

## Overview

Hypertension (high blood pressure) is the world's leading risk factor for common chronic diseases, and is highly responsive to health behaviour changes, particularly alterations in dietary habits. A diet rich in fresh or minimally processed fruits, vegetables, whole grains, nuts, seeds, beans, legumes, and low-fat dairy products, and low in saturated fat has shown to lower blood pressure, as has increased dietary potassium. This document sets out Hypertension Canada's position on the importance of potassium intake as part of dietary strategies to prevent and manage hypertension, based on scientific evidence and informed by global trends.

## Hypertension

In Canada, hypertension is among the top three risk factors for common chronic diseases including congestive heart failure, stroke, atrial fibrillation, renal disease, and coronary heart disease,<sup>1</sup> and by 2020 is projected to amount to over \$20 billion annually in direct health care costs<sup>2</sup>. Over 30% of hypertension is accounted for by high dietary sodium<sup>3</sup>. An estimated 7.2 million Canadian adults have hypertension, characterized by blood pressure measurement of 140/90 mmHg or higher,<sup>4</sup> as well as one in 50 children<sup>5,6</sup>. In addition, 7.4 million more adults have pre-hypertension, blood pressure measuring between 120/80 to 139/89 mmHg, and will develop hypertension without health behaviour or lifestyle change.<sup>7</sup>

The well-studied DASH (Dietary Approaches to Stop Hypertension) diet and those similar have proven highly effective at reducing blood pressure. A DASH-like diet is high in fresh fruits, vegetables, dietary fibre, non-animal protein (e.g. soy), and low-fat dairy products, and is low in saturated fat. Increased dietary potassium, a feature of the DASH diet, has also shown to reduce blood pressure generally, with the most significant benefit to those who consume high-sodium diets and with caution in certain at-risk populations<sup>8</sup>.

## Potassium

Potassium is a naturally occurring mineral, found in many foods, required for normal cell and body function, including kidney and heart function, muscle contraction, and nerve transmission. Natural high sources of potassium include many fruits such as apricots, bananas, guava, kiwifruit, and nectarines, and vegetables such as cooked broccoli and spinach, and potatoes. Other high sources include milk and yogurt, bran cereals, and cooked halibut and salmon. Low potassium intake has been associated with hypertension and several chronic diseases. Adequate potassium intake has been shown to reduce blood pressure, decreases risk of cardiovascular disease, and mitigates the negative consequences of high sodium consumption.<sup>9</sup>

"Potassium salt" (potassium chloride) is commonly used as an alternative to "salt" (sodium chloride) around the world both at the table and, increasingly, in processed foods to reduce sodium content.

## Potassium Consumption in Canada

The most recently available data shows that Canadians consume too much sodium and too little potassium.<sup>10</sup> This is similar to comparable nations: the National Diet and Nutrition Survey in the United Kingdom and various surveys leading to the U.S. Department of Health and Human Service's 2015–2020 Dietary Guidelines for Americans show low potassium intake among their populations, driven by diets lacking in fresh fruits and vegetables and high in processed foods, or the spread of the "western diet".

## Hypertension Canada Guidelines

The Hypertension Canada Guidelines are the nation's evidence-based clinical practice guidelines for the diagnosis, risk assessment, prevention and treatment of hypertension, and among them include the following recommendations specific to dietary strategies:

**Diet:** People living with hypertension and those at increased risk of developing hypertension should consume a diet that emphasizes fruits, vegetables, low-fat dairy products, whole grain foods rich in dietary fibre, and protein from plant sources that is reduced in saturated fat and cholesterol.

**Sodium intake:** To prevent hypertension and reduce blood pressure in adults living with hypertension, consider reducing sodium intake towards 2000 mg (5 g of salt or 87 mmol of sodium) per day.

**Potassium intake:** People not at risk of hyperkalemia [see sidebar], should increase dietary potassium to reduce blood pressure.<sup>11</sup>

## Summary of Supporting Evidence

Added to the Hypertension Canada Guidelines in 2016, the following excerpt outlines the supporting evidence:

*Supporting evidence for this recommendation comes from several systematic reviews and meta-analyses that reported a consistent association between increased potassium intake and blood pressure (BP) reduction. The most rigorous of these reviews was a meta-analysis of 22 randomized controlled trials by Aburto et al., who reported that increased potassium intake reduced SBP by 3.49 mm Hg (95% CI, 1.82-5.15 mm Hg) and DBP by 1.96 mm Hg (95% CI, 0.86-3.06 mm Hg).<sup>9</sup> Notably, BP reduction was only seen in those with hypertension. There was no significant dose response according to the amount of potassium consumed. However, BP reduction appeared to be greatest in those who consumed the greatest amount of salt (change in SBP of -6.9 vs -2.0 in those with high [4 g/d] vs low [ $< 2$  g/d] sodium intake). Although the magnitude of BP reduction is largest when the sodium intake is high, there still appears to be evidence of additive benefit when dietary interventions combine potassium increases with sodium reduction strategies.*

*The magnitude of expected BP reduction appears to be similar regardless of whether a potassium intervention is delivered through dietary changes or prescribed supplements. If possible, however, we recommend dietary modification as the preferred method of increasing potassium intake because of the additional nutritional benefits of whole foods over prescribed supplements. When appropriate, patients with hypertension should be encouraged to consume foods with higher potassium content (e.g., fresh fruits, vegetables, and legumes). Overall, potassium interventions appear to be largely safe with no increase in reported adverse events. However, it should be acknowledged that the generalizability of existing studies is limited by stringent exclusion criteria (e.g., excluding those with impaired urinary potassium excretion from renal failure or use of medications that predispose to hyperkalemia). As such, although the literature broadly supports increasing potassium intake to lower BP, caution should be exercised in those at higher risk of developing hyperkalemia."<sup>8</sup>*

## Populations At-Risk

While the general population will benefit from increased potassium intake, Hypertension Canada Guidelines note that some people may be at risk of developing hyperkalemia, and cautions health care professionals that before advising an increase in potassium intake, the following patients should be assessed for suitability and monitored closely:

- Patients taking renin-angiotensin-aldosterone inhibitors
- Patients taking other drugs that can cause hyperkalemia (e.g., trimethoprim, sulfamethoxazole, amiloride, triamterene)
- Chronic kidney disease (glomerular filtration rate  $< 45$  mL/min/1.73 m<sup>2</sup>)
- Baseline serum potassium  $> 4.5$  mmol/L

Such patients are made aware of their risk by their health care professional, and practice caution to avoid a hyperkalemic event, including noting potassium content on food labels.

## International Trends:

The World Health Organization's Guideline for Potassium Intake in Adults and Children issued in 2012 noted that increased potassium intake reduced systolic and diastolic blood pressure in adults:

- WHO recommends an increase in potassium intake from food to reduce blood pressure and risk of cardiovascular disease, stroke and coronary heart disease in adults. WHO suggests a potassium intake of at least 90 mmol/day (3510 mg/day) for adults.
- WHO suggests an increase in potassium intake from food to control blood pressure in children. The recommended potassium intake of at least 90 mmol/day should be adjusted downward for children, based on the energy requirements of children relative to those of adults.

The United Kingdom's Scientific Advisory Committee on Nutrition (SACN), in 2013, in collaboration with the Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment (COT) extensively reviewed the benefits and risks of potassium-based sodium replacers to population health, and subsequently recommended the food industry to consider the same as a means to reduce sodium content in food, with caution to those at risk. A partnership among Action on Salt, The World Action on Salt and Health, and Blood Pressure UK in 2018 issued a position paper supporting the use of potassium-based sodium replacers to reduce UK population salt intake.

## Calls to Action:

### For Canadians:

- Follow a DASH-like diet, high in fruits and vegetables, dietary fibre, non-animal protein (e.g. soy) and low-fat dairy products, and low in saturated fat, and integrate natural sources of potassium such as:
  - Fruits such as apricots, bananas, guava, kiwifruit, and nectarines
  - Vegetables such as cooked broccoli and spinach, and potatoes
  - Milk and yogurt, bran cereals, cooked halibut and salmon
- Consciously reduce your sodium intake toward 2,000 mg per day to achieve or maintain healthy blood pressure.
- Choose low-sodium processed food options, and check nutrition labels for sources of potassium, often used as an alternative salt.
- Refer to Hypertension Canada's booklet, [Blood Pressure Action Plan](#) for strategies in health behavior areas such as nutrition, exercise, alcohol consumption and others.
- Support advocacy efforts that aim to improve the diets of Canadians.

### For Federal, Provincial and Territorial Governments:

- Ensure whole, fresh foods are affordable and accessible to all Canadians.
- Monitor and publicly report industry compliance at the individual product level with the sodium levels set out in the 2012 Guidance Report for the Food Industry on Reducing Sodium in Processed Foods.<sup>12</sup>
- Support population-level potassium consumption data collection to enable analysis and recommendation of potassium intake levels to reduce blood pressure.
- Encourage industry to consider using potassium-based alternative salts as a potential means to reduce sodium and thus increase potassium content of processed food products.

### For Industry:

- Formulate all foods and beverages so that they meet Health Canada's sodium targets.<sup>12</sup>
- Explore potassium-based alternative salts as a potential means to reduce sodium and thus increase potassium content of processed food products.

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