



HYPERTENSION PREVENTION AND CONTROL IN CANADA:

A STRATEGIC APPROACH TO SAVE LIVES, IMPROVE QUALITY OF LIFE AND REDUCE HEALTH CARE COSTS

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Introduction

High blood pressure is the leading global risk for death and disability and one of the leading risks for significant complications, morbidity, and mortality in Canada¹. Globally, four in 10 adults over the age of 25 years have hypertension contributing to 9.4 million deaths and 162 million years of life lost in 2010.^{2,3} Consequently, the World Health Organization (WHO) is targeting a 25 per cent global reduction in uncontrolled hypertension by 2025⁴ – a target to which most countries, including Canada, have committed.

In Canada, 7.5 million people are living with hypertension.⁵ An additional 7.4 million people are at risk of hypertension and nine in 10 adults will develop hypertension if they live a normal lifespan.⁶ Hypertension costs the healthcare system over \$13 billion annually (direct and indirect healthcare costs, 2010) and costs are estimated to double by 2020 without concerted countermeasures.⁷ Importantly, healthy public policies that prevent hypertension and clinical interventions to control hypertension can be cost saving.^{8,9,10} For instance, it is estimated that creating a healthy food environment in Canada could increase gross domestic product (GDP)¹¹ while, at the same time, significantly improving the health of Canadians.

In response to the increasing prevalence of hypertension, the *2011-2020 Pan Canadian Hypertension Framework* [2011 Hypertension Framework]¹² prioritized the implementation of an expanded chronic care model for Canadians with high blood pressure to significantly reduce the individual and societal burden associated with this condition ([Figure 1](#)).¹³

¹ Institute for Health Metrics and Evaluation, <http://www.healthdata.org/data-visualization/gbd-arrow-diagram> accessed April 28 2015

² Lim SS, Vos T, Flaxman AD, Danaei G, Shibuya K, Adair-Rohani H et al. A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet* 2013; 380(9859):2224-2260.

³ World Health Organization. NCD Global Monitoring Framework. World Health Organizations, Geneva, 2013

⁴ World Health Organization. A global brief on hypertension: silent killer, global public health crisis. World Health Day 2013. Report , 1-39. 2013. Geneva, Switzerland, World Health Organization.

⁵ Robitaille C, Dai S, Waters C, Loukine L, Bancej C, Quach S et al. Diagnosed hypertension in Canada: incidence, prevalence and associated mortality. *CMAJ* 2012; 184(1):E49-E56.

⁶ Vasan RS, Beiser A, Seshadri S, Larson MG, Kannel WB, D'Agostino RB et al. Residual Lifetime Risk for Developing Hypertension in Middle-aged Women and Men. *JAMA* 2002; 287(8):1003-1010.

⁷ Weaver CG, Clement F, Campbell N, James MT, Klarenbach S, Hemmelgarn BR, Tonelli M, McBrien KA, for the Alberta Kidney Disease Network (AKDN) and the Interdisciplinary Chronic Disease Collaboration (ICDC). Health Care Costs Attributable to Hypertension: a Canadian Population-Based Cohort Study. *Hypertension*. 2015;66:00-00. DOI: 10.1161/HYPERTENSIONAHA.115.05702.

⁸ Moran AE, Odden MC, Thanataveerat A, Tzong KY, Rasmussen PW, Guzman D et al. Cost-Effectiveness of Hypertension Therapy According to 2014 Guidelines. *N Engl J Med* 2015; 372(5):447-455

⁹ Wang G, Labarthe D. The cost-effectiveness of interventions designed to reduce sodium intake. *J Hypertens* 2011; 29(9):1693-1699.

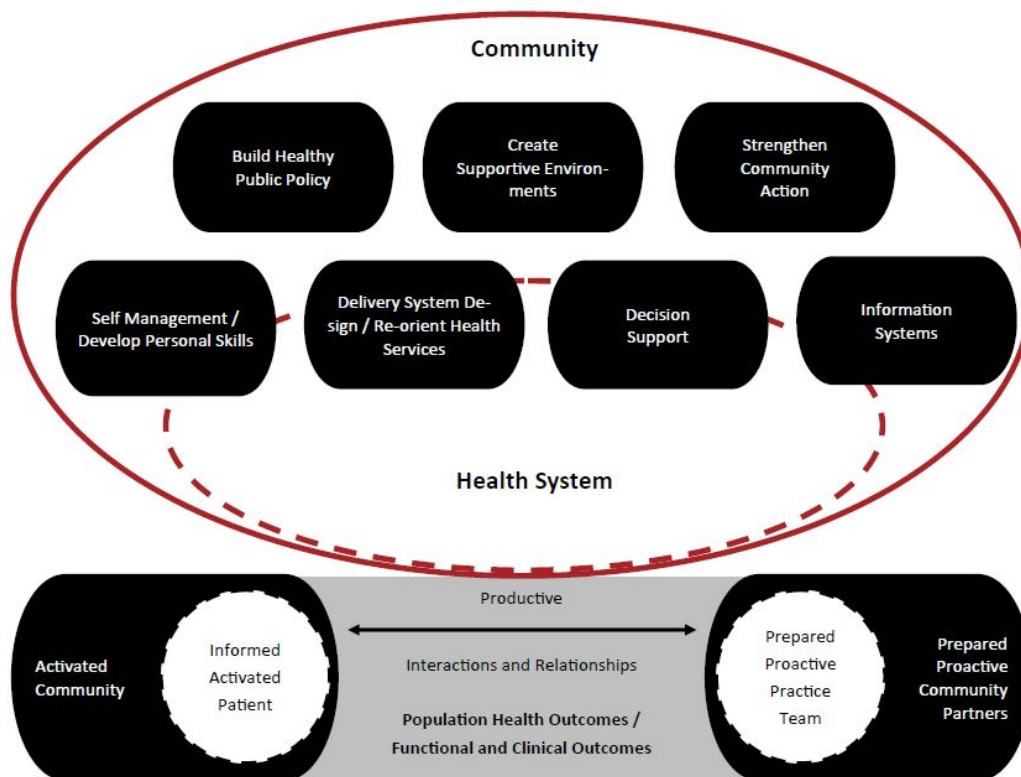
¹⁰ World Health Organization. WHO Global Action Plan for the Prevention and Control of Noncommunicable Diseases 2013-2020. Report , III-103. 2013. Geneva, Switzerland, WHO Press, World Health Organization.

¹¹ Mukhopadhyay K, Thomassin PJ. Estimating Macroeconomic Impacts with computational General Equilibrium Modeling. In: Legetic B, Cecchini M, editors. *Applying Modeling to Improve Health and Economic Policy Decisions in the Americas: The Case of Noncommunicable Diseases*. Pan American Health Organization; 2015. 35-57.

¹² Endorsed by the Canadian Council of Cardiovascular Nurses, Canadian Nurses Association, Canadian Cardiovascular Society, Canadian Stroke Network, College of Family Physicians of Canada, the Heart and Stroke Foundation, Hypertension Canada and the Public Health Physicians of Canada, and the Council of Chief Medical Officers of Health.

¹³ Chockalingam A, Campbell N, Ruddy T, Taylor G, Dery V on behalf of the expert working group. High Blood Pressure Prevention and Control: Canadian National Strategy. *CVD Prevention*. 2000;3:81-93

Figure 1: The Expanded Chronic Care Model



The expanded chronic care model (Figure 1)¹⁴ has been adopted and utilized by most provinces. The model considers the roles of the community and the health care system. From the community perspective, the model speaks to the development of healthy public policy, creating supportive environments, and strengthening community action. From the health care system perspective, it addresses information systems, decision supports, self-management, as well as the overall design of the health delivery system. Since 2011, new evidence has supported the interventions called for in the 2011 Hypertension Framework, which could reduce both the cost and the burden of hypertension-related death and disability.^{15,16,17,18}

Hypertension Canada and the Heart and Stroke Foundation (HSF) / Canadian Institutes of Health Research (CIHR) Chair in Hypertension Prevention and Control have led an effort to report on progress towards the 2011 Hypertension Framework targets. This report at the Framework's midpoint provides an opportunity to assess progress and to re-prioritize actions that are needed to achieve its objectives: to save lives, improve quality of life and reduce healthcare costs.

¹⁴ Barr VJ, Robinson S, Marin-Link B, Underhill L, Dotts A, Ravensdale D, Salivaras S. The expanded Chronic Care Model: an integration of concepts and strategies from population health promotion and the Chronic Care Model. *Hosp Q.* 2003;7:73-82.

¹⁵ World Health Organization. NCD Global Monitoring Framework. World Health Organization, Geneva, 2013

¹⁶ Moran AE, Odden MC, Thanataveerat A, Tzong KY, Rasmussen PW, Guzman D et al. Cost-Effectiveness of Hypertension Therapy According to 2014 Guidelines. *N Engl J Med* 2015; 372(5):447-455.

¹⁷ World Health Organization. WHO Global Action Plan for the Prevention and Control of Noncommunicable Diseases 2013-2020. Report, III-103. 2013. Geneva, Switzerland, WHO Press, World Health Organization.

¹⁸ Wang G, Labarthe D. The cost-effectiveness of interventions designed to reduce sodium intake. *J Hypertens* 2011; 29(9):1693-1699.

Executive Summary

Over the past three decades, multi-stakeholder coalitions have developed a series of strategic plans to reduce the burden of hypertension-related disease.^{19,20,21} An early priority was to develop national guidelines on drug treatment and lifestyle change as key modifiable risk factors.^{22,23} The next priority was the creation and dissemination of Hypertension Canada's CHEP clinical practice guidelines for the treatment and control of hypertension.²⁴ These initiatives have paid off.²⁵ Since 2006, Canada has the highest reported national rates of awareness, treatment and control for hypertension,²⁶ with 65 per cent of people controlled to target.

Progress toward the 2020 hypertension targets

Current trends indicate that the targets set in the 2011 Hypertension Framework for 2020 will not be achieved.²⁷ The Canadian Health Measures Surveys (2007-9, 2010-2011 and 2012-2013, [Table 1](#)) reported little change in the prevalence of hypertension, awareness of hypertension diagnosis, treatment, and control rates.²⁸ There has been no tangible progress towards the 2011-2020 Hypertension Framework targets and thus stronger action will be necessary.

Hypertension is approximately 80 per cent attributable to dietary factors²⁹ and 20 per cent related to lack of physical activity. Factors including tobacco use, chronic stress and genetics can also play a role. Beyond tobacco reduction, few global best practices to promote the healthy behaviours and healthy environments that would prevent many new cases of hypertension^{30,31} have been adopted in Canada. Most Canadian healthy food policy initiatives are voluntary and/or industry-led because Canada's federal government has pursued food policies conditional on significant private sector funding and involvement. Up till now, such initiatives have been demonstrably ineffective.

¹⁹ Federal/Provincial Working Group. The Prevention and Control of High Blood Pressure in Canada. MacLeod EB, Colburn HN, MacLean, DR, Sinclair, GE. Federal/Provincial Advisory Committee, 1-82. 1986. Ottawa, ON, Minister of National Health and Welfare.

²⁰ Chockalingam A, Campbell N, Ruddy T, Taylor G, Dery V on behalf of the expert working group. High Blood Pressure Prevention and Control: Canadian National Strategy. CVD Prevention. 2000;3:81-93

²¹ Campbell N, Young E, Drouin D, Legowski B, Adams M, Farrell J, Kaczorowski J, Lewanczuk R, Moy Lum-Kwong M, Tobe S. A framework for discussion on how to improve prevention, management and control of hypertension in Canada. Can J Cardiol. 2012;28:262-69.

²² Federal/Provincial Working Group. The Prevention and Control of High Blood Pressure in Canada. MacLeod EB, Colburn HN, MacLean, DR, Sinclair, GE. Federal/Provincial Advisory Committee, 1-82. 1986. Ottawa, ON, Minister of National Health and Welfare.

²³ Chockalingam A, Abbott D, Bass M, Battista R, Cameron R, de Champlain J et al. Recommendations of the Canadian Consensus Conference on Non-Pharmacological Approaches to the Management of High Blood Pressure. March 21-23, 1989 Halifax, Nova Scotia. CMAJ. 1990;142:1397-409.

²⁴ Federal/Provincial Working Group. The Prevention and Control of High Blood Pressure in Canada. MacLeod EB, Colburn HN, MacLean, DR, Sinclair, GE. Federal/Provincial Advisory Committee, 1-82. 1986. Ottawa, ON, Minister of National Health and Welfare.

²⁵ Campbell NR, McAlister FA, Quan H. Monitoring and Evaluating Efforts to Control Hypertension in Canada: Why, How, and What It Tells Us Needs to Be Done About Current Care Gaps. Can J Cardiol 2013; 29:564-570.

²⁶ Chockalingam A, Campbell N, Ruddy T, Taylor G, Dery V on behalf of the expert working group. High Blood Pressure Prevention and Control: Canadian National Strategy. CVD Prevention. 2000;3:81-93

²⁷ Campbell N, Young ER, Drouin D, Legowski B, Adams MA, Farrell J et al. A Framework for Discussion on How to Improve Prevention, Management and Control of Hypertension in Canada. Can J Cardiol 2012; 28:262-269.

²⁸ Padwal RS, Bienek A, McAlister FA, Campbell NRC, for the Outcomes Research Task Force of the Canadian Hypertension Education Program. Epidemiology of Hypertension in Canada: an Update. Can J Cardiol. In press 2015.

²⁹ ie. Excess dietary sodium, lack of fruit and vegetables (potassium), excessive alcohol consumption and obesity

³⁰ World Cancer Research Fund International <http://www.wcrf.org/int/policy/nourishing-framework>, accessed April 29 2015

³¹ World Health Organization. Global status report on noncommunicable disease 2014. Report , iv-280. 2014. Geneva, Switzerland, World Health Organization.

The Canadian Hypertension Advisory Committee (CHAC), a coalition of national health and scientific organizations, was formed to advocate for implementation of the 2011 Hypertension Framework.³² A survey conducted by Hypertension Canada in 2015 found that the vast majority of Canadian adults support the healthy public policies put forward by CHAC members and others.

Many novel community programs exemplifying the principles of the expanded chronic care model have been initiated, but none has been scaled up to affect national hypertension indicators.^{33,34,35,36} Community-based programs promoting physical activity and healthy diets are localized, financed largely through research grants, voluntary, and poorly integrated with the health care system. A partnership between Hypertension Canada and Loblaw Companies Ltd. to promote the role of pharmacists and dietitians in standardized, best-practice hypertension screening and care shows early promise of a national retail-based program's potential to reach a significant number of Canadians. In order to be more effective, future enhancements should include ongoing and improved integration with the health care system and community programs and initiatives.

Hypertension Canada, the Heart and Stroke Foundation, and other not-for-profit organizations continue to develop educational resources and programs to promote hypertension management self-efficacy in patients and best practices in hypertension prevention, treatment and control among health care professionals. This is not sustainable without a return of government funding to support these activities, which could reasonably be expected to generate a positive return on investment.³⁷ Provincial governments continue to work on improved chronic disease management such as integrated electronic information systems, and integrated, interdisciplinary health care task-sharing.

Canada is fortunate to have several surveillance and monitoring resources to track hypertension. Recently, obtaining public reports and analysis of these data on key hypertension indicators has been a challenge.³⁸ Hypertension status assessment of disadvantaged populations and Aboriginal/Indigenous populations has not been improved in line with the recommendations in the 2011 Hypertension Framework.³⁹ When assessed, disadvantaged populations often carry a much higher burden of hypertension and its related diseases.^{40,41,42}

³² <http://www.hypertensiontalk.com/position-statements/>, accessed October 2, 2015

³³ Kaczorowski J, Chambers LW, Dolovich L, Paterson J.M., Karwalajtys T, Gierman T et al. Improving cardiovascular health at population level: 39 community cluster randomised trial of Cardiovascular Health Awareness Program (CHAP). *BMJ* 2011; 342:d442.

³⁴ Jones CA, Nanji A, Mawani S, Davachi S, Ross L, Vollman A et al. Feasibility of community-based screening for cardiovascular disease risk in an ethnic community: The South Asian Cardiovascular Health Assessment and Management Program (SA-CHAMP). *BMC Public Health* 2013; 13(1):160.

³⁵ Jones C, Simpson SH, Mitchell D, Haggarty S, Campbell N, Then K et al. Enhancing hypertension awareness and management in the elderly: lessons learned from the Airdrie Community Hypertension Awareness and Management Program (A-CHAMP). *Can J Cardiol* 2008; 24(7):561-567.

³⁶ Santschi V, Tsuyuki RT, Paradis G. Evidence for pharmacist care in the management of Hypertension. *Can Pharm J* 2015; 148(1):13-16.

³⁷ Moran AE, Odden MC, Thanataveerat A, Tzong KY, Rasmussen PW, Guzman D et al. Cost-Effectiveness of Hypertension Therapy According to 2014 Guidelines. *N Engl J Med* 2015; 372(5):447-455.

³⁸ Campbell NR, McAlister FA, Quan H. Monitoring and Evaluating Efforts to Control Hypertension in Canada: Why, How, and What It Tells Us Needs to Be Done About Current Care Gaps. *Can J Cardiol* 2013; 29:564-570.

³⁹ Campbell N, Young ER, Drouin D, Legowski B, Adams MA, Farrell J et al. A Framework for Discussion on How to Improve Prevention, Management and Control of Hypertension in Canada. *Can J Cardiol* 2012; 28:262-269.

⁴⁰ Leenen FH, Dumais J, McInnis NH, Turton P, Stratychuk L, Nemeth K et al. Results of the Ontario survey on the prevalence and control of hypertension. *CMAJ* 2008; 178(11):1441-1449.

⁴¹ Lee DS, Chiu M, Manuel DG, Tu K, Wang X, Austin PC et al. Trends in risk factors for cardiovascular disease in Canada: temporal, socio-demographic and geographic factors. *CMAJ* 2009; 181(3-4):E55-E66.

Table 1 - Hypertension Indicators: 2007-2013	2007 - 2009	2010 - 2011	2012 - 2013	2020 Target
Hypertension prevalence	19.6%	21.8%	22.6%	13%
Adults in Canada are aware of the risk of developing hypertension and of the lifestyle factors that influence blood pressure	--	--	15 - 34% ^c	90%
Adults in Canada are aware that high blood pressure increases the risk of major vascular disease (stroke, heart attack, dementia, kidney failure, heart failure)	--	--	32 - 87% ^b	85%
People in Canada who have hypertension are aware of their condition	83.4%	82.9%	84.3%	95%
Those with hypertension are attempting to follow appropriate lifestyle recommendations ^a	62-82 %	--	51% ^b	90%
Canadians initially diagnosed with hypertension with normal BP while not on antihypertensive drug treatment ^a (i.e. lifestyle control of hypertension)	8.5%	11.1%	6.6%	40%
People unable to be successfully treated for hypertension through lifestyle therapy have appropriate drug therapy	79.9%	79.2%	79.6%	87%
People with hypertension have their blood pressure "under control"	65.9%	64.1%	68.1%	78%
Aboriginal/Indigenous "populations" have similar" rates for" blood pressure health indicators as the general population.	--	--	--	NA
Populations at higher risk have similar rates for blood pressure health indicators as the general population	--	--	--	NA

^a The percentages are for people following specific lifestyle recommendations from the SLCDC-htn module 2009. The other data are from the Canadian Health Measures surveys

^b Hypertension Canada's Public Attitudes and Awareness Survey 2015

^c Hypertension Canada survey in 2015: 34% were aware of the 90% risk of developing hypertension while only 15% were aware of all the lifestyle risks

"N/A" is not applicable. "--" indicates data that is not available.

Policy Recommendations: 2015 - 2020

To move toward the targets, several actions are urgently required. Canada's federal, provincial and territorial governments need to implement the healthy public policies advocated by CHAC and others. To that end, the Sodium Working Group (SWG) Recommendations⁴³ should be prioritized for implementation because one third of hypertension is attributable to excess dietary sodium.

⁴³ Sodium Working Group. Sodium Reduction Strategy for Canada - Recommendations of the Sodium Working Group. Report , 1-61. 2010. Ottawa, Canada, Health Canada.

A national strategy to improve both diets and physical activity is strongly supported by the public, badly needed, and long overdue. It could be modeled after the Pan-Canadian Public Health Network (PCPHN) *Curbing Childhood Obesity: A Federal, Provincial and Territorial Framework for Action to Promote Healthy Weights*.⁴⁴ Such initiatives should be led by a cross-sector partnership of governments and healthcare NGOs, accountable to each other for their respective roles in optimizing the prevention and control of hypertension.

Focusing on best-practice and integrated initiatives that fulfil the expanded chronic care model, the partnership could identify and scale up successful, cost effective community and workplace programs that would fill gaps and generate efficiencies in health care delivery. This includes increasing patient orientation and health care capacity with the rapid adoption of task-sharing, interdisciplinary health teams in which the scope of pharmacy practice is expanded to prescribing antihypertensive treatments and lifestyle modifications. Integrated electronic medical records would facilitate these recommendations, and could also be used for vascular risk assessment, surveillance and monitoring.

Gaps in hypertension status surveillance for disadvantaged populations and Aboriginal/Indigenous groups need to be filled so that specific interventions that address the needs of these populations can be equitably implemented.

The targets set in the 2011 Hypertension Framework will only be met with a concerted effort of a partnership between federal, provincial and territorial governments with non-governmental health care organizations to implement an expanded chronic care model of health care delivery for Canadians. The sections that follow comprise a detailed exploration of opportunities related to specific elements of the model.

⁴⁴ <http://www.phac-aspc.gc.ca/hp-ps/hl-mvs/framework-cadre/index-eng.php>, accessed Oct. 2, 2015

Recommendations Summary

Overview and Structure

The fundamental recommendation of the 2011 Hypertension Framework and this update document is to develop a robust implementation of the Expanded Chronic Care Model ([Figure 1](#)) equitably across Canada. This is a complex goal. This Recommendations Summary, and the document that follows, breaks it down this way:

I. [Recommendation \(section link\)](#)

1. Strategy

a. Tactic

Recommendations

I. [Build Healthy Public Policy and Create Supportive Environments](#)

1. **Implement effective multi-sectoral national food policy and physical activity policies that improve environments and create equity by making healthy choices the easy choices for all Canadians.**

- a. Restrict the marketing of foods and beverages to children and youth.
- b. Implement healthy food and beverage procurement policies in publicly funded programs and institutions and other settings (private, not-for-profit) that buy, serve and sell food to Canadians.
- c. Regulate and reduce the addition of sodium and trans fatty acids in processed food products. Determine the best way to minimize added sugar and saturated fat in the food supply.
- d. Charge the Healthy People and Communities Steering Committee of the Pan-Canadian Public Health Network (PCPHN) with the implementation of the Sodium Working Group Recommendations (2010) and provide adequate staffing and funding for the task.⁴⁵ Have the Committee report annually and publicly on progress through the PCPHN Council to the Conference of Deputy Ministers of Health.

⁴⁵ Sodium Working Group. Sodium Reduction Strategy for Canada - Recommendations of the Sodium Working Group. Report , 1-61. 2010. Ottawa, Canada, Health Canada.

- e. Require and improve nutrition labeling on processed food products and in eating establishments to help Canadians easily and correctly identify healthy foods.
 - f. Subsidize healthy food products and tax unhealthy food products simultaneously.
 - g. Minimize commercial food and beverage industry influence over public health policy.
- 2. Develop strong inter-sectoral partnerships to advocate effectively for evidence-based policy interventions, especially regarding modifiable risk factors.**
- a. Integrate policy recommendations into clinical practice guidelines
 - b. Publish policy recommendations focused on public health and journals for health care professionals
 - c. Incorporate policy and advocacy education into scientific meetings. Illustrate the potential of advocacy to improve health by addressing poverty and access to health resources in underserved communities.
 - d. Partner on advocacy with Aboriginal/Indigenous communities, having an understanding of the cultural and environmental changes that have contributed to reduced physical activity levels and to poor nutrition in those communities.

II. Strengthen Community Action

- 1. Scale up and sustain proven transformative community programs to meet the population's needs.**
- a. Invest in systematizing transformative projects that can prevent or delay the onset of hypertension (e.g., Community Health Awareness Program (CHAP)).
 - b. Utilize untapped human resources and expertise by expanding the role and remuneration of pharmacists and other health professionals (nurses) across Canada so that they can prescribe medications and order laboratory tests.
 - c. Prioritize community programs in areas where populations perceived to be disadvantaged live, work and play.
- 2. Practice a community-based approach in health system delivery.**
- a. Undertake community-level interventions including self-help programs, universal screenings, mobilization of community leaders and agencies to promote healthy lifestyles and use volunteers/community members to help administer programs.

III. Develop Personal Skills for Better Self-Management

- 1. Ensure that all people who are diagnosed with hypertension are actively engaged in their care and medical decisions with high quality resources, such as those from**

Hypertension Canada, that empower them to self-manage their blood pressure.

- 2. Allow for individualization of treatment based on clinical circumstances and patient wishes.**
- 3. Practice a population-based approach in health system delivery.**
 - a. Facilitate access to medical care for individuals without a primary care provider through workplace-based blood pressure screening and targeted outreach to disadvantaged populations.

IV. Reorient / Redesign the Health Services Delivery System

- 1. Improve health outcomes by reorienting funding mechanisms so that they are patient-centred and promote the proactive prevention, identification and care of hypertension.**
 - a. Reward flexible, team-based care that allows providers to devote appropriate time to more complex patients.
 - b. Prevent costly misdiagnosis by funding and promoting the use of ambulatory and home-based blood pressure monitors as well as training for their optimum use.
 - c. Focus on decentralized community programs that can ensure an identified primary care provider - a physician, a nurse or a pharmacist - for every Canadian who is appropriately accessible and empowered to maintain continuity of care.⁴⁶
⁴⁷ The provider should know the blood pressure status of each patient, have ways to track each patient's blood pressure status, and have mechanisms in place to ensure that appropriate follow-up and screening occurs.
- 2. Develop locally-adapted, evidence-based care maps for the management of hypertension that systemize care and allow for individualization of treatment based on clinical circumstances and patient wishes. Prioritize areas where populations perceived to be disadvantaged live, work and play.**
 - a. Use poor nutrition, lack of physical activity and obesity to identify candidates for health behaviour changes. Apply stages of change model to prevent progression to diabetes and hypertension.

⁴⁶ Van Walraven, C, Oake N, Jennings A, Forster A. The association between continuity of care and outcomes: a systematic and critical review. *J Eval Clin Prac* 16:947-956, 2010.{6998}

⁴⁷ Wolinsky FD, Bentler SE, Liu L, Geweke JF, Cook EA, Obrizan M, et al. Continuity of care with a primary care physician and mortality in older adults. *J Gerontol A Biol Sci Med Sci*.65:421-8, 2010. {6999}

V. [Improve Decision Support](#)

1. **Ensure that Canadian health care professional education around hypertension is based on the highest Canadian standards of care, Hypertension Canada’s CHEP Guidelines, and is culturally sensitive.**
 - a. Use Hypertension Canada’s CHEP Guidelines in medical, pharmacy, nursing and nutrition faculties and in continuing medical education programming.
2. **Produce educational resources that enable primary care providers to counsel patients on hypertension prevention, to screen for high blood pressure, to optimally assist the patient with lifestyle and drug therapies, and to contribute to the ongoing achievement of blood pressure and health targets.**
 - a. Identify key indicators and create a reporting template for developers of electronic medical records that could facilitate audit and feedback. Develop, implement and evaluate a core curriculum for assessing blood pressure using automated office, home and ambulatory blood pressure measurement devices.
 - b. Work to have the blood pressure assessment curriculum accredited and integrated in training schools for doctors, nurses, pharmacists, and other health care professionals.

VI. [Address Hypertension in Aboriginal/Indigenous Populations](#)

1. **Target primary chronic disease prevention in Aboriginal/Indigenous youth.**
 - a. Partner with Aboriginal/Indigenous school systems and leadership to improve cardiovascular health in those communities.
2. **Improve health outcomes by reorienting funding mechanisms so that they are patient-centred and promote the proactive prevention, identification and care of hypertension.**
 - a. Facilitate collaboration between communities and health care providers in order to ensure that care and programming are culturally appropriate and evidence-based.

VII. [Address Hypertension in Disadvantaged Populations](#)

1. **Scale up and sustain proven transformative community programs to meet the population’s needs.**
 - a. Prioritize community programs in areas where populations perceived to be disadvantaged live, work and play.

VIII. [Optimize Information Systems](#)

1. **Strengthen research, monitoring and evaluation to inform nutrition and health policy development: assess the impact of dietary risk factors and interventions on health outcomes.**
 - a. Orchestrate national surveys and the use of existing data (e.g., electronic medical record data and pharmacy kiosk data) that can measure the key indicators from the 2011 Hypertension Framework.
 - b. Permanently fund national longitudinal surveys such as the National Population Health Survey (defunct), the Canadian Longitudinal Study on Aging (ongoing, indefinite) and the Canadian Partnership for Tomorrow (ongoing, indefinite) in order to capture the incidence and prevalence of hypertension-related complications and temporal trends in risks. Ensure the quality of blood pressure assessment used in these surveys.
 - c. Improve the Canadian Health Measures Survey (CHMS): make it longitudinal, capture important sub-groups (those living on reserves and in the Territories, institutionalized, marginalized, etc.) and release comprehensive updated blood pressure analysis biannually. Include a validated physical measure of sodium consumption.
 - d. Include a nutrition component in the Canadian Community Health Survey (CCHS) every five years to help monitor population sodium consumption
 - e. Improve the Canadian Chronic Disease Surveillance System (CCDSS): Provide consistent administrative data from every province and release updated hypertension analysis annually. Take advantage of existing and ongoing administrative data collection by enabling linkage between the CHMS and CCDSS.
 - f. Conduct a hypertension module in the Survey of Living with Chronic Disease every 5 years in Canada to track knowledge, attitudes and behaviours.
 - g. Enable national and regional surveys to assess Aboriginal/Indigenous peoples and key populations perceived to be disadvantaged (Black, South Asian, People living in the territories, People living in Atlantic Canada). Collect self-reported ethnicity, language and individual level socioeconomic status variables in administrative data and ensure blood pressure measurements in disadvantaged populations.
 - h. Monitor changes in sodium, saturated and trans fats, free sugars, iodine and potassium concentrations in processed foods: require food product label review and label accuracy assessment by an independent group of researchers charged with reporting annually to the public.
 - i. Monitor the risks associated with increasing blood pressure using modified survey tools such as the Canadian Tobacco Use Monitoring Survey; Canadian

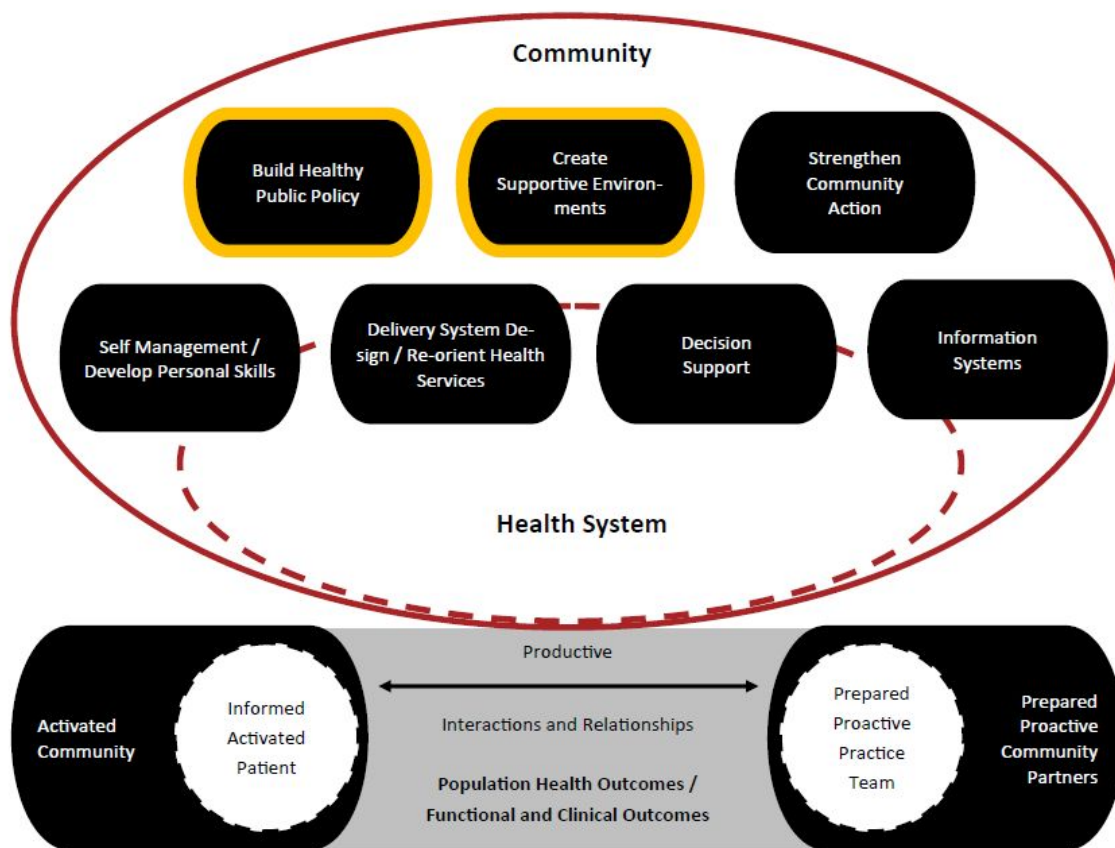
Tobacco, Alcohol and Drugs Survey; and the Active Healthy Kids Canada annual report card.

- j. Commit a minimum of 10 years' funding for monitoring research to ensure scientific rigour over that time period.

Build healthy public policy / Create supportive environments

Develop a policy framework for chronic disease prevention that can support Canadians in improving their lifestyle behaviors and in meeting the nationally recommended benchmarks for diet, physical activity, tobacco and alcohol use.

Section Acknowledgements: Norm Campbell



Progress toward the 2020 hypertension targets

The hypertension prevalence rate in the general population is increasing and drifting away from the 2020 target of 13 per cent among adults in Canada (Table 1)⁴⁸. The rise in prevalence is likely attributable to several population trends, notably Canada’s aging population, improved survival of those with hypertension (related to enhanced diagnosis and control rates), but also the lack of improvement or worsening of lifestyle behaviours at the population level.

Modifiable risk factors including excess dietary salt (32 per cent attributable risk), lack of dietary potassium (17 per cent attributable risk), lack of physical activity (17 per cent attributable risk), adiposity (32 percent attributable risk) and excess alcohol consumption (3 per cent attributable risk) constitute the majority of the hypertension disease burden.⁴⁹ The most important risk

⁴⁸ Padwal RS, Bienek A, McAlister FA, Campbell NRC for the Outcomes Research Task Force of the Canadian Hypertension Education Program. Epidemiology of Hypertension in Canada: an Update. Can J Cardiol. In Press.

⁴⁹ Committee on Public Health Priorities to Reduce and Control Hypertension in the U.S. Population, Institute of Medicine of the National Academies. A Population-Based Policy and Systems Change Approach to Prevent and Control Hypertension. Report , v-173. 2010. Washington, DC, USA, National Academies Press.

factor is poor diet, which is responsible for an estimated 80% of hypertension, directly or indirectly (e.g. through obesity). Data from the 2010 Global Burden of Disease Study highlight poor diet as the leading risk factor for death and disability globally and in Canada.^{50,51}

The United Nations has set 2025 targets to reduce uncontrolled hypertension by 25 per cent and dietary sodium by 30 per cent.^{52,53} The World Health Organization (WHO) underlines the importance and urgency of population-wide approaches to achieve global targets and has recommended that all adults consume less than 2000 mg sodium per day. WHO selected hypertension as the theme for World Health Day in 2013. Policies to improve diets are identified as key interventions needed to prevent and control noncommunicable diseases, including hypertension.^{54,55} Indeed, sodium reduction strategies have been coined by the WHO as an elite 'best-buy' intervention to improve health.⁵⁶

Policy Actions: 2011-2015

Non-governmental Organizations

Non-governmental organizations have advocated for the implementation of different population strategies to address chronic disease risks, including diet (and specifically decreasing dietary sodium) for several decades. In the five years since the 2011 Hypertension Framework was launched, several significant developments have occurred.

In 2010, the Hypertension Advisory Committee (HAC) was formed to support the implementation of the 2011 Hypertension Framework, prioritizing public policy and reduction of dietary risk.⁵⁷ The key policy approaches for inclusion in such a strategy are identified in [Table 2](#), which also shows the high level of support for these policies among Canadians.^{58,59,60,61,62} To be effective, the policies need clear government oversight with monitoring, evaluation and regulation where voluntary approaches have not had rapid and uniform progress.

⁵⁰ Campbell NR, Lackland DT, Lisheng L, Niebylski ML, Nilsson PM, Zhang XH. Using the Global Burden of Disease Study to Assist Development of Nation-Specific Fact Sheets to Promote Prevention and Control of Hypertension and Reduction in Dietary Salt: A Resource From the World Hypertension League. *J Clin Hypertens (Greenwich)* 2015; 17(3):165-167.

⁵¹ Institute for Health Metrics and Evaluation <http://www.healthdata.org/data-visualization/gbd-arrow-diagram> accessed April 30 2015

⁵² World Health Organization. WHO Global Action Plan for the Prevention and Control of Noncommunicable Diseases 2013-2020. Report , III-103. 2013. Geneva, Switzerland, WHO Press, World Health Organization.

⁵³ World Health Organization. Global status report on noncommunicable disease 2014. Report , iv-280. 2014. Geneva, Switzerland, World Health Organization.

⁵⁴ World Health Organization. WHO Global Action Plan for the Prevention and Control of Noncommunicable Diseases 2013-2020. Report , III-103. 2013. Geneva, Switzerland, WHO Press, World Health Organization.

⁵⁵ World Health Organization. Interventions on diet and physical activity: what works: summary report. WHO 2009;1-48.

⁵⁶ World Health Organization. WHO Global status report on noncommunicable diseases 2010. Report , iii-161. 2011. Geneva, Switzerland, WHO Press, World Health Organization.

⁵⁷ HSF CIHR Chair in Hypertension Prevention and Control. <http://www.hypertensiontalk.com/> accessed April 30 2015

⁵⁸ Hypertension Canada Public Attitudes and Awareness Survey, 2015

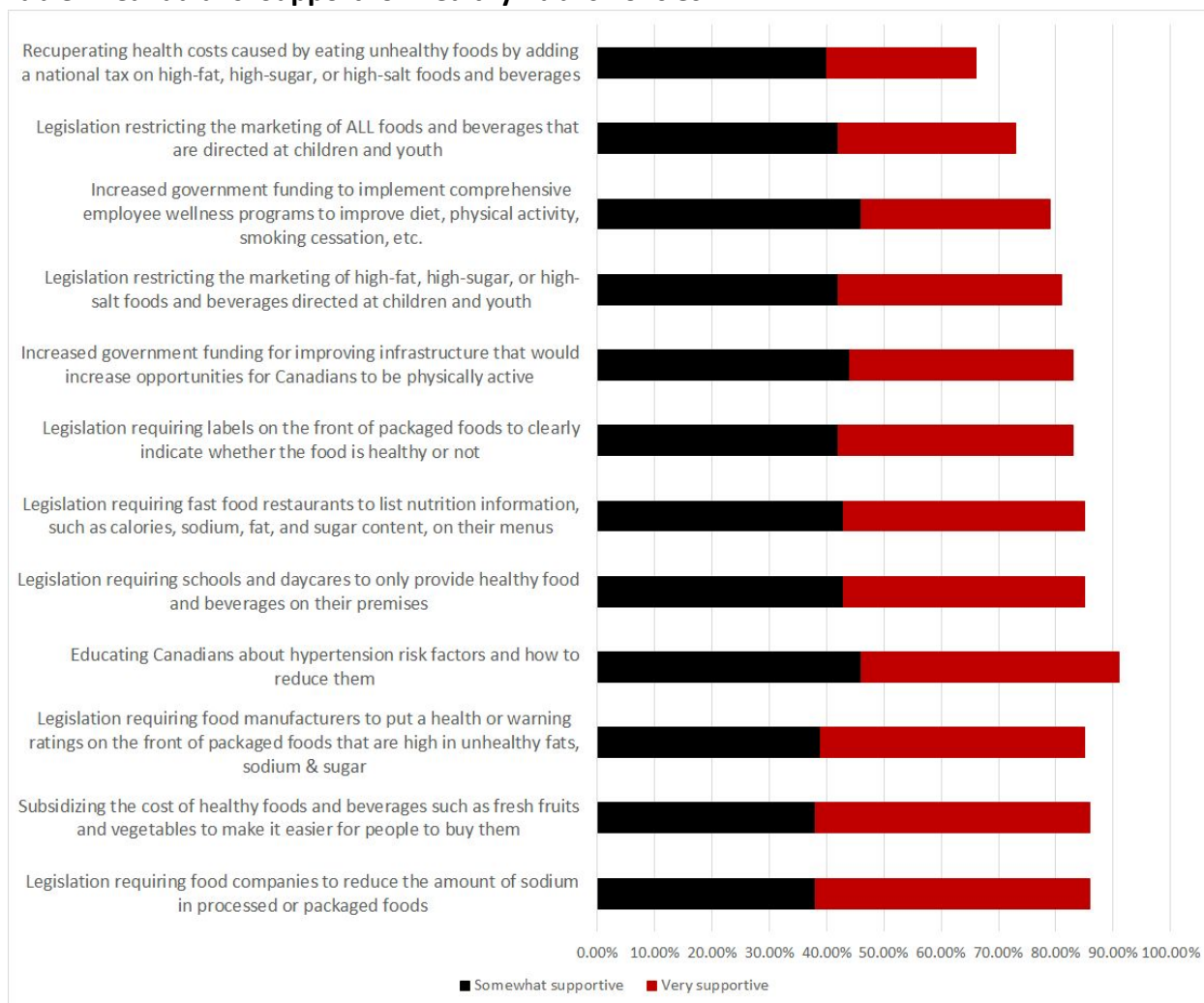
⁵⁹ Claro RM, Linders H, Ricardo CZ, Legetic B, Campbell NRC. Consumer attitudes, knowledge, and behavior related to salt consumption in sentinel countries of the Americas. Original Research. *Rev Panam Salud Publica* 2012; 32(4):265-273.

⁶⁰ Decima Research. Canadians' and Health Care Professionals' Views on Sodium. Report , 1. 12-16-2009. Canada, Decima Research Inc.

⁶¹ Nielsen. Battle of the Bulge & Nutrition Labels Healthy Eating Trends Around the World. A Nielsen Report. Report , 1-8. 2012. New York, USA, The Nielsen Company.

⁶² Ipsos Reid. Canadians' Perceptions of, and Support for, Potential Measures to Prevent and Reduce Childhood Obesity. Final Report. Report , 1-95. 2011. Ottawa, ON, Ipsos Reid.

Table 2: Canadians’ Support for Healthy Public Policies



The interventions outlined in Table 2 and in *A Call for Action to Implement a National Healthy Food Policy Agenda*⁶³ have the greatest potential to reduce⁶³ the burden of hypertension in Canada. They draw from and build upon several other international frameworks including the WHO’s *Global Action Plan for the Prevention and Control of Noncommunicable Diseases 2013-2020*⁶⁴; the World Cancer Research Fund NOURISHING Framework for healthy diets⁶⁵; and most recently the Healthy Food Environment Policy Index (Food-EPI) developed by the International Network for Food and Obesity / non-communicable Diseases Research, Monitoring and Action Support (INFORMAS).⁶⁶ Analysis of the policies indicate they can be cost-effective or even cost-saving.

The implementation of such policies requires coordinated action by many different stakeholders, including governments, civil society, the private sector and individual Canadians.

⁶³ <http://www.hypertensiontalk.com/> accessed April 20 2015

⁶⁴ World Health Organization. WHO Global Action Plan for the Prevention and Control of Noncommunicable Diseases 2013-2020. Report , III-103. 2013. Geneva, Switzerland, WHO Press, World Health Organization.

⁶⁵ <http://www.wcrf.org/int/policy/nourishing-framework>, accessed April 30, 2015

⁶⁶ Lobstein T, Brinsden H, Landon J, Kraak V, Musicus A, Macmullan J. INFORMAS and advocacy for public health nutrition and obesity prevention. *Obes Rev* 2013; 14 Suppl 1:150-156.

Table 3 lists organizations that support *A Call for Action to Implement a National Healthy Food Policy Agenda*.⁶⁷ Policy implementation plans should include targets and policy measures to increase the availability, affordability and accessibility of healthy foods and beverages, and decrease the same foods and beverages known to contribute to illness and disease risk.

Table 3: Organizations Supporting A Call for Action to Implement a National Healthy Food Policy Agenda

Alberta Policy Coalition for Chronic Disease Prevention
Canadian Association of Cardiovascular Prevention and Rehabilitation
Canadian Council of Cardiovascular Nurses
Canadian Diabetes Association
Canadian Nurses Association
Canadian Pharmacists Association
Canadian Society of Internal Medicine
Canadian Medical Association
Canadian Society of Nephrology
Canadian Association of Pediatric Nephrologists
Canadian Stroke Network
Canadian Stroke Network
College of Family Physicians of Canada
Dietitians of Canada
Food Secure Canada
Heart and Stroke Foundation
Hypertension Canada

The Committee has also developed and launched a number of detailed policy position statements on reducing dietary sodium,⁶⁸ restrictions on unhealthy food and beverage marketing to children,^{69,70} healthy food and beverage procurement policies,^{71,72} and food taxation and subsidy policies.^{73,74} The Committee will continue to support action on other identified priority areas including better research, monitoring and evaluation on nutrition and nutrition policy; reducing conflicts of interest in public policy decision-making on dietary issues and working towards defining healthy and unhealthy foods in Canada.

⁶⁷ <http://www.hypertensiontalk.com/position-statements/>, accessed September 6, 2015

⁶⁸ Campbell NRC, Willis KJ, L'Abbe M, Strang R, Young E. Canadian Initiatives to Prevent Hypertension by Reducing Dietary Sodium. *Nutrients* 2011; 3(8):756-764.

⁶⁹ Gelfer M, Mang E, Duhaney T, Campbell N. Calls for restricting the marketing of unhealthy foods to children ignored by policy makers: what can we do? *Can Fam Physician* 2014; 60(11):969-980.

⁷⁰ Campbell N, Pipe A, Duhaney T. Calls for restricting the marketing of unhealthy food to children: Canadian cardiovascular health care and scientific community get ignored by policy makers. What can they do? *Can J Cardiol* 2014; 30(5):479-481.

⁷¹ Houle SK, Rosenthal MM, Campbell NR, Duhaney T, Tsuyuki RT. Why pharmacists should care about the marketing of unhealthy foods: Increasing our role in public health policy / Pourquoi les pharmaciens devraient-ils s'intéresser à la promotion des aliments néfastes pour la santé? *Contributions davantage aux politiques en matière de santé publique. Can Pharm J (Ott)* 2014; 147(1):4-7.

⁷² Campbell N, Duhaney T, Arango M, Ashley LA, Bacon SL, Gelfer M et al. Healthy food procurement policy: an important intervention to aid the reduction in chronic noncommunicable diseases. *Can J Cardiol* 2014; 30(11):1456-1459.

⁷³ Niebyski ML, Redburn KA, Duhaney T, Campbell NR. Healthy food subsidies and unhealthy food taxation: A systematic review of the evidence. *Nutrition* 2015; 31:787-795

⁷⁴ Duhaney T, Campbell N, Niebyski ML, Kaczorowski J, Tsuyuki RT, Willis K et al. Death by Diet: The Role of Food Pricing Interventions as a Public Policy Response and Health Advocacy Opportunity. *Can J Cardiol* 2015; 31(2):112-116.

In addition to the Hypertension Advisory Committee, several other provincial and national health organizations including Hypertension Canada, the Centre for Science in the Public Interest, Food Secure Canada, the Heart and Stroke Foundation, the Childhood Obesity Foundation, the College of Family Physicians of Canada, the Dietitians of Canada, the Alberta Policy Coalition for Chronic Disease Prevention, the Quebec Coalition on Weight Related Problems and many others have been strong policy champions and advocates issuing complementary calls for government prioritization and implementation of internationally recommended food policies.⁷⁵

Federal Government

Since the launch of the 2011 Hypertension Framework, the federal government has made little progress toward the implementation of a national food policy or physical activity policy agenda.

The full implementation of the SWG Recommendations,⁷⁶ which aim to reduce the average daily sodium intake by Canadians to 2300 mg by 2016, would have helped to shift the prevalence of hypertension down toward the 2011 Hypertension Framework target of 13 per cent by 2020. The following *Case Study: Sodium Reduction for Canada - Recommendations of the Sodium Working Group* provides a full status update on this initiative.

Further to the Sodium Reduction Strategy, the *Integrated Pan-Canadian Healthy Living Strategy*,⁷⁷ the *Federal-Provincial-Territorial Framework for Action to Promote Healthy Weights*⁷⁸ and the *Preventing Chronic Disease Strategic Plan 2013-2016*⁷⁹ have all identified healthy eating as a priority policy initiative. Current federal investment in this area is limited primarily to health education and to supporting individual behaviour change. None of these approaches shows potential for long-term improvement in health outcomes without population-level policies to improve people's overall food environment.

It is noted that the Government of Canada is undertaking a process to modernize and improve food labels so that Canadians can correctly interpret nutrient thresholds. It is also producing a tool that will enable communities to assess and improve their food environments. Both initiatives have potential. It is notable that, following a report that the food labels in Canada were not accurate, the Federal Government ceased to monitor the accuracy of food labels.⁸⁰ Perhaps more concerning is the very high proportion of people reported to have financial interests in the food industry on federal government food policy committees.⁸¹ The Sodium Working Group and the Food Expert Advisory Committee had 47 per cent and 77 per cent of members, respectively, with financial interests in the food industry.

Supporting other lifestyle behaviours, the federal government passed Bill S-211: the National

⁷⁵ The authors acknowledge the policy and advocacy work of the various national and provincial NGOs not listed in this report. For inclusion into the final report in 2020, we encourage non governmental and governmental organizations to submit summaries of their public policy work to address not only diet but other policy efforts to address shared modifiable risk factors. Your summaries will be added as an appendix.

⁷⁶ Sodium Working Group. Sodium Reduction Strategy for Canada - Recommendations of the Sodium Working Group. Report , 1-61. 2010. Ottawa, Canada, Health Canada.

⁷⁷ <http://www.phac-aspc.gc.ca/hp-ps/hl-mvs/ipchls-spimmvs-eng.php>, accessed April 30 2015

⁷⁸ <http://www.phac-aspc.gc.ca/hp-ps/hl-mvs/ipchls-spimmvs-eng.php>, accessed April 30 2015

⁷⁹ http://www.phac-aspc.gc.ca/cd-mc/diabetes-diabete/strategy_plan-plan_strategique-eng.php, accessed April 30 2015

⁸⁰ Fitzpatrick L, Arcand J, L'Abbe M, Deng M, Duhaney T, Campbell N. Accuracy of Canadian food labels for sodium content of food. *Nutrients* 2014; 6(8):3326-3335.

⁸¹ Campbell N, Willis KJ, Arthur G, Jeffery B, Robertson HL, Lorenzetti DL. Federal government food policy committees and the financial interests of the food sector. *Open Med* 2013; 7(4):e107-e111.

Health and Fitness Day Act in 2014. It encourages local municipalities as well as the public to celebrate and promote the use of local health, recreational, sports and fitness facilities. The Government of Canada is encouraged to explore other policy responses to increase access to physical activity opportunities for Canadian children, youth and adults.

Provincial/Territorial Governments

The provinces and territories are well positioned to develop and advocate for healthy food policies in their jurisdictions. Improving food security and people's access to healthy, nutritious food remains an important issue for many provincial and territorial governments. Recent reports outline more than 100 policies, programs, and initiatives across provincial and territorial jurisdictions that are in place to address food insecurity and to increase access to healthy affordable food.⁸²

Improving children's dietary behaviours has been a focus of many governments. With the exception of the Territories, all Canadian provinces have school food guidelines or policies in place. Almost all use a categorization (e.g., serve/sell most; serve/sell sometimes; serve/sell least) system to define the nutritional quality of food and beverage products according to established threshold criteria for a range of nutrients (namely unhealthy fats, sugar and salt).

To create equity between existing guidelines and to harmonize action, the *Provincial and Territorial Guidance Document for the Development of Nutrient Criteria for Foods and Beverages in School* was launched in early 2014.⁸³ The voluntary provincial-territorial document is intended to promote the development and reformulation of food and beverage products, in line with nutrient targets for saturated and trans fats, salt (sodium), sugars, calcium, vitamin D, sugar substitutes and protein. In order to be effective, it will need to be elevated so that it is legislated, enforced and evaluated.

Currently, Alberta is the only province to have developed comparable nutrition guidelines for adults. These have been implemented in public health facilities and are promoted for adoption by the private sector. In 2015, the Ontario Liberal Government introduced the Making Healthier Choices Act (MHCA), which will require restaurant chains to post the caloric content of food and beverage items. British Columbia has also implemented the Informed Dining Program, a voluntary program to label restaurant foods.

In 2010 provincial and territorial Health Ministers developed *Reducing the Sodium Intake of Canadians: Federal, Provincial and Territorial Actions Taken and Future Directions*^{84,85}. Broadly, the report highlights actions that provincial and territorial governments are taking to reduce dietary sodium. It also confirms ongoing commitments to coordinate a consistent, national approach to sodium reduction.

⁸² <http://www.foodshedproject.ca/pdf/Provincial%20Approaches%20to%20Food%20Security.pdf> accessed and <http://www.phn-rsp.ca/thcpr-vcpsre-2013/images/Compilation-of-Initiatives-EN.pdf> April 30 2015

⁸³ Federal PaTG, The Working Group. Provincial and Territorial Guidance Document for the development of Nutrient Criteria for Foods and Beverages in Schools 2013. Report , 1-55. 2013. Canada, Government of Canada.

⁸⁴ Federal PaTMOH. Reducing the Sodium Intake of Canadians: Federal, Provincial and Territorial Actions Taken and Future Directions. Report , 1-34. 2011. Canada, Federal, Provincial and Territorial Ministers of Health.

⁸⁵ Provincial and Territorial Ministers of Health and Healthy Living. Reducing the Sodium Intake of Canadians: A Provincial and Territorial Report on Progress and Recommendations for Future Action. Report , i,-42. 2012. Canada, Provincial and Territorial Ministers of Health and Healthy Living. (www.icsh-cces.ca/upload/sodium-report-PTMH-2012.pdf)

Policy Recommendations: 2015-2020

- 1. Implement effective multi-sectoral national food policy and physical activity policies that improve environments and create equity by making healthy choices the easy choices for all Canadians.**
 - a. Restrict the marketing of foods and beverages to children and youth.
 - b. Implement healthy food and beverage procurement policies in publicly funded programs and institutions and other settings (private, not-for-profit) that buy, serve and sell food to Canadians.
 - c. Regulate and reduce the addition of sodium and trans fatty acids in processed food products. Determine the best way to minimize added sugar and saturated fat in the food supply.
 - d. Charge the Healthy People and Communities Steering Committee of the Pan-Canadian Public Health Network (PCPHN) with the implementation of the Sodium Working Group Recommendations (2010) and provide adequate staffing and funding for the task.⁸⁶ Have the Committee report annually and publicly on progress through the PCPHN Council to the Conference of Deputy Ministers of Health.
 - e. Require and improve nutrition labeling on processed food products and in eating establishments to help Canadians easily and correctly identify healthy foods.
 - f. Subsidize healthy food products and tax unhealthy food products simultaneously.
 - g. Minimize commercial food and beverage industry influence over public health policy.

- 2. Develop strong inter-sectoral partnerships to advocate effectively for evidence-based policy interventions, especially regarding modifiable risk factors.**
 - a. Integrate policy recommendations into clinical practice guidelines
 - b. Publish policy recommendations focused on public health and journals for health care professionals
 - c. Incorporate policy and advocacy education into scientific meetings. Illustrate the potential of advocacy to improve health by addressing poverty and access to health resources in underserved communities.
 - d. Partner on advocacy with Aboriginal/Indigenous communities, having an understanding of the cultural and environmental changes that have contributed to reduced physical activity levels and to poor nutrition in those communities.

⁸⁶ Sodium Working Group. Sodium Reduction Strategy for Canada - Recommendations of the Sodium Working Group. Report , 1-61. 2010. Ottawa, Canada, Health Canada.

3. **(See Also) Strengthen research, monitoring and evaluation to inform nutrition and health policy development: assess the impact of dietary risk factors and interventions on health outcomes.** *See section on optimizing information systems for detailed recommendations.*

Case Study: Sodium Reduction for Canada - Recommendations of the Sodium Working Group

Section Acknowledgements: Eric Young

Background

In late 2007, a multi-stakeholder Sodium Working Group (SWG) composed of representatives from governments, the food industry, public health, nutrition experts and clinicians were given the task of developing “a population strategy for reducing sodium intake among Canadians” by Hon. Tony Clement, Minister of Health.⁸⁷ The Group presented Sodium Reduction for Canada - Recommendations of the Sodium Working Group to Hon. Leona Aglukkaq, Minister of Health, in July 2010.

The Sodium Working Group’s target to reduce the population’s sodium intake levels by one third by 2016 was supported by Provincial Premiers and Territorial Leaders in 2010. In September 2010, Provincial and Territorial Health Ministers called for regulations to be developed in case voluntary sodium reductions were not demonstrated.

In December 2010, the federal government cited the setting of population-level sodium reduction targets with the provinces and territories as one of the key accomplishments for that year. Unfortunately, the implementation of the SWG recommendations has been neither robust nor effective.

The Strategy had six overarching recommendations, including:

- setting an interim target of an average population intake of 2,300 mg of sodium per day by 2016;
- developing operational plans to implement the strategy;
- providing adequate funding to ensure success of the strategy; and
- integrating the recommendations into nutrition policies and programs.

There were also specific recommendations related to the food supply (10 recommendations), awareness and education (7 recs), research (5 recs) and monitoring and evaluation (5 recs). The document recommended starting with a structured, voluntary reduction approach, which, if monitoring demonstrated limited progress, could include regulatory and fiscal approaches. A key recommendation was that of annual public reporting on the progress of the implementation of the strategy.

To support the SWG’s strategic recommendations, there are many tools available to enable government-coordinated hypertension prevention implementation efforts in Canada. A number of relevant, foundational, national frameworks have been developed over the last ten years. Public and population health experts have many venues for collaboration. And there has been extensive, intersectoral work done by the food processing industry, academics, federal and provincial-territorial government departments, researchers and research agencies, public

⁸⁷ <http://www.hc-sc.gc.ca/fn-an/nutrition/sodium/related-info-connexes/strateg/reduct-strat-eng.php>

health and preventive medicine specialists, clinical specialists, nutritionists and many health-focused non-governmental organizations.

Canadian Health Promotion Policy Environment

The SWG recommendations complemented previous frameworks that had been developed over the last several years. Those frameworks include:

The Canadian Healthy Living Strategy (2005)

The federal, provincial and territorial governments (except for Quebec, which preferred to collaborate while pursuing an independent like-minded strategy) endorsed this strategy as a conceptual framework for sustained action. This strategy proposed a target of a 20 per cent increase in the proportion of Canadians who are physically active, eat healthy and are at healthy body weights.⁸⁸ Under healthy eating the target was "By 2015, increase by 20 per cent the proportion of Canadians who make healthy choices according to the CCHA SC/CIHI Health Indicators". The target measure was consumption of fruit and vegetables of at least five fruits and vegetables per day. The focus of the recommendations on healthy eating was on personal behaviours and choices. The plan called for an integrated research agenda and annual reports on progress to be presented on progress to the federal-provincial-territorial Conference of Deputy Ministers of Health and to the federal-provincial-territorial Ministers of Health.

The Integrated Strategy on Healthy Living and Chronic Disease (2005)

Developed by the Public Health Agency of Canada,⁸⁹ this strategy had three pillars:

1. Promote health by addressing conditions that lead to unhealthy eating, physical inactivity and unhealthy weights.
2. Prevent chronic disease through focused and integrated action on major chronic diseases and their risk factors.
3. Support the early detection and management of chronic diseases.

Building a Heart Healthy Canada and Action Plan (2009)

These were developed by a large multi-stakeholder group over two years and presented to Hon. Leona Aglukkaq, Minister of Health.⁹⁰ One important goal was to create a healthy food environment, including improving food quality and reducing salt, and "ensuring timely implementation of the Working Group's [Sodium Working Group] recommendations."

⁸⁸ www.phac-aspc.gc.ca/hp-ps/hl-mvs/pchls-spimmvs/sum-res-eng.php

⁸⁹ www.phac-aspc.gc.ca/hp-ps/hl-mvs/hla-umvs/index-eng.php

⁹⁰ <http://www.waittimealliance.ca/wp-content/uploads/2014/05/CCS-Building-a-Heart-Healthy-Canada.pdf>

A Declaration on Prevention and Promotion (2010)

The federal, provincial and territorial Ministers of Health and Health Promotion/ Healthy Living produced this document, which emphasised and prioritized chronic disease prevention. It identified the importance of "changing risk factors and conditions that lie outside the health sector".

Given such a strong policy mandate, the federal, provincial and territorial Ministers of Health and Health Promotion/ Healthy Living adopted the recommended interim target of the strategy: a population average sodium consumption of 2,300 mg per day by 2016 (down from the 2010 levels of 3,400 mg per day).

Pan-Canadian Public and Population Health Organizational Structure

A number of collaborative structures have been developed in Canada to link federal, provincial and territorial public and population health policy. These structures provide the opportunity for integration of health public policy and programs across the country and include:

The Pan-Canadian Public Health Network (PCPHN)

In 2005, the federal-provincial-territorial Ministers of Health set up the PCPHN with a broad mandate to facilitate information-sharing among public health professionals in Canada. It is a collaboration of individuals from all levels of government, academics, public health professionals and intersectoral experts. Its Council of 17 comprises Chief Medical Officers of Health and federal-provincial-territorial officials. The Council reports to the Conference of federal-provincial-territorial Deputy Ministers of Health. The Deputy Ministers of Health "provide direction and approve health policy priorities for Canada."⁹¹ The Council may provide advice and guide the "development of collaborative strategies."

The PCPHN Council has three steering committees: Healthy People and Communities, Communicable and Infectious Diseases, and Public Health and Infrastructure. Since 2010, the PCPHN Steering Committee on Healthy People and Communities had prioritized healthy weights and sodium reduction. Of the two priorities, that group has, thus far, only reported progress on healthy weights.

The Council of Chief Medical Officers of Health of Canada

This group includes all provincial and territorial Chief Medical Officers of Health, as well as the Chief Public Health Officer for Canada (from the Public Health Agency of Canada) and the medical health lead in the First Nation and Inuit Health Branch of Health Canada. This group reports through the PCPHN Council to the Conference of federal-provincial-territorial Deputy Ministers of Health.

Sodium Reduction for Canada - Recommendations of the Sodium Working Group

The SWG recommended a reduction in sodium levels "in processed food products and foods sold in food services establishments" as well as increased education and awareness. Research, monitoring, and evaluation were also recommended for levels of sodium in the food supply

⁹¹ <http://www.phn-rsp.ca/network-eng.php>

(which was expected to change with product reformulation), patterns of food consumption, changes in sodium intake over time, morbidity and mortality changes, effectiveness of education and awareness programs and cataloguing sodium-related research underway. Notably, it specified that "an annual public report on the evaluation of all components of the [SWG Recommendations] should be released"; "Health Canada should specifically monitor the sodium in food products in collaboration with the food industry"; and "The level of funding to support priority research projects identified in the research plan also needs to be monitored."

Progress since the SWG Recommendations

A federal-provincial-territorial sodium group was established to review and make recommendations to the federal-provincial-territorial Ministers of Health on the implementation of the SWG Recommendations. Health Canada chose not to be party to the final provincial-territorial report that resulted. That report, *Reducing the Sodium Intake of Canadians: A Provincial and Territorial Report on Progress and Recommendations for Future Action*, was delivered in 2012.⁹² It outlined provincial and territorial initiatives to reduce sodium consumption.

Initiatives targeted sodium reduction in the food supply; awareness and education; and research, monitoring and evaluation. The report asked the food industry "to join governments in publicly committing to the 2016 sodium reduction goal" and provided a list of opportunities for federal government leadership and collaboration with the provinces and territories.

It also called for partnership and independent oversight:

"Objective monitoring by someone other than the food industry is necessary for evaluating industry progress in lowering sodium in food products, and would both create a level playing field and provide appropriate recognition for companies who are meeting commitments. The federal government is asked to work with provinces and territories, industry and other stakeholders on a plan for independent monitoring of the food supply."

Canada's health and scientific community hopes that the PCPHN Steering Committee or the provincial-territorial Ministers of Health will update the above report by 2016 and that the federal government will be a party to the updated report.

After the SWG Recommendations were released, Health Canada worked with the food industry and nutrition and health experts to develop sodium target guidance documents for industry, which the federal government refers to as benchmarks for many processed foods.⁹³ Neither Health Canada nor the food industry (collectively) has provided detailed ongoing monitoring and public reporting of the sodium content in the processed foods listed in the national guidance documents for industry. The implementation of the comprehensive SWG Recommendations required the federal government to play a leadership role for which it has

⁹² <http://www.health.alberta.ca/documents/Sodium-Report-PTMH-2012.pdf>

⁹³ www.hc-sc.gc.ca/fn-an/alt_formats/pdf/legislation/guide-ld/2012-sodium-reduction-indust-eng.pdf

not met expectations. Current national data indicate that a large majority of food products do not meet the voluntary sodium benchmark targets set out in 2011.^{94,95,96,97,98}

In 2012, Bill C-460: An Act Respecting the Implementation of the Sodium Reduction Strategy for Canada, was introduced into the House of Commons as a private member's bill. It was subsequently defeated in May, 2013 by the majority conservative government despite strong support from opposition party members and more than 60 health, scientific and civil society organizations that represented at least 70 per cent of Canadians. Polls of Canadian adults indicate overwhelming support for regulating the amount of salt added during food processing (see [Table 2](#)).

Funding for research and monitoring

It was anticipated that a collaboration of Canadian Institutes of Health Research (CIHR), Natural Sciences and Engineering Research Council and other agencies would develop a framework for sodium research related to the SWG Recommendations, and that would then lead to federal accountability for monitoring. This has not been realized. According to the Public Health Agency of Canada's Healthy Living Fund report from 2010-14, not a single sodium reduction research study or pilot project was reported as funded by that source during that time.

CIHR has a number of sodium-related studies listed on its website, however, only a small amount of funding has gone to monitoring sodium trends in processed foods.⁹⁹ None of the funded studies included an in-depth assessment of industry-disclosed information on sodium benchmark levels in listed foods.¹⁰⁰

Private sector voluntary action

According to Agriculture and Agri-Food Canada (AAFC), the "industry is committed to lowering the sodium content of processed food." Neither the federal government nor most processed food companies have publicly committed to all of the guidance document's benchmark targets.

¹⁰¹ Health Canada did not develop a comprehensive and transparent plan or a publicly

⁹⁴ Arcand J, Au JT, Schermel A, L'Abbe MR. A comprehensive analysis of sodium levels in the Canadian packaged food supply. *Am J Prev Med* 2014; 46(6):633-642.

⁹⁵ Scourboutakos MJ, L'Abbe MR. Sodium Levels in Canadian Fast-food and Sit-down Restaurants. *Can J Public Health* 2013; 104(1):e2-e8.

⁹⁶ Scourboutakos MJ, L'Abbe MR. Changes in sodium levels in chain restaurant foods in Canada (2010-2013): a longitudinal study. *CMAJ Open* 2014; 2(4):E343-E351.

⁹⁷ Dunford E, Webster J, Woodward M, Czernichow S, Yuan WL, Jenner K et al. The variability of reported salt levels in fast foods across six countries: opportunities for salt reduction. *CMAJ* 2012; 184(9):1023-1028.

⁹⁸ Scourboutakos MJ, Semnani-Azad Z, L'Abbe MR. Restaurant meals: almost a full day's worth of calories, fats, and sodium. *JAMA Intern Med* 2013; 173(14):1373-1374.

⁹⁹ CIHR - 201103SOK project on nutrition, begun in 2011 and lasting three years, was awarded \$173,040 for "Evaluating the impact of Canada's Sodium Reduction Strategy on Dietary Intakes of Sodium, the overall nutritional quality of the food supply, changes in food labelling and consumer knowledge and attitudes towards sodium" by Mary L'Abbe, et al, under the "Sodium and Health - Operating Grants Knowledge to Action" CIHR grants. This research at the University of Toronto was to look at the food supply using the U of T database and plot trends in the foods contained therein. The research group was also going to do a web-based survey on knowledge, attitudes and behaviour related to using food labels.

¹⁰⁰ A study funded (\$261,194) an assessment of population-level prevention and implications for socioeconomic inequities in health using dietary sodium as a case example. A study of the role of endoplasmic reticulum (ER) stress in the development of kidney disease (201103OSO - \$227,019), one on the effects of parental sodium intake on offspring [in pregnant rats] (201109OSO - \$430,446), and another on the role of RFamide peptides in CNS cardiovascular regulation (201009OSO - \$272,313) are reported under the "Sodium and Health -Operating Grants" on the CIHR website. The last of the sodium targeted initiatives was a collaborative health research project (NSERC / CIHR) under the heading "Sodium Reduction in the Food Supply" (201110CPF - \$54,638). That was a study of the "strategies for overcoming dough stickiness during the processing of low sodium breads".

¹⁰¹ <http://www.agr.gc.ca/eng/industry-markets-and-trade/food-regulations/food-policy-and-regulatory-issues/reports-and-resources/sodium-reduction-efforts-by-the-canadian-food-industry/?id=1363026410711>

accessible database for monitoring, by company and by product, the changing levels of sodium in listed foods.

AAFC reports a qualitative, voluntary survey of 55 Canadian companies which found that "most companies had a sodium reduction strategy, policy or guidelines in place. Most also had taken steps to reduce the levels of sodium in their products". The Canadian Restaurant and Foodservice Association reported in 2010 that "many restaurants have decreased their sodium levels since that time." These assessments conflict with the results of University of Toronto research published in the Canadian Medical Association Journal, looking at sodium levels in restaurant foods from 2010 to 2013.¹⁰²

The study quantitatively assessed changes over time in the sodium content in 3,878 foods. While a portion of foods had decreased in sodium content (30 per cent), others had increased (16 per cent) and most remained constant (54 per cent). On average, a very small reduction of 25 mg of sodium per 100 g of food was achieved.¹⁰³ The authors concluded that "From 2010 to 2013 sodium levels in the majority of restaurant foods in Canada were unchanged... This study highlights the importance of establishing targets for sodium reduction in restaurant foods in Canada, and the need for a government-enforced sodium-reduction strategy with regular monitoring."

The federal government developed a plan for monitoring food and sodium consumption in the population through an expanded nutrition segment of the 2015 Canadian Community Health Survey. This will allow some assessment of broad changes in sodium in food, but cannot produce the level of granularity and statistically relevant data required to adequately track reductions in specific products or by producer. It would allow for a comparison with the results a similar study (CCHS 2.2) conducted in 2004. The federal government should commit to repeat this survey every five years so that comparisons can be made over time.

Post-mortem on the Sodium Working Group

While it is true that provinces and territories bear most of the responsibility for the health care, the global food supply is regulated at the federal level by the *Food and Drugs Act* and *Food and Drug Regulations*. Likewise, *Canada's Food Guide* is the most widely distributed federal publication after income tax forms. Accordingly, leadership by the federal government is crucial when it comes to keeping people healthy. While provinces and territories have reported significant progress in some areas of the SWG Recommendations, the federal government has not. Lack of leadership has limited important public health promotion and disease prevention initiatives that could enhance the sustainability of the health care system and improve the health of Canadians.

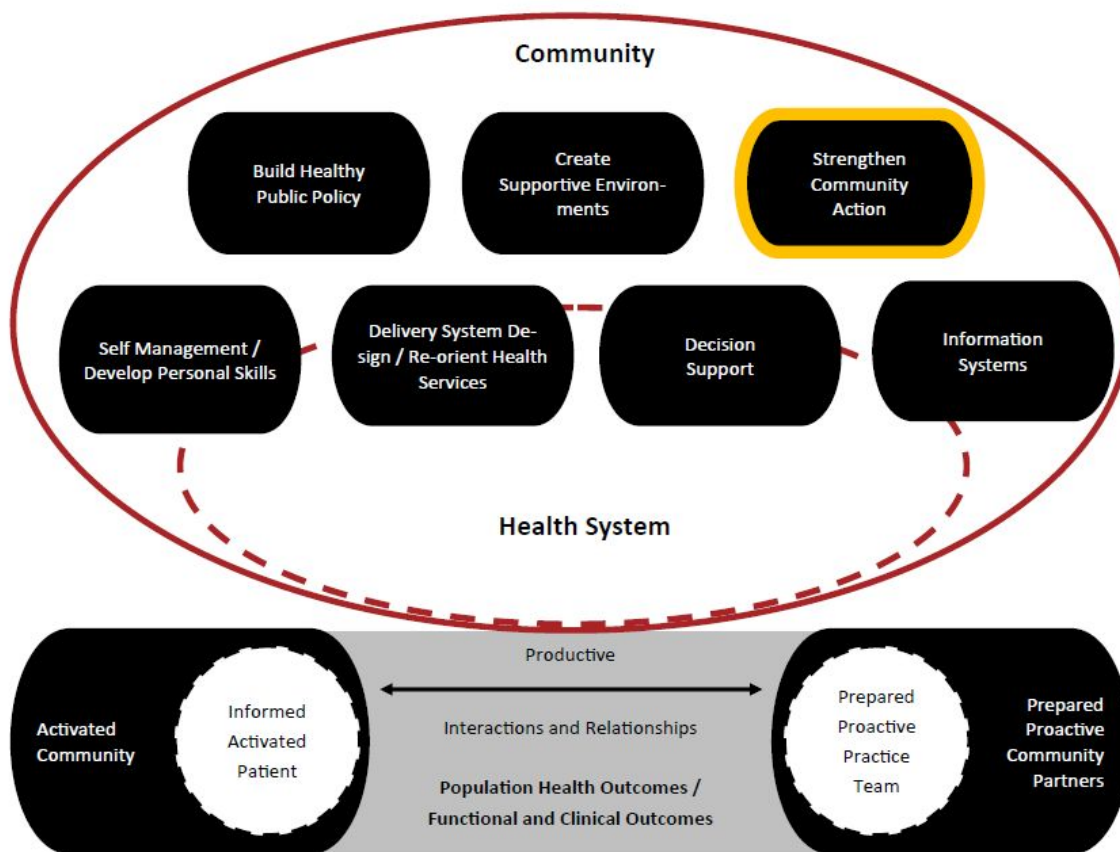
¹⁰² Scourboutakos, M.J. and L'Abbe, M.R, "Changes in sodium levels in chain restaurant foods in Canada (2010-2013): a longitudinal study", *CMAJ Open*, 2(4), E343- E 531.

¹⁰³ The mean sodium level per 100 gms was 917 mg in 2010 and 892 mg in 2013.

Strengthen community action

Plan, implement and evaluate programs which support community action in setting local priorities and which develop individuals' sense of control and resilience in the prevention, control and management of hypertension in settings where they live, work and play. Consult and engage with community members and organizations to adopt evidence-based health promotion and disease prevention services and structures.

Section Acknowledgements: Janusz Kaczorowski



Progress toward the 2020 hypertension targets

Canada, as most other countries, does not fare well in preventing or delaying the onset of hypertension. According to the latest national reports^{104,105}, 85 per cent of Canadians are not meeting the weekly physical activity recommendations; fruit and vegetable consumption is in decline; consumption of processed and fast foods as well as heavy alcohol drinking are on the rise; and high rates of obesity and overweight remain virtually unchanged (putting roughly 60 per cent of men and 45 per cent of women at risk of diet-related disease). To reverse these trends, effective upstream prevention strategies at the population level need to be urgently implemented..

¹⁰⁴ Colley RC, Garriguet D, Janssen I, Craig CL, Clarke J, Tremblay MS. Physical activity of Canadian children and youth: accelerometer results from the 2007 to 2009 Canadian Health Measures Survey. Health Rep 2011 March;22(1):15-23.

¹⁰⁵ Statistics Canada. Canadian Community Health Survey, 2011. The Daily 2012;(Tuesday, June 19, 2012) <www.statcan.gc.ca/daily-quotidien/120619/dq120619b-eng.pdf>

The 2011 Hypertension Framework identified two mutually reinforcing prongs of action required to reduce the population burden of hypertension: population-level interventions and individual-level interventions focused on high-risk individuals.¹⁰⁶ Community-based programs are the prime tool for implementing a population-level prevention initiative.¹⁰⁷ These programs encompass a wide range of interventions delivered in a synergistic way in community settings in order to target an entire population instead of individuals. The aim of such programs is to reduce risk for everybody in the community. Key components of such interventions include mass media campaigns, self-help programs, universal screenings, mobilization of community leaders and agencies to promote healthy lifestyles, and engaging volunteers and others to help deliver the programs.¹⁰⁸

Community-based programs are attractive on several accounts:

- They have the potential to fight root causes of hypertension and to prevent new cases;
- They can help to prevent other diseases with common risk factors;
- They present an educational opportunity to reach marginalized (by the conventional health system) populations and advance community organization and activation principles. That is, they build the capacity of communities by establishing critical masses of community resources that other community projects can then utilize.^{109,110,111,112,113,114,115}
- Because of the use of mass media or volunteers, community-based programs can have comparatively low cost-effectiveness ratios.^{116,117}

Policy Actions: 2011-2015

While the effectiveness of many community-based programs is debatable, the “Made-in-Canada” Cardiovascular Health Awareness Program (CHAP) has consistently demonstrated implementability and effectiveness. CHAP is a patient-centred, interdisciplinary,

¹⁰⁶ Campbell N, Young ER, Drouin D, Legowski B, Adams MA, Farrell J, Kaczorowski J, Lewanczuk R, Lum-Kwong MM, Tobe S. A framework for discussion on how to improve prevention, management, and control of hypertension in Canada. *Can J Cardiol* 2012 May;28(3):262-9.

¹⁰⁷ Sellers DE, Crawford SL, Bullock K, McKinlay JB. Understanding the variability in the effectiveness of community heart health programs: a meta-analysis. *Soc Sci Med* 1997 May;44(9):1325-39.

¹⁰⁸ Parker DR, Assaf AR. Community interventions for cardiovascular disease. *Prim Care* 2005 December;32(4):865-81.

¹⁰⁹ Held C, Iqbal R, Lear SA, Rosengren A, Islam S, Mathew J, Yusuf S. Physical activity levels, ownership of goods promoting sedentary behaviour and risk of myocardial infarction: results of the INTERHEART study. *Eur Heart J* 2012 February;33(4):452-66.

¹¹⁰ Ijzelenberg W, Hellems IM, van Tulder MW, Heymans MW, Rauwerda JA, van Rossum AC, Seidell JC. The effect of a comprehensive lifestyle intervention on cardiovascular risk factors in pharmacologically treated patients with stable cardiovascular disease compared to usual care: a randomised controlled trial. *BMC Cardiovasc Disord* 2012 September 10;12(1):71.

¹¹¹ 8. Sehestedt T, Hansen TW, Li Y, Richart T, Boggia J, Kikuya M, Thijs L, Stolarz-Skrzypek K, Casiglia E, Tikhonoff V, Malyutina S, Nikitin Y, Bjorklund-Bodegard K, Kuznetsova T, Ohkubo T, Lind L, Torp-Pedersen C, Jeppesen J, Ibsen H, Imai Y, Wang J, Sandoya E, Kawecka-Jaszcz K, Staessen JA. Are blood pressure and diabetes additive or synergistic risk factors? Outcome in 8494 subjects randomly recruited from 10 populations. *Hypertens Res* 2011 June;34(6):714-21.

¹¹² Mittelmark MB, Hunt MK, Heath GW, Schmid TL. Realistic outcomes: lessons from community-based research and demonstration programs for the prevention of cardiovascular diseases. *J Public Health Policy* 1993;14(4):437-62.

¹¹³ Schooler C, Farquhar JW, Fortmann SP, Flora JA. Synthesis of findings and issues from community prevention trials. *Ann Epidemiol* 1997 October 1;7(7):S54-S68.

¹¹⁴ De Las Nueces D, Hacker K, DiGirolamo A, Hicks LS. A systematic review of community-based participatory research to enhance clinical trials in racial and ethnic minority groups. *Health Serv Res* 2012 June;47(3 Pt 2):1363-86.

¹¹⁵ Scheirer MA. Is Sustainability Possible? A Review and Commentary on Empirical Studies of Program Sustainability. *American Journal of Evaluation* 2005 September 1;26(3):320-47.

¹¹⁶ Schooler C, Farquhar JW, Fortmann SP, Flora JA. Synthesis of findings and issues from community prevention trials. *Ann Epidemiol* 1997 October 1;7(7):S54-S68.

¹¹⁷ O'Connor P, Vazquez-Benitez G, Selby J, Margolis K, Desai J, Magid D. CB1-06: Benefits of Early Versus Later Hypertension Treatment and Control on Cardiovascular Outcomes in Those with Diabetes: Clinical and Research Implications. *Clin Med Res* 2012 August;10(3):156.

multi-pronged, community-led cardiovascular disease and stroke prevention and management program targeted at older adults. CHAP integrates community-based cardiovascular health promotion and chronic disease management activities through partnerships with primary health care providers, community pharmacists, public health, locally recruited and trained older adult 'peer health educator' volunteers, and community agencies.

Local lead organizations offer regular CHAP programming in community pharmacies. Participants are referred to pharmacies by family physicians and through local advertising efforts. Blood pressure measurements and other information relevant to the completion of a cardiovascular disease and stroke risk assessment (e.g. physical activity, diet, body mass index (BMI), and smoking status), are recorded by peer health educator volunteers using automated blood pressure measurement devices. Results are shared with the family physician, regular pharmacist and the participants themselves using action-oriented paper summaries and a secure, internet-based portal. The age-matched peer health educators also provide participants with educational messages about lifestyle modification, refer to locally available resources, support adherence to prescribed therapies and encourage and support involvement in self-care.

CHAP is easily implementable in any community and has been rigorously evaluated in a series of controlled studies. CHAP has been shown to add value in terms of the health and wellbeing of participants and volunteers without additional costs to the health care system. CHAP has received many awards (ex: *CIHR-CMAJ Top Canadian Achievements in Health Research Awards for 2012*) and has been recognized by the BMJ^{118,119} as one of 20 outstanding articles published since the mid 1990s. Scaling up CHAP across Canada would significantly improve the prevention and management of hypertension.

The Chronic Care Model identifies successful chronic disease management strategies in six fundamental areas. The CHAP program is explicitly based on the Wagner's model (see [Figure 1](#) for an expanded version), which connects community resources and policies with health system components. The model stipulates that improvement in care requires an approach that incorporates patient-, provider-, and system-level interventions. For example, primary care providers are asked to intervene with risk behaviours of patients by linking to community-based programs and patient self-management supports that can improve care at both the population and the individual level.^{120,121}

A comprehensive economic analysis published in 2013 showed that CHAP can reduce cardiovascular disease-related hospitalization costs at the community level without a corresponding increase in overall healthcare costs.¹²² In terms of cardiovascular disease hospitalizations, one dollar invested in the CHAP program was associated with savings of two dollars in terms of annual cardiovascular disease hospitalization rates.

CHAP was recognized locally, provincially, nationally and internationally as exemplary in terms of its design, evaluation and impact. The accumulated evidence over 15 years demonstrates

¹¹⁸ Kaczorowski J et al. Improving cardiovascular health at population level: 39 community cluster randomised trial of Cardiovascular Health Awareness Program (CHAP) *BMJ* 2011;342:d442

¹¹⁹ Twenty top papers to mark The BMJ's two digital decades, *BMJ* 2015;351:h3660

¹²⁰ Campbell N, Young ER, Drouin D, Legowski B, Adams MA, Farrell J, Kaczorowski J, Lewanczuk R, Lum-Kwong MM, Tobe S. A framework for discussion on how to improve prevention, management, and control of hypertension in Canada. *Can J Cardiol* 2012 May;28(3):262-9.

¹²¹ Mittelmark MB, Hunt MK, Heath GW, Schmid TL. Realistic outcomes: lessons from community-based research and demonstration programs for the prevention of cardiovascular diseases. *J Public Health Policy* 1993;14(4):437-62.

¹²² Goeree, R. et al. Economic appraisal of a community-wide cardiovascular health awareness program. *Value Health* 16, 39–45 (2013).

how CHAP can provide better quality health care, improve system-level integration of care, and bend the cost curve.

Considerable resources are spent on initiatives that are discontinued soon after their initial funding ends.^{123,124} At present, CHAP continues to operate as a series of pilot and research projects that are not integrated as part of a comprehensive strategy to improve the health of Canadians. Competing interests and lack of knowledge about CHAP by decision-makers are the most significant barriers. Support and endorsement of CHAP by the key national and professional associations would increase awareness and facilitate a scaled implementation and the sustainability of CHAP.

Health care in Canada is decentralized, involving different systems in each of 15 provinces and territories. Even within the provinces and territories, there is further fragmentation and regionalization. This decentralization is a barrier to the sustainability of novel programs across multiple jurisdictions. Despite the abundance of innovations, Canada remains “A Country of Perpetual Pilot Projects.”¹²⁵ Investment and coordination for systematically scaling up transformative hypertension prevention projects in communities across Canada is insufficient.

The most egregious ‘missed opportunity’ is in recognizing and funding community pharmacists for their unique abilities to detect and control hypertension. Pharmacists are highly accessible primary health care professionals. They have expertise in pharmacotherapy and in-pharmacy blood pressure kiosks are used 1,000 times per month in many community pharmacies. Pharmacists are therefore ideally suited to screen for hypertension and to improve hypertension management. Indeed, numerous randomized controlled trials of pharmacist care in hypertensive patients have demonstrated that pharmacist care was associated with a greater reduction in blood pressure than the usual care.^{126,127}

More recently, two Canadian trials have shown pharmacist *prescribing* in hypertension was associated with higher levels of achievement against blood pressure and lipid targets^{128,129} as well as greater reductions in blood pressure.^{130,131} These trials were conducted in Alberta, where pharmacists can apply to prescribe and to order laboratory tests. Taken together, this evidence highlights the important public health role that pharmacists could play in improving

¹²³ Scheirer MA. Is Sustainability Possible? A Review and Commentary on Empirical Studies of Program Sustainability. *American Journal of Evaluation* 2005 September 1;26(3):320-47.

¹²⁴ Shediach-Rizkallah MC, Bone LR. Planning for the sustainability of community-based health programs: conceptual frameworks and future directions for research, practice and policy. *Health Educ Res* 1998 March;13(1):87-108.

¹²⁵ Bégin, H. M., Eggertson, L. & Macdonald, N. A country of perpetual pilot projects. *Can. Med. Assoc. J.* 180, 1185–1185 (2009).

¹²⁶ Systematic review of 39 trials, reduction in blood pressure of 7.6 (95% CI -9.0 to -6.3)/3.9 (95% CI -5.0 to -2.8) mmHg

¹²⁷ Santschi V, Chiolero A, Colosimo AL, Platt RW, Taffé P, Burnier M, Burnand B, Paradis G. Improving blood pressure control through pharmacist interventions: a meta-analysis of randomized controlled trials. *J Am Heart Assoc.* 2014 Apr 10;3(2):e000718. doi: 10.1161/JAHA.113.000718.

¹²⁸ In the PREVENTION study, McAlister et al randomized 279 patients post stroke or transient ischemic attack to case management by a nurse (without prescribing) compared to case management by a prescribing pharmacist. After 6 months of follow-up, 40.4% of patients achieved lipid and blood pressure targets with traditional nurse case management, compared to 64.3% in the pharmacist prescribing group ($p < 0.0001$)

¹²⁹ McAlister FA, Majumdar SR, Padwal RS, Fradette M, Thompson A, Buck B, Dean N, Bakal JA, Tsuyuki R, Grover S, Shuaib A. Case management for blood pressure and lipid level control after minor stroke: PREVENTION randomized controlled trial. *CMAJ.* 2014 May 13;186(8):577-84. doi: 10.1503/cmaj.140053. Epub 2014 Apr 14.

¹³⁰ In the RxACTION study, Tsuyuki et al studied 248 uncontrolled hypertensive patients randomized to independent pharmacist prescribing vs usual pharmacist and physician care. After six months of follow-up blood pressure was reduced by 18.3/8 mmHg in the pharmacist prescribing group compared with 11.8/4.9 mmHg, a difference of 6.6/3.2 mmHg ($p = 0.0006$ for systolic and $p = 0.01$ for diastolic)

¹³¹ Charrois TL, McAlister FA, Cooney D, Lewanczuk R, Kolber MR, Campbell NR, Rosenthal M, Houle SK, Tsuyuki RT. Improving hypertension management through pharmacist prescribing; the rural Alberta clinical trial in optimizing hypertension (Rural RxACTION): trial design and methods. *Implement Sci.* 2011 Aug 11;6:94. doi: 10.1186/1748-5908-6-94.

hypertension detection and control. What is needed now is systematic implementation of these services. Other jurisdictions in Canada should strongly consider legislative changes towards an expanded scope of practice for pharmacists.

Policy Recommendations: 2015-2020

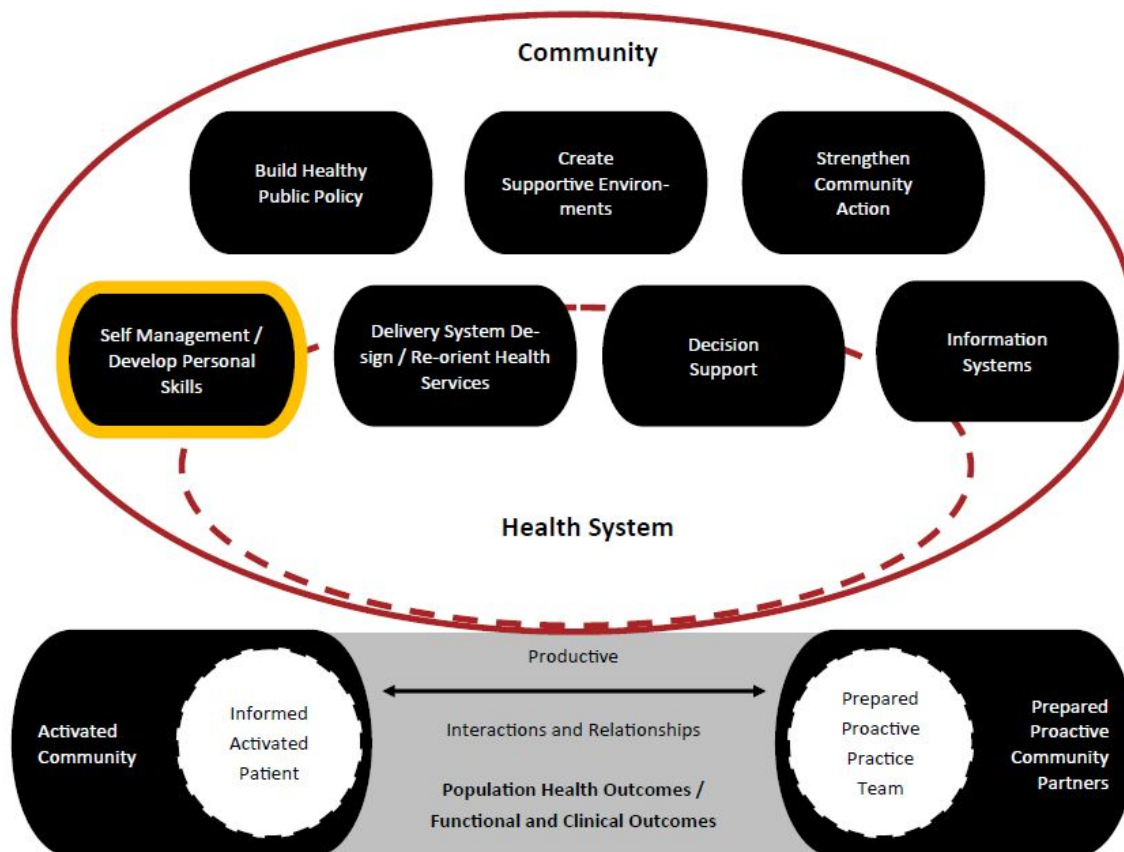
- 1. Scale up and sustain proven transformative community programs to meet the population's needs.**
 - a. Invest in systematizing transformative projects that can prevent or delay the onset of hypertension (e.g., Community Health Awareness Program (CHAP)).
 - b. Utilize untapped human resources and expertise by expanding the role and remuneration of pharmacists and other health professionals (nurses) across Canada so that they can prescribe medications and order laboratory tests.

- 2. Practice a community-based approach in health system delivery.**
 - a. Undertake community-level interventions including self-help programs, universal screenings, mobilization of community leaders and agencies to promote healthy lifestyles and use volunteers/community members to help administer programs.

Develop Personal Skills for Better Self-Management

Ensure all people in Canada have the resources, knowledge and ability they need to optimally prevent, detect and control hypertension recognizing this recommendation is highly dependent on implementing and maintaining supportive environments.

Section Acknowledgements: Angelique Berg, Felicia Flowitt



Progress toward the 2020 hypertension targets

Canada has the world's highest national rates of hypertension awareness, treatment and control and one of the lowest prevalence rates among high income countries. Nevertheless, surveillance and other research indicates that progress since 2011 towards the 2020 hypertension self-efficacy indicator targets has been at best minimal (Table 1).^{132,133,134} Further, the prevalence of hypertension and associated healthcare costs is rising along with the average age of the Canadian population and rates of obesity.^{135,136}

¹³² Weaver CG, Clement F, Campbell N, James MT, Klarenbach S, Hemmelgarn BR, Tonelli M, McBrien KA, for the Alberta Kidney Disease Network (AKDN) and the Interdisciplinary Chronic Disease Collaboration (ICDC). Health Care Costs Attributable to Hypertension: a Canadian Population-Based Cohort Study. *Hypertension*. 2015;66:00-00. DOI: 10.1161/HYPERTENSIONAHA.115.05702.

¹³³ http://www.hypertensiontalk.com/canadian_hypertension_framework/; accessed April 15 2015

¹³⁴ Padwal RS, Bienek A, McAlister FA, Campbell NRC for the Outcomes Research Task Force of the Canadian Hypertension Education Program. Epidemiology of Hypertension in Canada: an Update. *Can J Cardiol*. In Press.

¹³⁵ Padwal RS, Bienek A, McAlister FA, Campbell NRC for the Outcomes Research Task Force of the Canadian Hypertension Education Program. Epidemiology of Hypertension in Canada: an Update. *Can J Cardiol*. In Press.

Ninety per cent of Canadians are expected to develop hypertension if they live a normal life span. The objective for 2020 is that 90 per cent of adults will be aware of this risk and also the risk factors for developing hypertension. Unfortunately, a recent survey conducted by Hypertension Canada and representative of the Canadian population, found that only 34 per cent of respondents were aware of the risk of developing hypertension and only 15 per cent were aware of the many risk factors that may cause it.

Conversely, the same survey found that 87 per cent of respondents were aware that hypertension causes major vascular complications, including heart attack, stroke, kidney disease and dementia, among others. Further, 97 per cent of respondents living with hypertension are taking steps to control their blood pressure. This would indicate that we have met the 2020 targets for these objectives of 85 per cent and 90 per cent, respectively. What remains a cause for concern is that 70 per cent of respondents living with hypertension did not feel very confident in their ability to control their blood pressure, pointing to an opportunity for improved patient education and support.

Policy Actions: 2011-2015

Hypertension Canada and other national and provincial organizations continue to produce hypertension prevention, treatment and control resources for Canadians. Hypertension Canada's resources are based on its CHEP Guidelines for hypertension treatment and control - which are a key reference for health care professionals.^{137,138} These resources are directly available at <https://www.hypertension.ca/en/public>.

Key topics include:

- Understanding and managing blood pressure in order to prevent complications;
- Proper blood pressure measurement techniques and logs for recording blood pressure;
- Salt and Sodium - Get the facts and healthy eating for a healthy blood pressure information;
- Physical activity and maintaining a healthy weight;
- Smoking cessation and reducing alcohol consumption; and
- Hypertension in conjunction with other conditions such as diabetes and kidney disease.

¹³⁶ Weaver CG, Clement F, Campbell N, James MT, Klarenbach S, Hemmelgarn BR, Tonelli M, McBrien KA, for the Alberta Kidney Disease Network (AKDN) and the Interdisciplinary Chronic Disease Collaboration (ICDC). Health Care Costs Attributable to Hypertension: a Canadian Population-Based Cohort Study. *Hypertension*. 2015;66:00-00. DOI: 10.1161/HYPERTENSIONAHA.115.05702.

¹³⁷ Campbell NR, Petrella R, Kaczorowski J. Public education on hypertension: A new initiative to improve the prevention, treatment and control of hypertension in Canada. *Can J Cardiol* 2006; 22(7):599-603.

¹³⁸ Jones CA, Mawani S, King KM, Allu SO, Smith M, Mohan S et al. Tackling health literacy: adaptation of public hypertension educational materials for an Indo-Asian population in Canada. *BMC Public Health* 2011; 11(24):1-11.

Key characteristics of resources are that they:

- Use pictures as well as words; then easy to understand for patient
- Are written for a sixth grade or lower reading level;
- Comprehensive about a topic and yet condensed and streamlined;
- Propose realistic solutions;
- Include tools such as menus, tables, lists and other references;
- Are available to be in doctors' offices where patients are diagnosed;
- Are made available electronically where it makes sense, especially for BP log and quick reference.

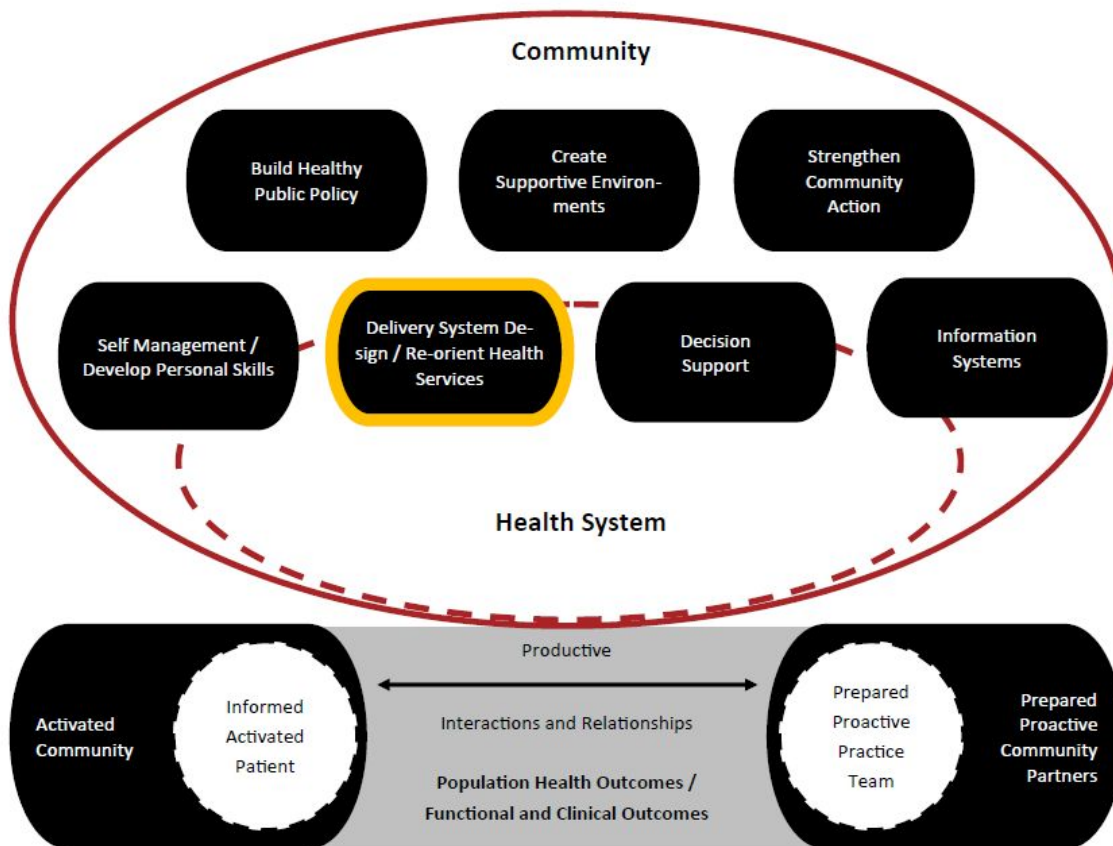
Policy Recommendations: 2015-2020

1. **Ensure that all people who are diagnosed with hypertension are actively engaged in their care and medical decisions with high quality resources, such as those from Hypertension Canada, that empower them to self-manage their blood pressure.**
2. **Allow for individualization of treatment based on clinical circumstances and patient wishes.**
3. **Develop locally-adapted, evidence-based care maps for the management of hypertension that systemize care and allow for individualization of treatment based on clinical circumstances and patient wishes. Prioritize areas where populations perceived to be disadvantaged live, work and play.**
 - a. Use poor nutrition, lack of physical activity and obesity to identify candidates for health behaviour changes. Apply stages of change model to prevent progression to diabetes and hypertension.
4. **Practice a population-based approach in health system delivery.**
 - a. Facilitate access to medical care for individuals without a primary care provider through workplace-based blood pressure screening and targeted outreach to disadvantaged populations.
5. **(See Also) Implement effective multi-sectoral national food policy and physical activity policies that improve environments and create equity by making healthy choices the easy choices for all Canadians.. See section on Healthy Public Policy for detailed recommendations.**
6. **(See Also) Strengthen research, monitoring and evaluation to inform nutrition and health policy development: assess the impact of dietary risk factors and interventions on health outcomes. See section on Optimizing Information Systems for detailed recommendations.**

Reorient/redesign the Health Services Delivery System

Use an integrated interdisciplinary primary health care team approach focusing on healthy living and based on principles of chronic disease management. This approach should be applied to all individuals within a defined population.

Section Acknowledgements: Richard Lewanczuk



Progress toward the 2020 hypertension targets

As noted in the preceding sections, progress has been made towards the introduction of healthy public policy to prevent and control hypertension at the population level. However, populations are made up of individuals, and it is ultimately the individual who needs to model healthy behaviours that can prevent and control chronic diseases such as hypertension. Thus, one can consider hypertension prevention and control at a population level as well as at an individual level.

Policy Actions: 2011-2015

Health care delivery systems function to ensure that appropriate health care is available to Canadians in a timely and equitable manner. Over the past years, provincial health care systems have seen a shift from a reactive “illness care” model to a proactive “health care” model. In other words, health care delivery has seen an evolution from a system of reactively

treating individuals with disease to one focusing on early detection and treatment and now individual risk identification and disease prevention.

Toward this end, most provinces, as well as national health organizations, have adopted the principles of chronic disease management as articulated by the expanded chronic care model.¹³⁹ This model considers the role of the community in addition to that of the health care system. From the community perspective, the model speaks to the development of healthy public policy, creating supportive environments, and strengthening community action. From the health care system perspective, it addresses information systems, decision supports, self-management, as well as the overall design of the health delivery system.

Progress under community components of the model are described separately within this revised framework. From a health systems perspective, there has been progress in all four relevant areas. With respect to information systems, the continued proliferation of electronic medical records ensures that data on blood pressure and associated risk factors is linked and readily accessible to the clinician. Guidelines from organizations such as CHEP continue to evolve, and are becoming integrated with information systems, thereby facilitating decision support. This typically takes the form of embedded guidelines and a system of reminders for both clinicians and patients.

Hypertension Canada and other organizations also continue to develop self-management tools for providers and the public. Perhaps most significantly, there is a shift in the design of healthcare delivery systems. In most provinces, delivery of healthcare is evolving to an interdisciplinary team-based approach. A pervasive mandate of these teams is to identify individuals with chronic disease, such as hypertension, and place these individuals on care pathways that ensure optimal, evidence-based care as well as appropriate system handoffs when needed. In addition, this team-based, and often population-based care, ensures that all individuals are appropriately screened for hypertension and even extends to identifying those at risk of hypertension and intervening in order to prevent its onset.

As these practice-based improvements occur, and as a population-based approach is adopted, it is not surprising to observe that the prevalence of hypertension appears to have increased. The increased prevalence may not be the result of a failure in hypertension prevention, but may instead be caused by better screening.

Another characteristic of new, proactive health care is that patients are now considered to be active participants in care rather than passive recipients. This maturation is captured in the “Triple Aim” approach to health care.¹⁴⁰ In this approach, a health care system – whether provincial or local – considers care of the individual, care of the population, as well as efficiencies of care (costs). In this manner, health care needs are being more broadly addressed by an approach that considers quality, scale and efficiency together.

The following recommendations aim to evolve health care delivery systems in Canada in accordance with the previous recommendations of 2011, supported not only by principles articulated by the Expanded Chronic Care Model,¹⁴¹ but also in the Medical Home model,¹⁴² the

¹³⁹ Barr VJ, Robinson S, Marin-Link B, Underhill L, Dotts A, Ravensdale D, Salivaras S. The expanded Chronic Care Model: an integration of concepts and strategies from population health promotion and the Chronic Care Model. *Hosp Q.* 2003;7:73-82 {6062}

¹⁴⁰ Berwick DM1, Nolan TW, Whittington J. The triple aim: care, health, and cost. *Health Aff (Millwood)* 27:759-69, 2008

¹⁴¹ Barr VJ, Robinson S, Marin-Link B, Underhill L, Dotts A, Ravensdale D, Salivaras S. The expanded Chronic Care Model: an integration of concepts and strategies from population health promotion and the Chronic Care Model. *Hosp Q.* 2003;7:73-82

World Health Organization's recommendations on delivery systems as contained in their 2005 documents¹⁴³ and further described in their 2013 publication *Global Action Plan for the Prevention and Control of Non-Communicable Diseases 2013-2020*.¹⁴⁴

Policy Recommendations: 2015-2020

- 1. Improve health outcomes by reorienting funding mechanisms so that they are patient-centred and promote the proactive prevention, identification and care of hypertension.**
 - a. Reward flexible, team-based care that allows providers to devote appropriate time to more complex patients.
 - b. Prevent costly misdiagnosis by funding and promoting the use of ambulatory and home-based blood pressure monitors as well as training for their optimum use.
 - c. Focus on decentralized community programs that can ensure an identified primary care provider - a physician, a nurse or a pharmacist - for every Canadian who is appropriately accessible and empowered to maintain continuity of care.^{145 146} The provider should know the blood pressure status of each patient, have ways to track each patient's blood pressure status, and have mechanisms in place to ensure that appropriate follow-up and screening occurs.

- 2. Develop locally-adapted, evidence-based care maps for the management of hypertension that systemize care and allow for individualization of treatment based on clinical circumstances and patient wishes. Prioritize areas where populations perceived to be disadvantaged live, work and play.**
 - a. Use poor nutrition, lack of physical activity and obesity to identify candidates for health behaviour changes. Apply stages of change model to prevent progression to diabetes and hypertension.

¹⁴³ "Preventing chronic diseases : a vital investment" (World Health Organization publication 2005 {6997})

¹⁴⁴ World Health Organization publication 2013 {6797}

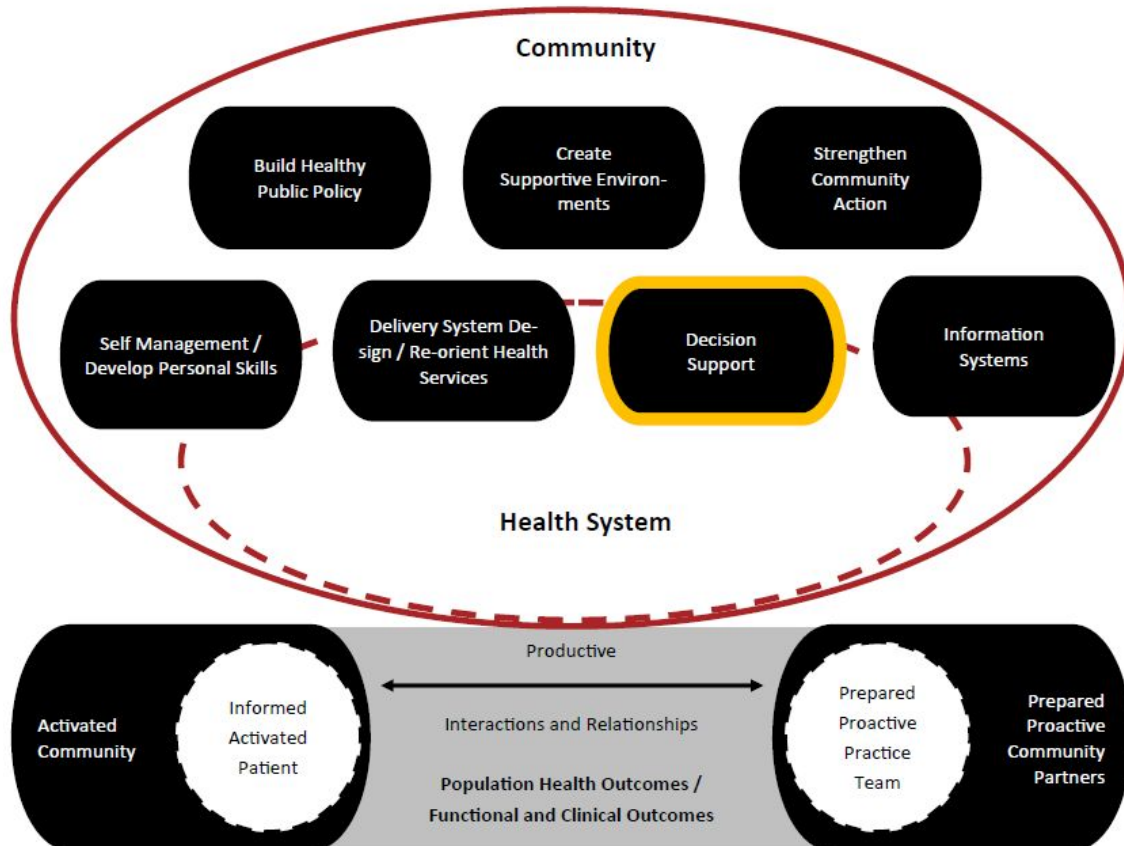
¹⁴⁵ Van Walraven, C, Oake N, Jennings A, Forster A. The association between continuity of care and outcomes: a systematic and critical review. *J Eval Clin Prac* 16:947-956, 2010.{6998}

¹⁴⁶ Wolinsky FD, Bentler SE, Liu L, Geweke JF, Cook EA, Obrizan M, et al. Continuity of care with a primary care physician and mortality in older adults. *J Gerontol A Biol Sci Med Sci*.65:421-8, 2010. {6999}

Improve Decision Support

Promote a culture of evaluation and continuous quality cycles in the collection of key indicators of high blood pressure prevention, detection, treatment and control, and evaluate the uptake of findings - that the knowledge about the process and outcomes of interventions is making a difference.

Section Acknowledgements: Angelique Berg, Norm Campbell, Felicia Flowitt



Progress toward the 2020 hypertension targets

The 2011 Hypertension Framework called for gains in hypertension management through increased awareness of hypertension, sustaining the number of people who are aware that they have hypertension, and increasing the number of people who are treated for hypertension and have it controlled. Increased awareness was to have been achieved through expanded community and workplace screening, and better, deeper rigor in screening in the healthcare system. The section on self-efficacy explores progress against some of these objectives.

It is also important that while the indicators of hypertension diagnosis, treatment and control are usually perceived to be impacted by improved clinical care, they are also impacted by reductions in the population blood pressure. Regulations that reduce dietary sodium in the

food supply may even be able to achieve the targets set for hypertension diagnosis, treatment and control without a change in clinical practice.¹⁴⁷

Policy Actions: 2011 - 2015

Hypertension Canada's CHEP Guidelines for hypertension treatment and control continue to improve decision support for health care professions, thus driving improved patient outcomes and helping to maintain Canada's leadership position in hypertension control.¹⁴⁸ The mechanism for continuous improvement of the Guidelines and related tools is a feedback loop powered by evidence, data and a Herculean volunteer effort focused on knowledge translation and evaluation. Hypertension Canada's health care professional volunteers donate at least 10,000 hours annually to improving the CHEP Guidelines and their tools, generating \$3.5 million in value.

Improving decision support for healthcare professionals and patients comprises three activities: the creation of evidence-based recommendations for healthcare professionals; the development of professional and patient education materials and other tools based on the recommendations; and the evaluation of patient outcomes. The positive effects of ongoing updates to the Guidelines are manifest across all provinces and economic sectors. For example, improved availability of generic drugs and enhanced prescribing practices has led to increased utilization of generic versions of many common medications. This has, in turn, lowered the cost of these antihypertensive drugs across Canada from 3 billion dollars a year to 2.1 billion between 2009 and 2013.^{149,150}

Once a diagnosis of hypertension is made, health care professionals and patients now have access to a plethora of educational tools to help them succeed in lowering their blood pressure from a variety of sources, with varying levels of accuracy, appeal, and usefulness. Hypertension Canada this year undertook comprehensive market research and focus groups to ensure needs-based content in alignment with the CHEP Guidelines, and design that will encourage use by both healthcare professionals and patients, and application by patients.

Tools for patients are explored further in the section on self-efficacy. There are also some opportunities for improved tools for healthcare professionals. Kaiser Permanente in the United States has achieved 90 per cent hypertension control in its clinical population using standardized care algorithms and hypertension registries.¹⁵¹ These kind of "care maps" can and should be developed for use in Canada.

The surveillance and monitoring activities described in the section on optimizing information systems provide critical information for the development of resources for both healthcare professionals and patients.

¹⁴⁷ Joffres M, Campbell NRC, Manns B, Tu K. Estimate of the benefits of a population-based reduction in dietary sodium additives on hypertension and its related health care costs in Canada. *Can J Cardiol* 2007; 23(6):437-443.

¹⁴⁸ Campbell NR, Sheldon T. The Canadian effort to prevent and control hypertension: can other countries adopt Canadian strategies? *Curr Opin Cardiol* 2010; 25(4):366-372.

¹⁴⁹ Padwal RS, Bienek A, McAlister FA, Campbell NRC for the Outcomes Research Task Force of the Canadian Hypertension Education Program. Epidemiology of Hypertension in Canada: an Update. *Can J Cardiol*. In Press

¹⁵⁰ Joffres M, Campbell NRC, Manns B, Tu K. Estimate of the benefits of a population-based reduction in dietary sodium additives on hypertension and its related health care costs in Canada. *Can J Cardiol* 2007; 23(6):437-443.

¹⁵¹ Jaffe MG, Lee GA, Young JD, Sidney S, Go AS. Improved blood pressure control associated with a large-scale hypertension program. *JAMA* 2013; 310(7):699-705.

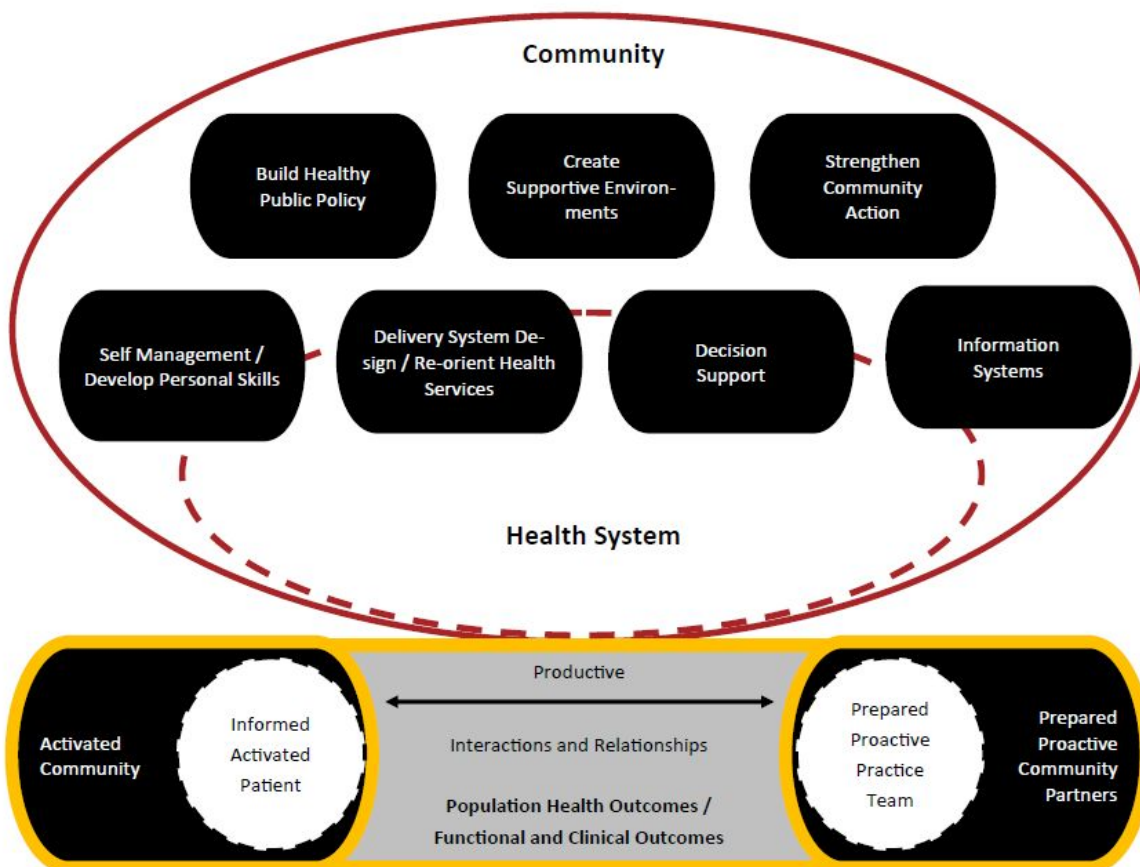
Policy Recommendations: 2015-2020

1. **Ensure that Canadian health care professional education around hypertension is based on the highest Canadian standards of care, Hypertension Canada's CHEP Guidelines, and is culturally sensitive.**
 - a. Use Hypertension Canada's CHEP Guidelines in medical, pharmacy, nursing and nutrition faculties and in continuing medical education programming.
2. **Produce educational resources that enable primary care providers to counsel patients on hypertension prevention, to screen for high blood pressure, to optimally assist the patient with lifestyle and drug therapies, and to contribute to the ongoing achievement of blood pressure and health targets.**
 - a. Identify key indicators and create a reporting template for developers of electronic medical records that could facilitate audit and feedback. Develop, implement and evaluate a core curriculum for assessing blood pressure using automated office, home and ambulatory blood pressure measurement devices.
 - b. Work to have the blood pressure assessment curriculum accredited and integrated in training schools for doctors, nurses, pharmacists, and other health care professionals.
3. **(See Also) Develop locally-adapted, evidence-based care maps for the management of hypertension that systemize care and allow for individualization of treatment based on clinical circumstances and patient wishes. Prioritize areas where populations perceived to be disadvantaged live, work and play. See sections on Individual Self-Efficacy and Reorient/Redesign the Health Services Delivery System for detailed recommendations.**
4. **(See Also) Strengthen research, monitoring and evaluation to inform nutrition and health policy development: assess the impact of dietary risk factors and interventions on health outcomes. See section on Optimizing Information Systems for detailed recommendations.**

Address Hypertension in Aboriginal/Indigenous populations

Aboriginal/Indigenous populations will have similar indices of blood pressure health indicators as the general population.

Section Acknowledgements: Sheldon Tobe, Norm Campbell, Darren Warburton, Fei Xu, Karen Yeates



Progress toward the 2020 hypertension targets

The 2011 Hypertension Framework identified that Canada lacked the capacity to track key hypertension indicators in Aboriginal/Indigenous populations. The diversity of Aboriginal/Indigenous populations is mirrored in what data are available: the prevalence of hypertension is 19 per cent in Inuit populations and 21.8 per cent in First Nations.¹⁵² Limited data also suggest rapid changes in the prevalence, treatment and control of hypertension over time, limiting the value of old data for determining Aboriginal/Indigenous public health policy needs.

A recent systematic review found that hypertension rates were lower in Aboriginal/Indigenous populations compared with the general population, possibly because the Aboriginal/Indigenous

¹⁵² First Nations Regional Health Survey 2008/2010, based on self-reporting. http://fnigc.ca/sites/default/files/docs/first_nations_regional_health_survey_rhs_2008-10_-_national_report_adult_2.pdf p116. Accessed June 12 2015

population is younger,¹⁵³ however the data within the systematic review is outdated. The Canadian Heart Health Strategy recommended that Canada ends “the heart health crisis among Aboriginal/Indigenous peoples by actively involving them in developing their own solutions and plans and providing culturally safe and appropriate support.”¹⁵⁴ From a social accountability perspective, what is needed is the engagement of Aboriginal/Indigenous peoples with other key stakeholders to address the priority concerns of Aboriginal/Indigenous communities.

2010-2015 Policy Actions

The Heart and Stroke Foundation of Canada has developed the Aboriginal Hypertension Management program which is now a government-funded program in Ontario. There is a set of Aboriginal specific tools for hypertension management available on the Heart and Stroke Foundation website including a video.

The First Nations Information Governance Centre (FNIGC), a federally incorporated, non-profit entity operating with a special mandate from the Assembly of First Nations’ Chiefs in Assembly started its 2015 rollout of the 250 First Nations communities Regional Health Survey. The FNIGC is founded on First Nations principles, and is a premier indigenous model of research and data excellence for the well-being of First Nations peoples and communities. This survey will ask about self-reported hypertension, the age of diagnosis, whether there is current therapy for it and whether a blood pressure assessment has been performed in the last 12 months. The survey does not assess blood pressure.

Policy Recommendations: 2015-2020

1. **Target primary chronic disease prevention in Aboriginal/Indigenous youth.**
 - b. Partner with Aboriginal/Indigenous school systems and leadership to improve cardiovascular health in those communities.
2. **Improve health outcomes by reorienting funding mechanisms so that they are patient-centred and promote the proactive prevention, identification and care of hypertension.**
 - a. Facilitate collaboration between communities and health care providers in order to ensure that care and programming are culturally appropriate and evidence-based.
3. **(See Also) Strengthen research, monitoring and evaluation to inform nutrition and health policy development: assess the impact of dietary risk factors and interventions on health outcomes. See section on Optimizing Information Systems for detailed recommendations.**

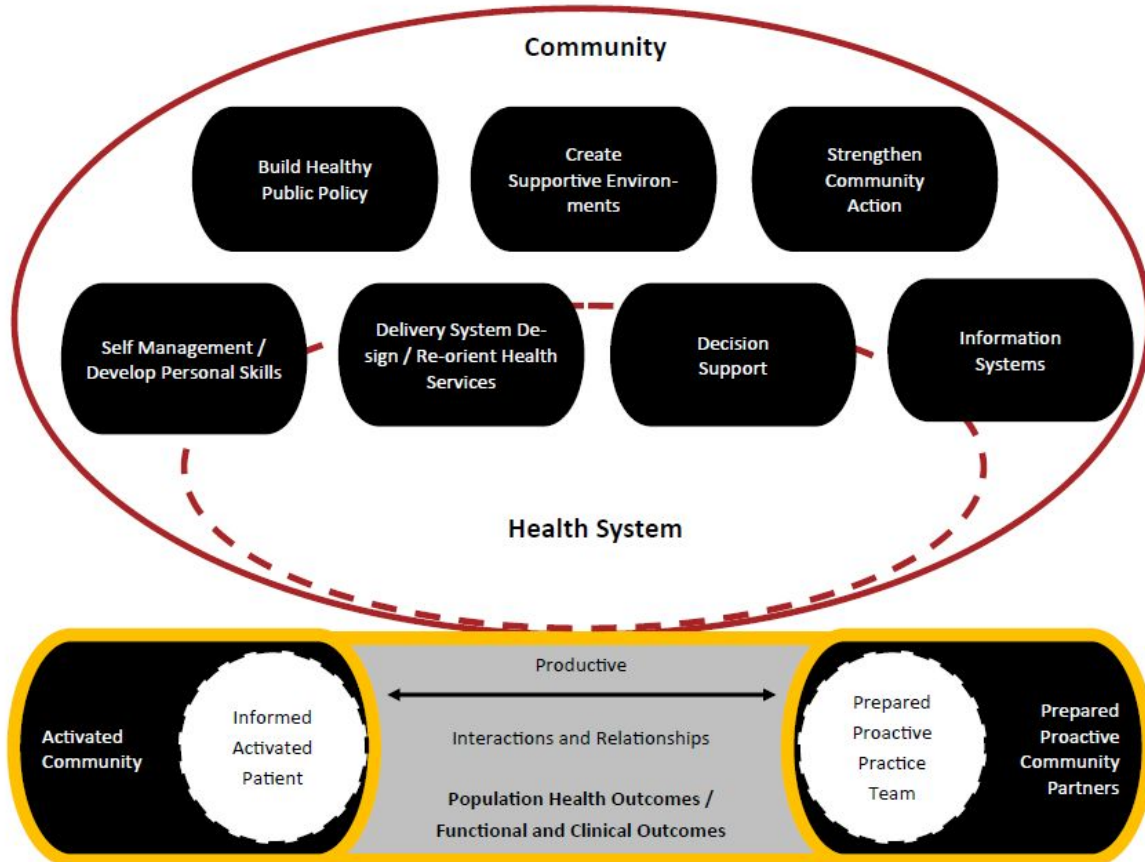
¹⁵³ Foulds HJ, Warburton DE. The blood pressure and hypertension experience among North American Indigenous populations. *J Hypertens* 2014; 32(4):724-734.

¹⁵⁴ Smith ER. The Canadian heart health strategy and action plan. *Can J Cardiol* 2009; 25(8):451-452.

Address Hypertension in disadvantaged populations

Disadvantaged populations will have similar rates for blood pressure health indicators as the general population.

Section Acknowledgements: Charlotte Jones, Norm Campbell, Nadia Khan



Progress toward the 2020 hypertension targets

Disadvantaged populations in Canada appear to have a disproportionately high rate of hypertension, which can cause premature death and disability and drive up health costs. The 2011 Hypertension Framework identified that Canada lacked the capacity to track key hypertension indicators in disadvantaged populations. In 2015, little has changed.

Old data indicate that Canadians who self-report as being Black, South Asian, socioeconomically disadvantaged and those who live in Atlantic Canada have a much higher prevalence of hypertension. Some groups develop hypertension at significantly younger ages than the general Canadian population.^{155,156,157}

¹⁵⁵ <http://www.statcan.gc.ca/tables-tableaux/sum-som/l01/cst01/health70b-eng.htm> and <http://resources.cpha.ca/CPHA/Conf/Data/2010/A10-449ae.pdf> accessed April 16 2015

¹⁵⁶ Leenen FH, Dumais J, McInnis NH, Turton P, Stratyckuk L, Nemeth K et al. Results of the Ontario survey on the prevalence and control of hypertension. CMAJ 2008; 178(11):1441-1449.

¹⁵⁷ Wolf HK, Andreou P, Bata IR, Comeau DG, Gregor RD, Kephart G et al. Trends in the prevalence and treatment of hypertension in Halifax County from 1985 to 1995. CMAJ 1999; 161(6):699-704.

These findings suggest a higher incidence of risk factors for hypertension (unhealthy diets, lack of physical activity, obesity, etc.) in disadvantaged populations. Further data indicate that disadvantaged groups such as persons who are homeless are less aware of their hypertensive status and have worse blood pressure control.^{158,159} South Asian Canadian and Chinese Canadian patients have worse antihypertensive medication adherence than the general population.¹⁶⁰

Current national surveys have not been analyzed to examine the impact of socioeconomic status on hypertension indicators. The Canadian Health Measures Survey (CHMS) is not adequately powered to assess disadvantaged subpopulations based on ethnicity or geographic location and does not sample from the territories. Population-based administrative data also do not contain information on individual level economic status or ethnicity. Aboriginal/Indigenous populations are faced with similar challenges that are addressed in another section of this document. Lack of surveillance is a major impediment to delineating disparity and introducing programs to achieve equity in health status with regard to the key hypertension indicators.

Policy Actions: 2011 - 2015

With less sustained in kind support from the Public Health Agency of Canada, the Hypertension Canada Outcomes Research Task Force has not been able to conduct detailed analyses since 2011. To our knowledge, the newer CHMS cycles have neither implemented a change in design to allow for geographic regional analyzes, nor do they over sample disadvantaged populations so meaningful analyses of these groups can occur. The Canadian Community Health Survey (CCHS) has some self-reported hypertension indicators but cannot be used to accurately track hypertension prevalence of hypertension or control rates in the absence of blood pressure measurements. To our knowledge there is no ongoing analysis of the CCHS to track disadvantaged populations. However, there is an analysis of geographical variation in both the CCHS and the Canadian Chronic Disease Surveillance System (CCDSS) that tracks administrative data on hypertension diagnosis and death rates.¹⁶¹

According to Health Canada,¹⁶² underserved or disadvantaged populations (and their prevalence among the total population: Statistics Canada 2006) in Canada include Aboriginal/Indigenous people (3 per cent), immigrants and refugees (17 per cent), visible minorities (11.2 per cent), language minorities (e.g. Aboriginal/Indigenous, immigrants), persons with alternate sexual orientation (~10 per cent male, 1-8 per cent female), persons with disabilities (15.5 per cent) and marginalized groups such as the homeless. These categories are not exclusive as individuals may belong to more than one category, facing additional challenges related to socio-economic status, gender or residence in an underserved region (e.g. remote/rural) of Canada.

¹⁵⁸ Jones CA, Perera A, Chow M, Ho I, Nguyen J, Davachi S. Cardiovascular disease risk among the poor and homeless - what we know so far. *Curr Cardiol Rev* 2009; 5(1):69-77.

¹⁵⁹ Lee TC, Hanlon JG, Ben-David J, Booth GL, Cantor WJ, Connelly PW et al. Risk factors for cardiovascular disease in homeless adults. *Circulation* 2005; 111(20):2629-2635.

¹⁶⁰ Liu Q, Quan H, Chen G, Qian H, Khan N. Antihypertensive medication adherence and mortality according to ethnicity: a cohort study. *Can J Cardiol* 2014; 30(8):925-931.

¹⁶¹ <http://www.statcan.gc.ca/tables-tableaux/sum-som/l01/cst01/health70b-eng.htm> and in the <http://resources.cpha.ca/CPHA/Conf/Data/2010/A10-449ae.pdf> accessed April 16 2015

¹⁶² <http://www.hc-sc.gc.ca/hcs-sss/pubs/acces/2001-certain-equit-acces/index-eng.php#part1tc1>: accessed June 5, 2015

While the literature is not extensive for all of these groups, there are a growing number of Canadian studies examining interventions to reduce hypertension and other cardiovascular risk factors in disadvantaged populations, including in persons who are homeless,¹⁶³ in South Asian Canadians and Chinese Canadians,^{164,165} and initiatives such as those in BC^{166,167} and in Ontario, to tailor the CHAP program¹⁶⁸ to include the York Region South Asian Community.

Other initiatives led by health authorities and charitable organizations also aim to address hypertension and cardiovascular disease risk in disadvantaged populations. Numerous hypertension and cardiovascular risk awareness and health promotion programs and materials, as well as chronic disease management programs across Canada¹⁶⁹ are specifically tailored to language and culture. Most self-management and health promotion interventions targeting South Asians¹⁷⁰ have been educational, and these have shown improvements in patient knowledge.

Many existing interventions and programs developed for the general population are associated with modest improvements in blood pressure awareness and control. Very few, however, have shown long-term, sustainable results or that these interventions can be effectively generalized or adapted to disadvantaged groups.¹⁷¹ Over time and by bringing to capacity established and new initiatives, a positive impact on underserved populations may be realized. Best practices must be shared, effective interventions need to be scaled up across Canada, and an adequate surveillance system is needed to truly reap and assess the benefits of targeted programs.

Policy Recommendations: 2015-2020

1. **Scale up and sustain proven transformative community programs to meet the population's needs.**
 - a. Prioritize community programs in areas where populations perceived to be disadvantaged live, work and play.
2. **(See Also) Develop locally-adapted, evidence-based care maps for the management of hypertension that systemize care and allow for individualization of treatment based on clinical circumstances and patient wishes. Prioritize areas where populations perceived to be disadvantaged live, work and play. See sections on Individual Self-Efficacy and**

¹⁶³ Hwang SW, Burns T: Health interventions for people who are homeless. *Lancet* 2014, 384(9953):1541-1547.

¹⁶⁴ <https://clinicaltrials.gov/ct2/results?term=%22+south+asian%22+AND+canada&Search=Search> : accessed June 5, 2015

¹⁶⁵ <https://clinicaltrials.gov/ct2/results?term=chinese+AND+Canada+AND+hypertension+&Search=Search>: accessed June 5, 2015

¹⁶⁶ Jeet S. Understanding Self-Management of Chronic Disease in the South Asian Community. A Literature Review of Barriers and Enablers. Report for: Health and Business Analytics, Fraser Health. November 2011: 1-66.

¹⁶⁷ <http://www.coheart.ca>

¹⁶⁸ <http://chaprogram.ca/adapting-a-cardiovascular-health-awareness-program-for-the-south-asian-community-in-the-york-region/>.

Accessed June 8, 2015

¹⁶⁹ Dorland J, McColl MA. Editors: Emerging Approaches to Chronic Disease Management in Primary Health Care. McColl Queen's Policy Studies Series- School of Policy Studies. Vol. 110; 2007. ISBN:9781553391319

¹⁷⁰ Hwang SW, Burns T: Health interventions for people who are homeless. *Lancet* 2014, 384(9953):1541-1547.

¹⁷¹ Dorland J, McColl MA. Editors: Emerging Approaches to Chronic Disease Management in Primary Health Care. McColl Queen's Policy Studies Series- School of Policy Studies. Vol. 110; 2007. ISBN:9781553391319

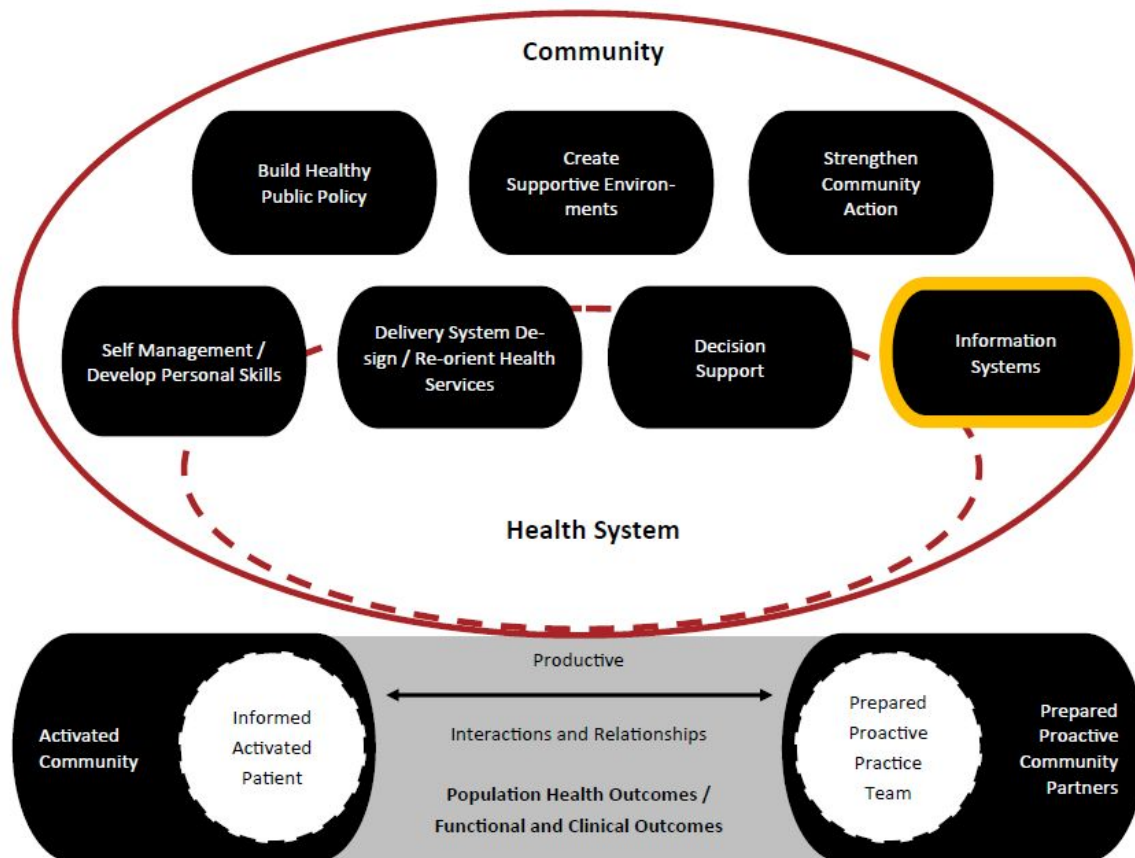
Reorient/Redesign the Health Services Delivery System for detailed recommendations.

- 3. (See Also) Strengthen research, monitoring and evaluation to inform nutrition and health policy development: assess the impact of dietary risk factors and interventions on health outcomes.** *See section on Optimizing Information Systems for detailed recommendations.*

Optimize information systems

Use rapidly evolving information technology and systems to their ultimate potential to transfer knowledge on how to improve hypertension prevention, detection, treatment and control.

Section Acknowledgements: Raj Padwal



Progress toward the 2020 hypertension targets

The Framework targets for 2020 called for a culture of evaluation and continuous quality improvement at national and clinical practice levels, and established key indicators to measure progress. The Canadian Health Measures Survey monitors key indicators at a national level. This is a challenge because health care is primarily a provincial responsibility. There are currently no surveys that monitor the prevalence of hypertension or its control rate at a provincial level.

Population surveillance is especially critical in establishing quality improvement and evaluation at the clinical practice level. A key quality aspect is establishing best-practices for health care professionals and then to implement and monitor their adoption. Hypertension Canada, a national nonprofit organization, publishes the CHEP clinical practice guidelines for the treatment and control of hypertension. The Guidelines also include guidance for health care practitioners about behaviour modification and lifestyle therapies. Entirely based on published evidence and rigorously reviewed by leading scientific and clinical experts, the CHEP Guidelines provide key best-practices in hypertension diagnosis, assessment and therapy.

Policy Actions: 2011 - 2015

The most significant barrier to the development of successful policy interventions is insufficient data. Hypertension Canada's expert volunteer Outcomes Research Task Force (ORTF), which reports on the outcomes of cross-sector activities to improve health, attempts to carry on with available data. The ORTF's work is critical for identifying gaps in prevention, care and treatment that governments, civil society and medical professionals can work together to fill. More support is needed from the Public Health Agency of Canada and its provincial and territorial counterparts to report on administrative data and the data from population health surveys that feed the activities of the ORTF's expert volunteers.

Although some individual clinical practices have developed mechanisms to track hypertension and its treatment and control through electronic medical records, these do not appear to be widespread, consistent and reported against the objectives in this framework. That said, a recent analysis of academic family physician practices reported 78 per cent control rates, which are very similar to the proportion of people in the CHMS that are aware of having hypertension and have blood pressure controlled¹⁷². This indicates that aggregated data from individual practices and community health centres can be a useful indicator of population health and that individual practitioners can monitor their own practices for quality assurance. This should be facilitated by government through electronic medical records.

Several of the provinces are working toward integrated electronic health records. The progress and capabilities of these projects are unknown. Recently, a private collaboration of Canadian primary care practices has shown the utility of electronic health records for hypertension surveillance and monitoring.¹⁷³ Important gaps in surveillance of hypertension, Aboriginal/Indigenous and disadvantaged populations have not been fully addressed. A First Nations Communities Regional Health Survey is being conducted in 2015 that has multiple questions about hypertension, but lacks blood pressure measurements. A preliminary report of Canadian hypertension costs has been published in abstract.¹⁷⁴

The ongoing Canadian Health Measures Survey, Canadian Community Health Survey, and Canadian Chronic Disease Surveillance System (Hypertension) continue to provide important surveillance data that helps to measure some health outcomes. Resource allocation priority must be given to ensuring the data is reported on and can be used by public health organizations wishing to undertake measurement and evaluation. As noted in the initial Framework, consideration should also be given to increasing its content on lifestyle factors that affect blood pressure and repeating the Survey on Living with Chronic Disease in Canada - Hypertension Module.

¹⁷² Godwin M, Williamson T, Khan S, Kaczorowski J, Asghari S, Morkem R et al. Prevalence and management of hypertension in primary care practices with electronic medical records: a report from the Canadian Primary Care Sentinel Surveillance Network. *CMAJ Open* 2015; 3(1):E76-E82.

¹⁷³ Godwin M, Williamson T, Khan S, Kaczorowski J, Asghari S, Morkem R et al. Prevalence and management of hypertension in primary care practices with electronic medical records: a report from the Canadian Primary Care Sentinel Surveillance Network. *CMAJ Open* 2015; 3(1):E76-E82.

¹⁷⁴ Weaver CG, Clement F, Campbell N, James MT, Klarenbach S, Hemmelgarn BR, Tonelli M, McBrien KA, for the Alberta Kidney Disease Network (AKDN) and the Interdisciplinary Chronic Disease Collaboration (ICDC). Health Care Costs Attributable to Hypertension: a Canadian Population-Based Cohort Study. *Hypertension*. 2015;66:00-00. DOI: 10.1161/HYPERTENSIONAHA.115.05702.

Outcomes researchers are looking forward to the release of data in 2016 from the 2015 Canadian Community Health Survey – Nutrition questionnaire that looks not only at what nutrients Canadians are eating, but also the impact on their health and well-being. The last time any data was collected on nutrition was in 2004: a commitment is needed to collect this data every five years at a minimum.

Conversely, it is concerning that the National Population Health Survey was discontinued in 2012, leaving a gap in surveillance activities that link health outcomes with socioeconomic indicators, and longitudinal studies, generally.

Some available data sources and the opportunities to improve them are presented in [Table 7](#).

Table 7: Available Data Sources

Data Source	Description	Provides data on:	Major weakness(es)	Recommended Frequency of Analysis
Canadian Health Measures Survey (CHMS)	National Survey Data from Statistics Canada (physical measures including blood pressure are directly measured)	Prevalence, incidence, awareness, treatment, control	Serial cross-sectional data (not longitudinal). Important subgroups (e.g. those residing on reserves or institutionalized) missing.	Following each newly released cycle. (approximately every 2 years)
Canadian Community Health Survey (CCHS) (self-reported)	National Survey Data from Statistics Canada (self-reported)	Prevalence, incidence, awareness, treatment, control (all self-reported). Much larger sample size than CHMS	Serial cross-sectional data (not longitudinal) Self-reported Important subgroups (e.g. those residing on reserves or institutionalized) missing.	Following each newly released cycle. (approximately every 2 years)
Canadian Chronic Disease Surveillance System (CCDSS)	Provincial linked administrative data	Prevalence, incidence, health care use, costs, complications, regional variation	Logistics of linking multiple provincial databases to achieve nationally representative picture. Data in some provinces limited to elderly (age 65 or greater)	Annually
IMS Health	Physicians and pharmacies across Canada	Treatments offered, drug utilization, drug costs, subgroup	Some selection bias as sample is composed of volunteer physicians and pharmacies	Annually or every 2 years

		analyses of drug classes		
Physician electronic medical record (EMR) data	Amalgamated data from physician and primary care network EMRs. The Canadian Primary Care Sentinel Surveillance Network (CPCSSN) is an example of a national network.	When grouped across many physicians, provides data on local, regional, provincial and national practice patterns, prescribing patterns, prevalence, treatment and control.	Missing data; lack of standardized data collection	Annually
In-pharmacy kiosks	Over 1 million BP measurements are performed daily from these devices. Use would require collaboration with kiosk vendors and retail pharmacies.	Can be used for BP screening. Are conveniently located and highly utilized by the public. Data are electronically transmitted to kiosk vendors and thus are readily available. Could be used to examine local and regional variation in control	Have never been used for surveillance/screening. Data are cross-sectional unless 'smart cards' are used to facilitate identification of serial measurements in the same in	Unknown. Proof-of-principle needs to be performed.
Canadian Longitudinal Study on Aging	Longitudinal cohort study	Trends in blood pressure and various health behaviours and health risks of people aged 45 – 85.		
Canadian Partnership for Tomorrow	Longitudinal cohort study	Trends in blood pressure and various health behaviours and health risks in people aged 35-69		

For governments, good economic analysis can help to identify the most cost-effective opportunities for action. One of the most important manuscripts to be published in 2015 was an economic analyses of the impact of clinically controlling hypertension in the United States. The analysis found an overall cost savings related to marked reductions in the costs associated with unrealized cardiovascular complications.¹⁷⁵

¹⁷⁵ Moran AE, Odden MC, Thanataveerat A, Tzong KY, Rasmussen PW, Guzman D et al. Cost-Effectiveness of Hypertension Therapy According to 2014 Guidelines. *N Engl J Med* 2015; 372(5):447-455.

Policy Recommendations: 2015-2020

1. **Strengthen research, monitoring and evaluation to inform nutrition and health policy development: assess the impact of dietary risk factors and interventions on health outcomes.**
 - a. Orchestrate national surveys and the use of existing data (e.g., electronic medical record data and pharmacy kiosk data) that can measure the key indicators from the 2011 Hypertension Framework.
 - b. Permanently fund national longitudinal surveys such as the National Population Health Survey (defunct), the Canadian Longitudinal Study on Aging (ongoing, indefinite) and the Canadian Partnership for Tomorrow (ongoing, indefinite) in order to capture the incidence and prevalence of hypertension-related complications and temporal trends in risks. Ensure the quality of blood pressure assessment used in these surveys.
 - c. Improve the Canadian Health Measures Survey (CHMS): make it longitudinal, capture important sub-groups (those living on reserves and in the Territories, institutionalized, marginalized, etc.) and release comprehensive updated blood pressure analysis biannually. Include a validated physical measure of sodium consumption.
 - d. Include a nutrition component in the Canadian Community Health Survey (CCHS) every five years to help monitor population sodium consumption
 - e. Improve the Canadian Chronic Disease Surveillance System (CCDSS): Provide consistent administrative data from every province and release updated hypertension analysis annually. Take advantage of existing and ongoing administrative data collection by enabling linkage between the CHMS and CCDSS.
 - f. Conduct a hypertension module in the Survey of Living with Chronic Disease every 5 years in Canada to track knowledge, attitudes and behaviours.
 - g. Enable national and regional surveys to assess Aboriginal/Indigenous peoples and key populations perceived to be disadvantaged (Black, South Asian, People living in the territories, People living in Atlantic Canada). Collect self-reported ethnicity, language and individual level socioeconomic status variables in administrative data and ensure blood pressure measurements in disadvantaged populations.
 - h. Monitor changes in sodium, saturated and trans fats, free sugars, iodine and potassium concentrations in processed foods: require food product label review by an independent group of researchers charged with reporting annually to the public.

- i. Monitor the risks associated with increasing blood pressure using modified survey tools such as the Canadian Tobacco Use Monitoring Survey; Canadian Tobacco, Alcohol and Drugs Survey; and the Active Healthy Kids Canada annual report card.
- j. Commit a minimum of 10 years' funding for monitoring research to ensure scientific rigour over that time period.