommendations and hypertension control (1,2,4).

Monitoring and evaluation of the program was also viewed as important (1,2,4,6,30). The vast majority of the work was done by health care professional volunteers. Early in the program, the volunteers were dismayed and discouraged by the amount of work required but, once early success was demonstrated, many more volunteers and especially more influential volunteers joined. The demonstration of success, particularly of markedly enhanced hypertension control associated with reductions in total mortality, CVD mortality and hospitalization also resulted in greater engagement of the federal and provincial governments, HSF and pharmaceutical industry (19,20,31,32). Improved surveillance through the federal and provincial governments allowed more nuanced targeting of implementation resources towards demonstrated clinical care gaps (6,19,20,32).

It is critical that the recommendations process be credible. The process had multiple steps to reduce commercial and other sources of bias (33). At the start, annually updated recommendations were viewed as important as results of major clinical trials were being frequently published and there was a perception that guidelines became quickly out of date. The recommendations process incorporated a diverse spectrum of expertise (e.g., evidence-based medicine experts, nursing, pharmacy, family medicine, psychology, sociology, exercise physiology) in addition to traditional clinical specialists and scientists ensuring they were credible and addressed the needs and views of a broad audience. Adding to the impact (and global influence) of the Canadian recommendations was pioneering work in blood pressure measurement, including recognition of the pivotal role that automated office blood pressure measurement can play to standardize in-office measurement, early adoption of guidelines emphasizing the central importance of out-of-office measurement, and the use of initial combination drug treatment (16,34,35).

TABLE 1. Selected lessons learned

1. Early and later experience with hypertension recommendation processes in Canada confirmed what has been widely seen elsewhere with other recommendation processes. Developing and publishing recommendations, by itself, has minor impact on clinical practice. This is especially true for complex recommendations that do not account for the clinical context of primary care.
2. For any strategy to be effective, input from those involved in creation of foundational knowledge and dissemination of that knowledge is critical. Specialists and scientists are often largely responsible for conducting and interpreting research, advocating for hypertension, developing and running hypertension programs and organizations as well as in evaluating and managing challenging patients but generally do not understand the context of primary care where the vast majority of people with hypertension are managed. For a recommendation to be effective, it is necessary to obtain active engagement and leadership from primary care organizations, experts and opinion leaders in the process development, and adaptation of recommendations, development and dissemination of educational resources and evaluation.
3. Differing recommendations, opinions and controversies can result in 'clinical inertia' with a failure to appropriately manage hypertension. To align health care professionals with the effort to control hypertension, reach agreement with major national health organizations to support a single unified hypertension recommendations process and use highly standardized education resources, which are aimed at primary care, optimized in the field, and that focus on the very limited number of activities important to control hypertension (e.g., see key messages Table 2).
4. Hypertension and cardiovascular organizations are unlikely to have substantive impact on their own. A broad approach with a multitude of stakeholder organizations including leadership by government, primary care and civil society is important.
5. The recommendations being implemented need to be credible to their audience and need to be able to be implemented within the primary care context.
6. A high rate of blood pressure control will not be sustained without strong sustained governmental and primary care support to implement and evaluate the process.

Source: based on the opinions of the authors

TABLE 2. Key messages for hypertension control from 2009*

1. Assess blood pressure at all appropriate visits.
2. Encourage people with hypertension to use approved devices and proper technique to measure blood pressure at home.
3. Ensure people with hypertension are screened for diabetes (and vice versa). Treat hypertension in people with diabetes with a combination of lifestyle changes and pharmacotherapy to control blood pressure to less than 130/80 mmHg. Many require use of three or more antihypertensive drugs including diuretics to achieve blood pressure targets.
4. Assess and manage overall cardiovascular risk in all people with hypertension including smoking, dyslipidemia, dysglycemia, abdominal obesity, unhealthy eating, and physical inactivity.
5. Sustained lifestyle modification is the cornerstone for the prevention and management of hypertension and cardiovascular disease (CVD).
6. Treat blood pressure to less than <140/90 mmHg in most people and to less than 130/80 mmHg in people with diabetes or chronic kidney disease. More than one drug is usually required.

* The Canadian Hypertension Education Program did not allow copyright for the key messages to facilitate repeated publication.

CAN CANADA DO BETTER?

The Canadian program achieved success between 2000 and 2010, long before the WHO HEARTS program was developed. The WHO HEARTS program outlines what are currently understood to be state-of-the-art interventions to control hypertension. Key WHO HEARTS recommendations such as using highly simplified directive treatment algorithms, and regular monitoring of treatment and control at the clinic level were not part of the Canadian intervention (3). Primary care is relatively strong and getting stronger in Canada. Many primary care clinics are multidisciplinary and have advanced information systems capable of performance reporting on hypertension control. These WHO HEARTS interventions would be very important to further enhance hypertension control in Canada. Over the timeframe of the Canadian program, clinical programs supported by commercial sources have become much less accepted emphasizing the critical nature of sustained government support. Health and scientific organizations need to sustain advocacy for health food policies to prevent and control hypertension and to engage federal and provincial governments in prioritizing hypertension control vis-a-vis WHO HEARTS (3). Although more research is needed to better understand the decline of hypertension control in Canadian women after 2011, the previous hypertension control program (2000-2010) had unprecedented success in closing a variety of hypertension control clinical gaps at a national population level. Recently there has been a call for the Canadian federal and provincial governments to collaborate with the health and scientific sectors

to develop and implement a strategic approach to hypertension control along the lines of the WHO HEARTS program and based on initial successes of that program in a diverse group of countries in the Americas (3). The need has become even more compelling due to the expected negative impact of the pandemic.

CONCLUSION

The unprecedented improvement in hypertension control in Canada, achieved by intensive implementation of simplified hypertension recommendations, adopted for and heavily supported by primary care organizations, may inspire other national programs that success is achievable. The more recent decline in Canadian hypertension control rate was associated with a loss of governmental and primary care oversight, a loss of governmental and commercial financial support and a loss of programmatic focus on hypertension control. A critical lesson for all population hypertension control programs is the need for sustained programmatic primary care and governmental support if success in hypertension control is to be achieved and sustained.

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the World Bank and SWITCH Health outside the submitted work, and is an unpaid consultant on dietary sodium and hypertension control to numerous governmental and non-governmental organizations. RTT reports investigator-initiated trial sponsorship from Merck, Sanofi, AstraZeneca, and Pfizer as well as consulting fees from Shoppers Drug Mart - Loblaw and Emergent Biosolutions. RP is CEO of mmHg, a provider of cloud-based digital health products, including remote patient monitoring of patients with hypertension. ST reports fees for advisory boards and speaking from Astra Zeneca, Bayer, Medtronic, and research grants from Bayer (FIDELIO/FIGARO

national lead), and KMH Labs (Zero to Five Study). AB has received consulting, speaking, travel and or research support from Amgen, Bristol Myers Squibb, Janssen, AstraZeneca, Novartis, Pfizer, Bayer, Lilly, Boehringer Ingelheim, HLS Therapeutics, Spectrum Therapeutics, Sanofi, and Bausch Health. JK, AAL have no COI to declare.

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Altibajos en el control de la hipertensión en Canadá: factores críticos y lecciones aprendidas

RESUMEN

La hipertensión arterial representa el principal riesgo de muerte; controlarla a nivel de la población constituye un desafío importante para todos los países de la Región de las Américas. A principios de la década de 1990, Canadá presentaba una tasa de control de la hipertensión del 13%. La tasa de control aumentó al 68% en el 2010, lo que vino acompañado por una disminución importante de las enfermedades cardiovasculares. Esta mejora sin precedentes en el control de la hipertensión empezó alrededor del año 2000 cuando se inició un programa integral para aplicar las recomendaciones sobre el tratamiento de la hipertensión, actualizadas anualmente. El programa incluyó un sistema de monitoreo integral para el control de la hipertensión. Después del 2011, hubo una marcada disminución del énfasis en la implementación y la evaluación, y la tasa de control de la hipertensión disminuyó, impulsada por una reducción en el control en las mujeres, que pasó del 69% al 49%. En el 2011, se formó una coalición de organizaciones científicas y de salud con la prioridad de elaborar una campaña de defensa y promoción de las políticas alimentarias para prevenir y controlar la hipertensión. Para el año 2015, esta postura fue adoptada por la mayoría de los partidos políticos federales, aunque la implementación ha sido lenta.

En este artículo se revisan los factores clave de éxito y las lecciones aprendidas. Algunos factores clave de éxito fueron tener una amplia representación en el comité directivo del programa; el compromiso multidisciplinario con la participación sustantiva del sector de la atención primaria; unas recomendaciones creíbles, imparciales y actualizadas; el desarrollo y la adaptación activa de recursos educativos basados en la experiencia en el terreno; la amplia implementación de los recursos de la atención primaria; la revisión anual del programa y de los indicadores de hipertensión; y el desarrollo y el énfasis en unas pocas intervenciones importantes para el control de la hipertensión. Entre las lecciones aprendidas se encontró la necesidad de contar con un fuerte compromiso y apoyo del gobierno nacional y provincial, y de mantener a las organizaciones de atención primaria y al personal médico en la implementación y la evaluación.

Palabras clave

Enfermedades cardiovasculares; hipertensión; atención primaria de salud; educación; Canadá.

Altos e baixos no controle da hipertensão no Canadá: fatores críticos e lições aprendidas

RESUMO

O controle populacional da hipertensão arterial – o maior fator de risco de morte – representa um grande desafio para todos os países das Américas. No início da década de 1990, o Canadá tinha uma taxa de controle de hipertensão de 13%. Esse índice aumentou para 68% em 2010, acompanhado por um declínio acentuado das doenças cardiovasculares. A melhoria sem precedentes no controle da hipertensão começou por volta do ano 2000, quando teve início um programa abrangente para implementar recomendações de tratamento de hipertensão atualizadas anualmente. O programa incluía um sistema integral de monitoramento do controle da hipertensão. Após 2011, houve uma acentuada redução da ênfase na implementação e avaliação, e a taxa de controle de hipertensão caiu, principalmente às custas de uma redução deste controle em mulheres (de 69% para 49%). Uma coalizão de organizações científicas e de saúde formou-se em 2011 com a prioridade de desenvolver posições de defesa de políticas alimentares para prevenir e controlar a hipertensão. Até 2015, essas posições haviam sido adotadas pela maioria dos partidos políticos federais, mas a implementação tem sido lenta.

Este manuscrito examina fatores-chave de sucesso e aprendizados. Alguns fatores-chave de sucesso incluíram uma ampla representatividade no comitê diretor do programa, engajamento multidisciplinar (com envolvimento significativo da atenção primária), recomendações imparciais e confiáveis, elaboração e adaptação ativa de recursos didáticos com base na experiência de campo, ampla implementação dos recursos da atenção primária, revisão anual do programa e dos indicadores de hipertensão e desenvolvimento e ênfase das poucas intervenções realmente importantes para o controle da hipertensão. As lições aprendidas incluíram a necessidade de ter forte envolvimento e apoio dos governos nacional e subnacionais e manter organizações e médicos da atenção primária engajados na implementação e avaliação.

Palavras-chave Doenças cardiovasculares; hipertensão; atenção primária à saúde; educação; Canadá.
