



SODIUM REDUCTION STRATEGY FOR CANADA

Recommendations of the
Sodium Working Group

July 2010

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The Honourable Leona Aglukkaq, P.C., M.P.
Minister's Office, Health Canada
Brooke Claxton Building, Tunney's Pasture
Ottawa, Ontario
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Dear Minister,

On behalf of the Sodium Working Group, the Steering Committee is pleased to submit the report, "Sodium Reduction Strategy for Canada – Recommendations of the Sodium Working Group". This report is the culmination of over two years of work by the Sodium Working Group, which was established by the former Minister of Health in late 2007 to develop a population health strategy for reducing sodium intake among Canadians. The recommendations provided in this report are directed at all levels of government, non-governmental organizations, consumers, industry and other relevant stakeholders.

The Sodium Working Group consists of members from food manufacturing and food service groups, health-focused non-governmental organizations, the scientific community, consumer advocacy groups, health professional organizations, and various government departments and agencies. Despite such a wide and varied representation in its membership, the Sodium Working Group was able to reach consensus on the recommendations contained in the report.


We would like to acknowledge the hard work, expertise and commitment of all the members of the Sodium Working Group in developing the recommendations contained in this report. The Sodium Working Group made it clear in its mandate that a sodium reduction strategy must be multi-staged and based on a three-pronged approach that includes: voluntary reduction of sodium levels in processed food products and foods sold in food services establishments; education and awareness of consumers, industry, health professionals and other key stakeholders; and research. A fourth component, monitoring and evaluation, cuts across the above three prongs. Thus, the recommendations contained in this report fall within these four areas.


This report represents the beginning of a process of implementation and monitoring. It should be followed by progress reports that will chronicle the implementation of the Strategy. These reports would include information on sodium intake by Canadians over time, the progress that industry is making in achieving the sodium reduction targets, the effectiveness of the education and awareness campaigns, and the progress in funding and conducting research to address knowledge gaps that were identified. The results of the monitoring and evaluation process for the overall strategy should be reviewed and if necessary, additional steps, including potential regulatory approaches may be recommended.


We commend your government for establishing the Sodium Working Group. We would also like to acknowledge the tremendous amount of work provided by the Secretariat and Technical Advisors to the Sodium Working Group. Without their dedication, expertise and support it would not have been possible to develop the Strategy.

We very much look forward to the public release of this report and the implementation of the recommendations within it. The members of the Sodium Working Group would be pleased to offer their advice on the implementation of the strategy. It is anticipated that the recommendations of the Sodium Working Group will have a great impact on the public health of Canadians.

Sincerely,


Dr. Hasan Hutchinson (Chair)
Health Canada


Dr. Mary L'Abbe (Vice-Chair)
University of Toronto


Dr. Norm Campbell
Hypertension Canada


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Food and Consumer Products of Canada

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LIST OF ACRONYMS

- AI** – Adequate Intake
- BMI** – Body mass index
- CCHS** – Canadian Community Health Survey
- CIHR** – Canadian Institutes of Health Research
- CINDI** – Countrywide Integrated Non-communicable Disease Intervention
- DASH** – Dietary Approaches to Stop Hypertension
- DRI** – Dietary Reference Intake
- DV** – Daily Value
- GRAS** – Generally Recognized As Safe
- IOM** – Institute of Medicine of the U.S. National Academies
- NFT** – Nutrition Facts table
- NGO** – Non-governmental organization
- SACN** – United Kingdom Scientific Advisory Committee on Nutrition
- SWG** – Sodium Working Group
- TNT** – Tracking Nutrition Trends
- UL** – Tolerable Upper Intake Level
- USDA** – United States Department of Agriculture
- WHO** – World Health Organization

SUMMARY

This document presents the strategy to reduce sodium consumption by Canadians recommended by the Multi-Stakeholder Working Group on Sodium Reduction (also referred to as the Sodium Working Group). The establishment of the Sodium Working Group (SWG) to develop and oversee the implementation of a population health strategy for reducing sodium intake among Canadians was announced by the Minister of Health in late 2007. The recommendations provided by this report are directed at all levels of government, as well as non-governmental organizations, consumers, industry and other relevant stakeholders.

The Sodium Reduction Strategy for Canada is multi-staged and based on a three-pronged approach that includes: structured voluntary reduction of sodium levels in processed food products and foods sold in food services establishments; education and awareness of consumers, industry, health professionals and other key stakeholders; and research. A fourth component, monitoring and evaluation, cuts across all

three other areas. The Strategy is comprehensive and integrated; the recommendations in the four areas cannot be separated from one another in that a successful outcome depends on all being acted upon. The Strategy has an interim sodium intake goal of a population average of 2300 mg of sodium per day to be achieved by 2016. The ultimate goal is to lower sodium intakes to a population mean whereby as many individuals as possible (greater than 95%) have

a daily intake below the Tolerable Upper Intake Level (UL) of 2,300 mg per day. For practical purposes, achieving this requires moving the population mean daily intake of sodium much closer to the Institute of Medicine of the U.S. National Academies' (IOM) recommended Adequate Intake which is 1,500 mg per day for persons aged 9 to 50 years, and less for those younger and older than that.

STRUCTURED VOLUNTARY APPROACH FOR THE FOOD SUPPLY

The voluntary approach envisaged by the SWG is a structured one involving:

- published sodium reduction targets for foods;
- defined timelines;
- a mechanism for public commitment by industry to the targets;
- a plan for monitoring progress by a body other than the food industry, and
- a plan for independent evaluation of the success of the program with the option of taking stronger measures as necessary depending on progress.

Health Concerns and International Response

There is a significant body of evidence linking high sodium intake to elevated blood pressure, which is the leading preventable risk factor for death worldwide. High blood pressure is the major cause of cardiovascular disease and a risk factor for stroke and kidney disease. There is also evidence to suggest that a diet high in sodium is a risk factor for osteoporosis, stomach cancer and asthma. According to the World Health Organization, interventions to reduce population-wide salt intake have been shown repeatedly to be highly cost-effective.

In 2004, the IOM set Dietary Reference Intakes (DRIs) for sodium. The Adequate Intake (AI) was set at 1,500 mg per day for those aged 9 to 50 years, with lower values for younger and older individuals. The AI is a recommended intake level, thought to meet or exceed the requirements of almost all individuals. The UL for sodium was set at 2,300 mg per day for people aged 14 years and over, with lower values for those less than 14 years of age. The UL has been defined as the highest average daily level of intake likely to pose no risk of adverse health effects, and reflects an intake level that should not be exceeded. It should be noted that the definition of the UL is problematic for sodium, as increases in blood pressure continue with increasing sodium intakes without an apparent threshold. Individuals with hypertension, diabetes and chronic kidney disease, as well as older-aged persons and those of African origin, who are more sensitive to the blood pressure raising effects of sodium, should limit their intake to lower levels.

High sodium intake is a global problem. As a result of the high salt intakes around the world, in 2003 the WHO set a worldwide target of 5g or less of salt (<2,000 mg sodium) per day per person. A number of jurisdictions have launched initiatives to reduce the sodium intake of their populations, most notably Finland, the United Kingdom, the European Union and, most recently, the United States.

The Canadian Situation

The current mean intake of sodium by Canadians is about 3,400 mg per day. Data from the 2004 Canadian Community Health Survey indicate that among people aged 9 to 70, over 85% of men and between 63% and 83% of women had sodium intakes exceeding the UL. Similarly, in young children, 77% of those aged 1 to 3 and 93% of those aged 4 to 8 years had intakes exceeding the UL. Among males in their teen years, 97% exceed the UL, and for females in that age group 82% exceed the UL.

In Canada, it has been estimated that a decrease in the average sodium intake of about 1,800 mg per day would prevent 23,500 cardiovascular disease events per year, a decrease of 13%. This would result in direct health care savings of \$1.38 billion per year, and if indirect costs are included, the savings would be \$2.99 billion per

year. While these savings estimates are based on 1993 data, cost of cardiovascular diseases in Canada, published in 1998, indicate that direct costs were \$6.82 billion, and total costs were \$18.47 billion. An American study published in 2010 shows that even a modest reduction of 1 g salt (400 mg sodium) per day achieved over a 10-year period would result in the number of coronary heart disease cases decreasing by 20,000 to 40,000, stroke by 11,000 to 23,000, myocardial infarction by 18,000 to 35,000, and deaths from all causes by 15,000 to 32,000 annually. A 3 g (1200 mg sodium) reduction in daily salt intake would have approximately the same effect on rates of coronary heart disease as a 50% reduction in tobacco use, a 5% reduction in the BMI (body mass index) of obese adults, or the use of statins to treat people at low or intermediate risk of coronary heart disease events. A salt reduction strategy would be more cost-effective than using medication to lower blood pressure in all people with hypertension. Proportionately similar reduction could be expected in Canada.

As mentioned above, the sodium intake of the majority of Canadians exceeds the UL. The major contributors to dietary sodium intake are commercially prepared foods, including those from restaurants and food service establishments. Sodium is present throughout the food supply. In total, it is estimated that commercially processed foods account for 77% of the sodium intake. Another 12% is naturally occurring, while 6% is added at the table and 5% is added during cooking.

Public opinion research has shown that Canadians are aware of sodium as a health issue, but perceive it as everybody else's problem. Very few understand what a healthy amount of sodium is, and most continue to have high dietary intakes. Some non-governmental groups, such as Blood Pressure Canada (now Hypertension Canada), the Canadian Stroke Network, the Centre for Science in the Public Interest, and the Heart and Stroke Foundation of Canada have taken a leadership role in informing Canadians about the risks of high sodium intake. While the food industry is engaged in sodium reduction activities, individual companies are at various stages. A number have been working on the issue for years and others have not yet begun.

The Sodium Working Group's Approach

To ensure that its recommendations would be based on the best available evidence, the SWG collected information from a variety of sources. Modelling exercises to estimate the potential impact of various reduction scenarios were conducted by Health Canada staff. Public opinion research to inform the Working Group about the current awareness about sodium by Canadians was commissioned by the Public Health Agency of Canada. A small, qualitative survey was commissioned by Agriculture and Agri-Food Canada to provide information on the progress, challenges and business impacts of sodium reduction on the Canadian food industry. Public consultations were held to gain information from experts and to gather input from the various stakeholders.

As part of the Terms of Reference for the SWG, it was stipulated that the Strategy developed to decrease the sodium intake of Canadians would be multi-staged and based on a multi-faceted approach that would include voluntary reduction of sodium levels in processed food products and foods sold in food services establishments, education and research. A fourth over-arching area, monitoring and evaluation, was subsequently added. Members of the SWG participated on one or more of four sub-committees, each of which focused on one approach. Each sub-committee developed the key dimensions and parameters in its area, conducted research, deliberated and developed a slate of recommendations for consideration and adoption by the full Working Group, resulting in this strategy.

The Sodium Working Group's Overarching Recommendations

- A. The Working Group has established an interim sodium intake goal of a population average of 2,300 mg of sodium per day to be achieved by 2016. The ultimate goal of the Sodium Reduction Strategy is to lower sodium intakes to a population mean whereby as many individuals as possible (greater than 95% of the population) have a daily intake that is below the Tolerable Upper Intake Level (UL).^a
- B. The Working Group recommends collaboration across all levels of government, health professional organizations, non-governmental organizations (NGOs), media, industry and academia to implement the specific recommendations in a coordinated, systematic and timely fashion.
- C. The Working Group recommends that federal, provincial and territorial governments provide adequate funding to support the successful implementation of the Sodium Reduction Strategy.
- D. The Working Group recommends that all levels of government and stakeholders develop and integrate sodium reduction into their nutrition programs, guidelines and policies.
- E. The Working Group recommends that the implementation process include outlining the individual steps required for each recommendation, specifying timelines and monitoring the completion of each step.
- F. The Working Group recommends that all Canadians take personal steps to reduce sodium consumption as part of an overall healthy diet.

a. For practical purposes, achieving this requires moving the population mean daily intake of sodium much closer to the IOM's recommended Adequate Intake (AI) which is 1,500 mg for persons aged 9 to 50 years, and less for those younger and older than that.

1. Food Supply Recommendations

- RECOMMENDATION 1-1:** The Working Group recommends that Health Canada continue to work with the food industry to establish voluntary sodium reduction targets by food category.
- RECOMMENDATION 1-2:** The Working Group recommends that Health Canada, in collaboration with the Provinces and Territories, continue to work with the restaurant and food service industries to establish voluntary sodium reduction targets for meals and menu items sold in restaurants and foodservice establishments.
- RECOMMENDATION 1-3:** The Working Group recommends that manufacturers lower the sodium content of their products to meet the voluntary targets and go beyond them over time to the lowest level possible, taking into consideration microbial food safety, quality and consumer acceptance.
- RECOMMENDATION 1-4:** The Working Group recommends that a mechanism be established on Health Canada's sodium website that would allow individual companies to commit to the Sodium Reduction Strategy.
- RECOMMENDATION 1-5:** The Working Group recommends that the *Food and Drug Regulations* be amended to ensure that the serving sizes used in the Nutrition Facts table (NFT) are as uniform as possible to facilitate the comparison of sodium levels in similar foods.
- RECOMMENDATION 1-6:** The Working Group recommends that the *Food and Drug Regulations* be amended to change the basis of the Daily Value (DV) for sodium in the Nutrition Facts table (NFT) from 2,400 mg to 1,500 mg to reflect the Adequate Intake (AI) level.
- RECOMMENDATION 1-7:** The Working Group recommends that Health Canada improve the current nutrition labelling system in Canada to facilitate consumer understanding and use, particularly as it relates to sodium.
- RECOMMENDATION 1-8:** The Working Group recommends that the *Food and Drug Regulations* and applicable provincial regulations be amended to require the on-site disclosure of nutrition information in a consistent and readily accessible manner for standardized menu items prepared and assembled on-site at restaurants and food services establishments, where feasible (i.e., in establishments with a high degree of standardization).
- RECOMMENDATION 1-9:** The Working Group recommends that the federal government, along with the provincial and territorial governments, where necessary, review the food additive approval process and modernize the standards of identity for foods while maintaining microbial food safety.
- RECOMMENDATION 1-10:** The Working Group recommends that the federal government, together with provincial and territorial governments, develop more consistent sodium guidelines and procurement policies for use by food service operations in publicly-funded institutions such as schools, daycares, hospitals, care facilities, correctional institutions and for the armed forces.

2. Awareness and Education Recommendations

- RECOMMENDATION 2-1:** The Working Group recommends that education programs be developed and adapted for intermediaries working in the various sectors of the food industry (manufacturing, distributing and foodservice) to inform them about sodium and the Sodium Reduction Strategy for Canada.
- RECOMMENDATION 2-2:** The Working Group recommends that education programs be developed to reach key intermediaries in the health, media, education and government sectors to inform them about sodium and the Sodium Reduction Strategy for Canada.
- RECOMMENDATION 2-3:** The Working Group recommends that the federal government lead the development and implementation of a social marketing campaign on sodium. This campaign should be aligned with efforts of the food industry to reformulate their products.
- RECOMMENDATION 2-4:** The Working Group recommends that governmental and non-governmental funding bodies develop cohesive and coordinated funding mechanisms to enhance community-based activities that will support the Sodium Reduction Strategy.
- RECOMMENDATION 2-5:** The Working Group recommends that federal, provincial and territorial governments continue to explore options to reduce the exposure of children to marketing for foods that are high in sodium.
- RECOMMENDATION 2-6:** The Working Group recommends that, in the context of a broad education campaign on sodium, a strategy be developed to help consumers understand the current Nutrition Facts table (NFT). It should be understood that changes to the NFT will be made in the future and a comprehensive strategy will be needed to support the revised NFT.
- RECOMMENDATION 2-7:** The Working Group recommends that the federal government review and update Canada's Food Guide to increase the prominence and effectiveness of advice regarding sodium and calories.

3. Research Recommendations

- RECOMMENDATION 3-1:** The Working Group recommends that the federal government provide increased resources to the granting councils and the relevant science-based departments and agencies to develop and implement mechanisms to build capacities, target research funding and improve research collaborations amongst academic, government and industry sectors, and enhance these partnerships to advance sodium reduction-related research.
- RECOMMENDATION 3-2:** The Working Group recommends that the federal government empower the granting councils and relevant partners to develop and implement a program of research funding to address knowledge gaps in basic understanding of sodium physiology to inform both policy and practice.

RECOMMENDATION 3-3: The Working Group recommends that the federal government empower the granting councils, relevant departments and agencies, and the food industry to work together to better understand the minimum levels of sodium attainable in foods without sacrificing the specific functional aspects of salt in foods, with an emphasis on microbial food safety and food technology issues.

RECOMMENDATION 3-4: The Working Group recommends that the federal government, relevant health non-governmental organizations (NGOs) and other stakeholders fund population and public health policy and program research.

RECOMMENDATION 3-5: The Working Group recommends that the federal government provide adequate resources to the granting councils and interested stakeholders to develop and implement a research initiative to investigate sodium reduction in the context of healthy eating patterns.

4. Monitoring and Evaluation Recommendations

RECOMMENDATION 4-1: The Working Group recommends development of a comprehensive sodium monitoring and evaluation plan with annual public reporting.

RECOMMENDATION 4-2: The Working Group recommends monitoring the sodium intake of Canadians.

RECOMMENDATION 4-3: The Working Group recommends monitoring the foods Canadians consume using a national dietary intake survey similar to the Canadian Community Health Survey (CCHS) 2.2.

RECOMMENDATION 4-4: The Working Group recommends monitoring and evaluating the progress of each of the program components of the Sodium Reduction Strategy for Canada—specifically, the food supply, awareness and education, and research.

RECOMMENDATION 4-5: The Working Group recommends monitoring long-term health outcomes, including measured blood pressure, morbidity and mortality from cardiovascular disease (acute myocardial infarction, stroke and heart failure, etc) and other sodium-related diseases (such as stomach cancer), as well as monitoring cost savings to the health system.

The release of the Sodium Reduction Strategy for Canada marks the beginning of a process of implementation and monitoring. The implementation of the recommendations will be monitored, as well as changes in the sodium intake by Canadians over time, the progress that industry is making in achieving the sodium reduction targets, the effectiveness of the education and awareness campaigns, and the progress in funding and conducting research to address identified knowledge gaps. The results of the monitoring

and evaluation of the overall strategy will be reviewed and additional steps may be recommended in order to facilitate the success of the strategy. These steps could include additional regulations, research, policy development and, possibly, fiscal instruments. The Working Group members intend to be active and involved in implementation in their various roles as well as providing advice to those responsible for the oversight of the Sodium Reduction Strategy for Canada.

INTRODUCTION

The majority of people worldwide consume far more sodium, mostly from salt, than is required physiologically. The accumulated evidence of a cause and effect relationship between high intakes of sodium and hypertension, a major cause of cardiovascular disease, is now convincing.¹ As a result, in 2003, the World Health Organization (WHO) and the United Nations Food and Agriculture Organization issued a joint report calling for a reduction in population salt intake to 5 g or less per day (<2,000 mg sodium).² A follow-up WHO consultation, held in 2007, concluded that population-wide reductions in dietary sodium consumption are highly cost-effective. Hence, there is a need to give priority to the implementation of national strategies, policies and programs aimed at the reduction of dietary salt consumption.³

As is generally the case internationally, in Canada the consumption of sodium is excessive. It is currently estimated that the average sodium intake is 3,400 mg per person per day from all sources.⁴ In October 2007, the then federal Minister of Health, Tony Clement, announced that Health Canada would establish an expert Sodium Working Group to develop and oversee the implementation of a population health strategy for reducing sodium intake among

Canadians. (See Appendix 1 for the Working Group Terms of Reference.)

About the Sodium Working Group

The Sodium Working Group (SWG) is chaired by a representative of Health Canada and includes a total of 25 members from food manufacturing and food service groups, health-focused non-governmental organizations (NGOs),

the scientific community, consumer advocacy groups, health professional organizations, and various government departments and agencies. Stakeholder organizations were invited to submit the names of one or two potential nominees for membership on the Working Group. Members were selected from this list of nominees to ensure a mix of disciplines, skill sets and perspectives. Consideration was also given to adequate geographical representation. (See Appendix 2 for a list of Working Group Members.)

The mandate of the SWG indicates that, under the leadership of Health Canada, the multi-stakeholder group is to design a population health strategy for the successful reduction of the sodium content of the diets of Canadians to be in line with the recommendations published by the Institute of Medicine of the U.S. National Academies' (IOM), which were released following an extensive review of the literature by an expert panel of scientists.⁵

SOME SALT FACTS AND FIGURES

- salt is the common name for sodium chloride
- 1 g salt contains 393 mg or 17 mmol of sodium
- 1 g (1,000 mg) of sodium equals 43.5 mmol
- 1 mmol of sodium equals 23 mg
- 1 mmol of sodium equals 1 mEq
- 2,300 mg of sodium are present in about 1 teaspoon of salt

A Sodium Reduction Strategy for Canada

This document sets out the Sodium Working Group's recommended strategy to reduce sodium consumption by Canadians. The Strategy's recommendations are directed at various levels of government, NGOs, consumers, industry and other relevant stakeholders. The Sodium Reduction Strategy for Canada is multi-staged and reflects a multi-faceted approach that includes:

- » structured voluntary reduction of sodium levels in processed food products and foods sold in food services establishments
- » awareness and education of Canadians, health professionals and other key stakeholders
- » research

Recommendations across these three areas are supported by additional recommendations concerning monitoring and evaluation.

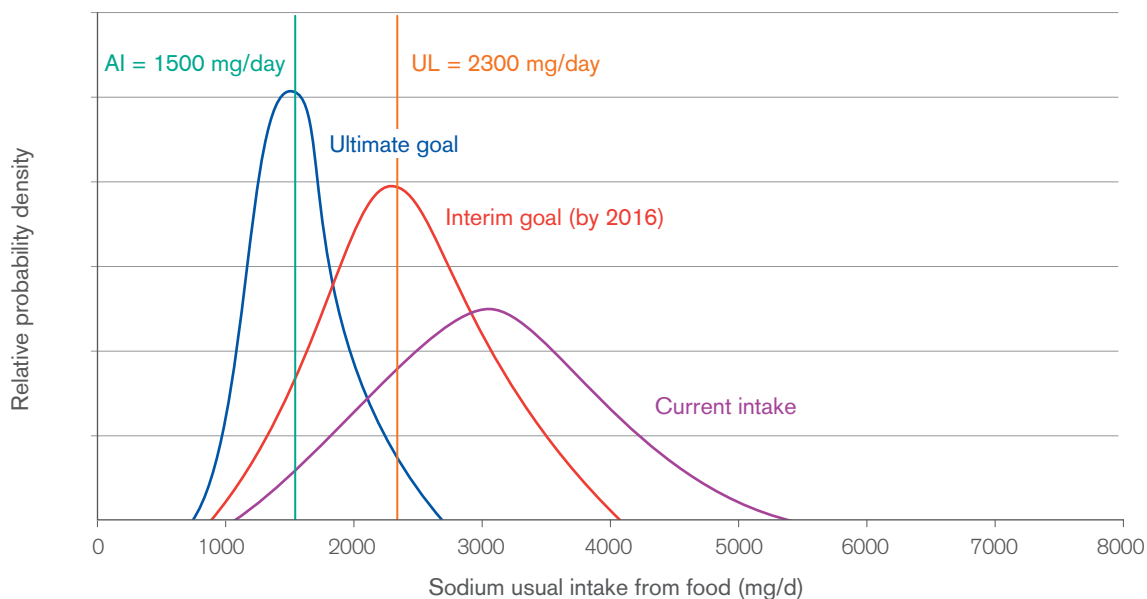
The Sodium Reduction Strategy is comprehensive and integrated. The clusters of recommendations cannot be separated from one another, in that a successful outcome

depends on all being acted upon. The Strategy recognizes that fostering healthy sodium intakes over a prolonged period of time requires a combination of efforts at multiple levels: individual, interpersonal, organizational, community and public policy. Developing public policy and creating supportive environments to support changes in behaviour, and empowering communities and individuals to reduce sodium intakes to a healthy range, are important components of the Strategy.

The Strategy has an interim sodium intake goal of a population average of 2300 mg of sodium per day to be achieved by 2016, while the ultimate goal is to lower sodium intakes to a population mean whereby as many individuals as possible—i.e., more than 95% of Canadians—have a daily intake that is below the Tolerable Upper Intake Level (UL) of 2,300 mg per day. For practical purposes, achieving this requires moving the population mean daily intake of sodium much closer to the IOM's recommended Adequate Intake (AI) which is 1,500 mg for persons aged 9 to 50 years, somewhat less for those younger and older than that. These goals are illustrated graphically in Figure 1.

FIGURE 1

Graphic illustration of interim and ultimate goals



This report

The Sodium Reduction Strategy for Canada set out in this document represents the work of the Sodium Working Group over the course of more than two years. The Strategy includes both overarching and area-specific recommendations. Development of the Strategy, important in its own right, represents an important beginning to the process of implementing the changes needed to reduce Canadians' sodium intake as part of a healthy diet.

This report includes two main parts:

- » **Part I—Context** provides an overview of the numerous issues and complexities that the Working Group considered in its research, consultations and deliberations. It sets out important background that not only provided the rationale for individual recommendations, but also elaborates on the health and other issues that the Working Group needed to consider in developing a strategy for the Canadian context.
- » **Part II—Sodium Reduction Strategy** sets out the Working Group's recommended goals and the strategy for achieving them, including six overarching recommendations, ten that address sodium in the food supply, seven that are aimed at providing the necessary awareness and education among various stakeholders, and five related to research. These are supported by five recommendations for monitoring and evaluation, which span all the other areas.

The report also includes five appendices, which provide important background as well as more in-depth information to support the Strategy.

A. Health Effects of Sodium

Sodium is an essential element that is required—in small amounts—for the normal functioning of the body. Excessive amounts of sodium have been shown to cause high blood pressure. The World Health Organization (WHO) has estimated that high blood pressure is the leading preventable risk factor for death in the world.⁶ In Canada, 19% of Canadian adults aged 20 to 79 years have hypertension and another 20% are classified as prehypertensive.⁷ Hypertension is a major cause of cardiovascular disease, which is the number one cause of death in Canada.^{8,9}

In addition to other lifestyle modifications and eating habits that have an impact on blood pressure risk, research has shown a direct relationship between sodium intake and hypertension; blood pressure rises with increased sodium intake in the general population and is reduced with decreased intake. A 2009 meta-analysis of 19 independent cohort samples, with 177,025 participants and over 11,000 vascular events, showed that high salt intake significantly increases the risk of stroke and total cardiovascular disease.¹⁰ In addition to the effect on blood pressure, high sodium intake has also been associated with vascular and cardiac damage that is independent of elevated arterial pressure, as well as with detrimental effects on calcium and bone metabolism, increased risk of stomach cancer, and with the severity of asthma.¹¹

A meta-analysis of controlled trials has shown that sodium intake also contributes to blood pressure levels in children.¹² A high intake of

sodium is also likely to predispose children to develop hypertension later in life. In addition, it is speculated that high sodium intake suppresses the salt taste receptors, which is likely to cause children to prefer foods with a higher salt content in later life.¹²

Lowering the salt intake of individuals around the world is expected to shift the population distribution of blood pressure toward more optimal levels, thus preventing millions of deaths from cardiovascular disease and stroke, and reducing the burden on health services. Not only is sodium reduction one of the easiest ways to reduce the global burden of cardiovascular disease, it is also cost-effective and efficient.^{13,14}

Although excessive dietary sodium intake is a key risk factor for the development of hypertension, other lifestyle variables, including obesity, inadequate physical activity and poor diet, are also important contributors.¹⁵ The DASH (Dietary Approaches to Stop Hypertension) diet, which is similar to *Canada's*

Food Guide, has been shown to result in substantial reductions in blood pressure even when sodium intake is not decreased.¹⁶ Nevertheless, evidence for the independent impact of sodium reduction on blood pressure comes from the findings of the DASH-sodium trial, a multi-centre, randomized, controlled-feeding trial which compared the effects of three levels of sodium and two dietary patterns on blood pressure. Sodium was found to have a significant effect on blood pressure in consumers following either a typical North American diet or a DASH diet, and the combination of the DASH diet and reduced sodium intake achieved the greatest effect on blood pressure.¹⁷

Adequate Intake and Tolerable Upper Intake Levels

Under the joint sponsorship of the American and Canadian governments, the IOM established a new set of Dietary Reference Intakes (DRIs), which include estimates of average

requirements, recommended dietary allowances and Tolerable Upper Intake Levels (ULs) for most nutrients. For sodium, it was determined that there were insufficient data to establish average requirements, so Adequate Intakes (AIs) were developed instead. Three different criteria were used to establish the AI for adults. First, the AI is set at a level of intake that ensures that the overall diet, with that level of sodium, provides sufficient quantities of other important nutrients. Second, the AI is above a level that has been shown to have adverse effects on blood lipid concentrations and insulin resistance. Finally, the AI is at a level that covers the sodium sweat losses of unacclimatized individuals who are exposed to high temperatures or who become physically active.^v The AI is a level that is expected to meet or exceed the sodium requirements of most individuals in a particular age and gender group. As shown in Table 1, the AI for those aged 9 to 50 years of age was set at 1,500 mg of sodium per day. For those aged less than 9 years and older than 50 years the AIs are lower.

The Tolerable Upper Intake Level (UL) for sodium, also shown in Table 1, was set at 2,300 mg per day for people aged 14 years and over, with lower values for those less than 14 years of age. The UL is defined by the IOM as the highest average daily level of intake likely to pose no

risk of adverse health effects, and reflects an intake level that should not be exceeded. It should be noted that the definition of the UL is problematic for sodium, as increases in blood pressure continue with increasing sodium intakes without an apparent threshold meaning that even at intakes below the UL, risk of hypertension is still increased relative to intakes at the AI. The IOM report says that individuals with hypertension, diabetes and chronic kidney disease, as well as older persons and those of African origin, all of whom are more sensitive to the blood pressure raising effects of sodium, should limit their intake to lower levels.⁵ In Canada, it has been further shown that people of south Asian origin are at higher risk of developing cardiovascular disease and should also limit their intake of sodium to lower levels.¹⁸

The ultimate sodium intake goal is one that minimizes the proportion of the population at potential risk of adverse effects from excessive sodium consumption. This requires a distribution of usual intakes whereby as many individuals as possible, at least 95% of the population, have daily intakes below the UL. Since currently the majority of the population has intakes exceeding the UL, a significant reduction in population sodium intakes is required.⁵

TABLE 1:
Sodium AIs and ULs for various life stage groups

Life stage groups	AI (mg/day)	UL (mg/day)
1–3 years	1,000	1,500
4–8 years	1,200	1,900
9–13 years	1,500	2,200
14–18 years	1,500	2,300
19–30 years	1,500	2,300
31–50 years	1,500	2,300
51–70 years	1,300	2,300
Over 70 years	1,200	2,300

Source: U.S. National Academies of Science Institute of Medicine, 2005.⁵

B. Health and Associated Economic Benefits of Sodium Reduction

In Canada, it has been estimated that if the average sodium intake is decreased by 1,840 mg/day—roughly equivalent to bringing it down from the current intake to the AI of 1,500 mg/day—hypertension prevalence would be decreased by 30%. This would result in approximately one million fewer hypertension patients and direct annual cost savings of \$430 million due to fewer physician visits, laboratory tests and drug use.¹⁹ It is also estimated that such a decrease in sodium intake would prevent 23,500 cardiovascular disease events per year in Canada, representing a decrease of 13% over current numbers.¹⁹ Such a decrease would contribute an additional \$949 million annually in direct savings.

Overall, reducing sodium by about 1,800 mg per day would result in direct health care savings of \$1.38 billion per year, and if indirect costs were included the savings would be \$2.99 billion per year.²⁰ It should be noted that these calculations are based on 1993 costs and are likely much greater in current (2010) dollars. While these savings estimates are based on 1993 data, cost of cardiovascular diseases in Canada, published in 1998, indicate that direct costs were \$6.82 billion and indirect costs were \$11.65 billion.²¹

A U.S. study published in 2010 estimated that, by reducing salt intake by 3 g (1,200 mg sodium) per day, the annual number of new cases of coronary heart disease in the U.S. would decrease by between 60,000 and 120,000, the number of stroke cases by between 32,000 and 66,000, myocardial infarction by between 54,000 and 99,000, and the annual number of deaths from all sources by between 44,000 and 92,000. This would save between 194,000 and 392,000 quality-adjusted life years, and save between \$10 billion and \$24 billion in health care costs annually. Even a modest reduction of 1 g salt (400 mg sodium) per day, achieved over a 10-year period, would result in the number of coronary heart disease cases decreasing by between 20,000 and 40,000, stroke by between 11,000 and 23,000, myocardial infarction by between 18,000 and 35,000, and deaths from all causes by between 15,000 and 32,000 annually.²² (See also sidebar.)

As a point of comparison, the study estimated that a 3 g reduction in daily salt intake would have approximately the same effect on rates of coronary heart disease as a 50% reduction in tobacco use, a 5% reduction in the BMI (body mass index) of obese adults, or the use of statins to treat people at low or intermediate risk of coronary heart disease events. The 3 g level of salt reduction was estimated to have a much greater benefit on preventing strokes than the other interventions. The study also estimated that a 3 g/day salt reduction strategy would be as effective as providing anti-hypertensive pharmaceutical drugs to all unmedicated hypertensives, but at a fraction of the cost (\$300 million compared to \$19.5 billion). The study estimated that the U.S. government would save from \$6 to \$12 in health care costs for each dollar spent on a program to reduce salt consumption, even if the government

PROJECTED EFFECTS OF POPULATION-WIDE SODIUM REDUCTION IN THE UNITED STATES²²

3 g salt (1200 mg sodium) decrease in population average sodium intake

- Coronary heart disease down by between 60,000 and 120,000 cases annually.
- Stroke down by between 32,000 and 66,000 cases annually.
- Myocardial infarction down by between 54,000 and 99,000 cases annually.
- Deaths from all sources down by between 44,000 and 92,000 annually.
- 194,000 to 392,000 quality-adjusted life years would be saved.
- Savings in health care costs would range from \$10 to \$24 billion annually.

1 g salt (400 mg sodium) decrease in population average sodium intake achieved over a 10-year period

- Coronary heart disease down by between 20,000 and 40,000 cases annually.
- Stroke down by between 11,000 and 23,000 cases annually.
- Myocardial infarction down by between 18,000 and 35,000 cases annually.
- Deaths from all sources down by between 15,000 and 32,000 annually.

assumed the entire cost of this program. It is also estimated that a successful population-wide salt reduction program would result in a 16% to 24% decrease in the number of women still requiring medication to treat their hypertension, and by a 22% to 34% decrease for men. In the United States, where the study was conducted, this would save \$3 to \$6 billion in the cost of treating high blood pressure alone.²²

Using the most recent (1998) data available, it is estimated that the direct costs associated with cardiovascular diseases at that time were \$6.82 billion and the indirect costs were \$11.65 billion, for a total of \$18.47 billion.

C. International Efforts to Reduce Sodium

WHO recommendations

High salt intake is a global problem. Table 2 shows the reported intake of sodium and salt for a number of countries. As a result of the high salt intake around the world, in 2003, the WHO set a worldwide target of 5g or less of salt (<2,000 mg sodium) per day, per person.² This was followed up with a technical meeting held in Paris in 2006, where the target was confirmed and the following recommendations, among others, were made on ways to reach this goal:³

- » Countries should commit to reducing the average salt consumption of the adult population to <5 g per day, except where lower levels have already been set.
- » Countries should develop a clear strategy to achieve this goal. This should include measurable objectives, targets,

indicators (including for population sub-groups) and a time frame for their accomplishment that is as short as possible.

- » Ministries of health are encouraged to play the leading role in initiating and coordinating the development of policies, strategies and actions aimed at reduction of salt intake. An intersectoral and multidisciplinary approach should be fostered and pursued through the ministries of health to facilitate the development, implementation and monitoring of policies.
- » Food producers and food distributors (catering companies, restaurants, schools and worksite canteens, etc.) are strongly encouraged to take initiatives to reduce the salt content of their food products and/or meals to the lowest salt content possible, knowing that consumers progressively adapt their taste to the offered salt intake.
- » There are potential advantages to voluntary government guidelines or self-regulatory approaches, including flexibility and speed of implementation. Such approaches should be pursued, but only if independent and transparent mechanisms for evaluating the impact of agreed actions within a specific time frame are also established.
- » Clear timelines should be defined for the implementation of a self-regulatory approach and, if the agreed goals are not met in a timely way, regulatory approaches should be initiated and enforced. This point may have already been reached in countries where, for years, voluntary approaches have proved ineffective.

TABLE 2:

Estimated sodium and salt intakes per day in selected countries*

Country	Sodium (mg)	Salt (g)	Sodium (mmol)	Method	Year	Reference
Spain	2,142	5.4	93	72-hour dietary recall	1995	Schröder et al. 2002 ²³
France	3,120	8.0	136	7-day food record	1999	Meneton et al. 2009 ²⁴
Finland	3,300	8.3	144	48-hour recall validated by urinary analysis	2002	Reinivuo et al. 2006 ²⁵
Canada	3,400	8.5	148	Dietary recall	2004	Statistics Canada 2004^{26**}
U.S.A.	3,435	8.6	149	Dietary recall	2006	USDA 2006 ²⁷
U.K.	3,460	8.6	150	24-hour urine analysis	2008	Nat. Centre for Social Research 2008 ²⁸
Brazil	4,500	11.3	196	Household budget survey/food disappearance	2003	Sarno et al. 2009 ²⁹
Turkey	7,200	18.0	313	24-hour urinary analysis	2008	World Action on Salt 2008 ³⁰

* It should be noted that the data were obtained using different methods (dietary recall, 24-hour urine collection, etc.) and should therefore be compared with caution.

** Estimate includes Statistics Canada reported intake of 3098 mg adjusted to account for salt added during preparation and at the table.

Early work in Finland continues

Following release of the WHO recommendations, a number of countries launched initiatives to reduce the sodium intake of their populations. Finland started a successful salt reduction campaign as part of a comprehensive strategy to lower the high incidence of cardiovascular disease in 1979, in North Karelia. The strategy sought to improve the overall nutritional quality of the population's diet, reduce smoking rates and increase activity levels. Work is ongoing nationally and, in the case of sodium reduction, focuses on informing the public through extensive media campaigns and the mandatory

labelling of high salt foods, as well as working with the food industry to reformulate foods on a voluntary basis. It is estimated that industry has reformulated a variety of product groups to reduce their salt content by about 20% to 25%.³¹ The comprehensive approach has resulted in a one-third reduction in average sodium intake, from over 5,000 mg per day in 1980 to about 3,300 in 2002, which contributed to a decrease of more than 10 mm Hg in the population average systolic and diastolic blood pressure, along with a 75% decrease in both stroke and coronary heart disease mortality.^{25,32}

United Kingdom reduction goals

In the United Kingdom, the Scientific Advisory Committee on Nutrition (SACN) recommended in 2003 that salt intake should be reduced from a population average of 9.5 g per day (3,800 mg sodium) to 6 g per day (2,400 mg sodium), which was to have been achieved by 2010. The average daily intake of sodium decreased from 3,800 mg in 2001 to 3,440 mg in 2008.³³ Following publication of the SACN report in 2003, the Food Standards Agency and Department of Health made a commitment to work towards reducing salt intakes in line with this recommendation. The strategy to achieve the goal has three main strands: a public campaign to raise consumer awareness of why a high salt intake is bad for their health and what they can do to reduce intake; working with the food industry to reduce levels of salt in processed foods; and front-of-package labelling to provide additional information to consumers on the levels of salt (and other nutrients) in food. To help guide the food industry as to the type of foods in which reductions are required, and the level of reductions that are needed to help reduce consumer intake, the Agency proposed targets for salt levels in a wide range of food categories. Developed in discussion with the food industry, the targets then went out for broader public consultation and were finalized in 2006. In 2008, progress towards achieving these targets was assessed and revised targets were published for 2012.³⁴

The European Union Framework

The European Union has also undertaken initiatives to limit salt consumption by people in its member states. In 2008, the European Commission established the E.U. Framework for National Salt Initiatives. The Framework provides a common vision for a general European approach towards salt reduction, with the overall goal of contributing to reduced salt intake at the population level to achieve the national or WHO recommendations. Participation of member states is voluntary and the Framework is meant to support and reinforce national plans. There are five key elements to the E.U. Framework:

1. Determine additional data needs
2. Establish benchmarks for major food categories
3. Develop actions to raise public awareness

4. Develop reformulation actions with industry/catering
5. Monitor and evaluate actions and reformulation

A minimum benchmark of 16% salt reduction over four years was established, with a minimum annual reduction of 4%. Twelve categories of foods have been identified as priorities; each member state must choose at least five.³⁵

Current U.S. recommendations

In the United States, the IOM established an ad hoc committee to review and make recommendations about various means that could be employed to reduce dietary sodium intake to levels recommended by the 2005 Dietary Guidelines for Americans, which state that intakes of sodium should not exceed 2300 mg per day. Three meetings were held in 2009 and the report was released in April 2010.³⁶ (See sidebar next page.)

In developing their recommendations, the IOM Committee considered factors such as the health effects of high sodium intakes, the health and economic benefits of lowering sodium, current intakes and sources of sodium in the diet, international efforts to reduce sodium, current knowledge and behaviour of consumers related to sodium, past and current initiatives to reduce sodium, the role of sodium in foods, the perception of salty taste and the adaptability of that perception, and the use and role of salt substitutes. The IOM recommends the setting of mandatory national standards for the sodium content of foods and, in the mean time, an immediate voluntary reduction of sodium in processed foods and those served in food service establishments. The regulatory approach would be done by modifying the Generally Recognized as Safe (GRAS) status of sodium chloride in order to reduce the salt content of the food supply in a stepwise manner. The stepwise approach is recommended to allow the consumers' salt taste perception to be modified over time, thus resulting in higher consumer acceptance. This approach should also be followed for menu items in restaurant/food service establishments that are sufficiently standardized to allow practical implementation. The recommendation goes on to state that FDA should revisit the GRAS status of other sodium containing compounds and make adjustments consistent with the changes for sodium chloride.

IOM RECOMMENDATIONS

Primary Strategies:

Recommendation 1

- The Food and Drug Administration (FDA) should expeditiously initiate a process to set mandatory national standards for the sodium content of foods.

Interim Strategies:

Recommendation 2

- The food industry should voluntarily act to reduce the sodium content of foods in advance of the implementation of mandatory standards.

Supporting Strategies:

Recommendation 3

- Government agencies, public health and consumer organizations, and the food industry should carry out activities to support the reduction of sodium levels in the food supply (including revisions to base the daily value for sodium on the Adequate Intake, which is 1500 mg).

Recommendation 4

- In tandem with recommendations to reduce the sodium content of the food supply, government agencies, public health and consumer organizations, health professionals, the health insurance industry, the food industry, and public-private partnerships should conduct augmenting activities to support consumers in reducing sodium intake.

Recommendation 5

- Federal agencies should ensure and enhance monitoring and surveillance relative to sodium intake measurement, salt taste preference, and sodium content of foods, and should ensure sustained and timely release of data in user-friendly formats.

Also in the U.S., the New York City Health Department initiated in 2008 a nationwide effort to reduce the salt levels in processed and restaurant foods. Under the Health Department's leadership, a coalition of health organizations and public agencies was formed to work with food industry leaders on a voluntary framework to cut the salt in their products. The approach is to set substantive, achievable, gradual, voluntary and measurable targets, following the U.K. model. The goal is to obtain a 20% reduction in sodium intake in five years by decreasing the sodium content of foods by 25%.³⁷ In 2010, New York City published sodium targets for packaged and processed foods, as well as restaurant foods.^{38,39}

For a comprehensive review of international efforts to lower sodium consumption, see *Dropping the Salt: Practical steps countries are taking to prevent chronic non-communicable diseases through population-wide dietary salt reduction*, prepared for the Public Health Agency of Canada.⁴⁰

D. The Canadian Situation

Canadian sodium intake

Historical data on sodium consumption in Canada is very limited. A Canadian study on the relationship between sodium, potassium and hypertension, published in 1962, measured 24-hour sodium excretion, conducted for 14 consecutive days, by nine adults with an average age of 58 years. It found a daily excretion of 162.2 mEq, which indicates a daily intake of about 3,740 mg of sodium.⁴¹ An analysis of food samples representative of the Canadian diet collected in the 1970s reported 1,142 mg of sodium per 1,000 kcal.⁴² When this value is adjusted by the daily energy intakes reported in the Nutrition Canada Survey carried out in 1970–1972, the daily sodium intake of adult males was approximately 3,300 mg and about 2,200 mg for adult females.⁴³ This estimate does not include salt added at the table and during cooking. The Intersalt Cooperative Research Group included two Canadian centres (in St. John's and Labrador) in its study of 24-hour urinary sodium excretion. The data indicated that the average daily intake of sodium in St. John's was 4,239 mg and in Labrador it was 3,425 mg.⁴⁴

The mean usual sodium intakes for all Canadians reported in the 2004 Canadian Community Health Survey (CCHS) 2.2, which focused on nutrient intakes by Canadians, was 3,098 mg per day. Actual sodium consumption is

... 88% of all the sodium in the [Canadian] diet is added during food manufacturing or preparation and is not present naturally.

estimated to be even higher since the survey did not include discretionary salt added at the table and during cooking of homemade meals, which could increase the intakes by approximately another 11%.^{45,46} Thus, the actual mean intake of Canadians is approximately 3,400 mg per day. The mean usual intakes from food sources for various age and gender groups and the percentage of each group having intakes above the UL are shown in Figure 2.⁴ Virtually the entire population has intakes above the AI. The data indicate that among people aged 9 to 70 years, over 85% of men and between 63% and 83% of women had sodium intakes exceeding the UL. Similarly, in young children, 77% of those aged 1 to 3 years and 93% of those aged 4 to 8 years had

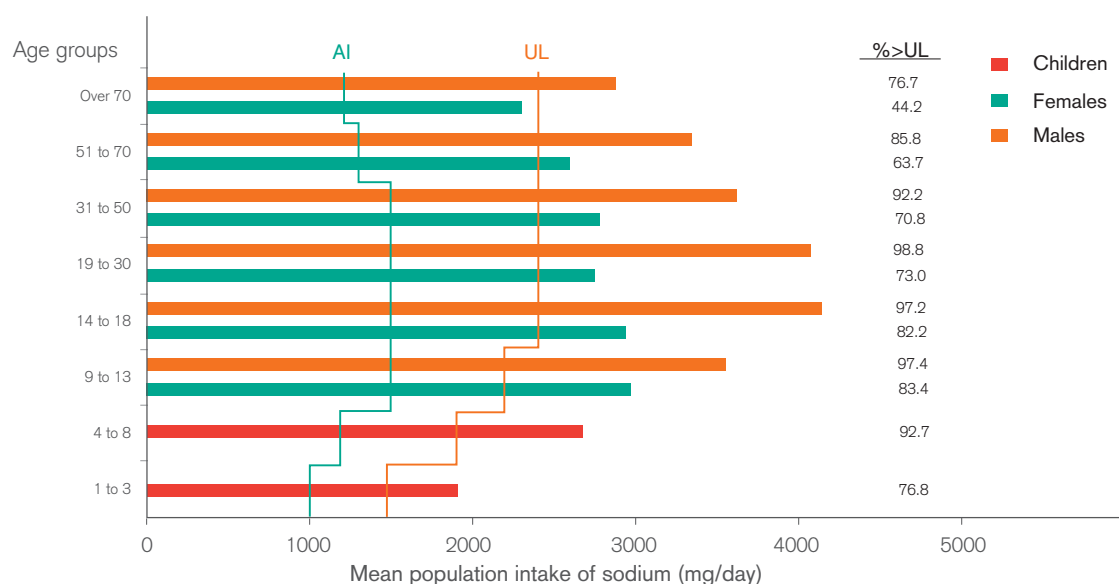
intakes exceeding the UL. Among those in their teen years, 97.2% of males and 82.2% of females exceeded the UL.

Sources of sodium in the Canadian diet

The primary source of sodium in the Canadian diet is salt (sodium chloride). Other sources that contribute to the sodium ingested by Canadians include the flavour enhancer monosodium glutamate and food additives such as sodium benzoate, sodium bicarbonate, sodium citrate, sodium nitrite and sodium acid pyrophosphate. The majority of sodium found in the typical diet comes from processed food products, accounting for 77% of the total. Another 12% is naturally occurring, while the discretionary sources account for only 11% (with 6% added at the table and 5% added during cooking).⁴⁶ Thus, 88% of all the sodium in the diet is added during food manufacturing or preparation and is not present naturally.

The major contributors to dietary sodium intake are commercially prepared foods, including those from restaurants and food services establishments. As shown in Figure 3, the main food group sources are: breads, which include all commercial breads, muffins, buns, biscuits, rolls and similar baked products (14%); processed meats

FIGURE 2
Mean usual sodium intakes from food



(9%); vegetable-based dishes, tomato and vegetable juices (8%); soups (7%); pasta-based dishes (6%); cheese (5%); milk products (4%); red meat-based dishes (4%); poultry-based dishes (4%); gravies and sauces (4%); pizza (3%); breakfast cereals (3%); potato-based dishes (3%); fish and shellfish dishes (2%); eggs (2%); rice-based dishes (2%); and potato chips and salty snacks (2%).²⁶

It should be noted that looking at sodium intake by food category must be done with care. Some are high in sodium content, but are consumed in lower amounts, such as processed meats and sauces and gravies, while some are lower in sodium content, but are consumed in large amounts, such as bread and milk products other than cheese.

The importance of including food service establishments in the Strategy

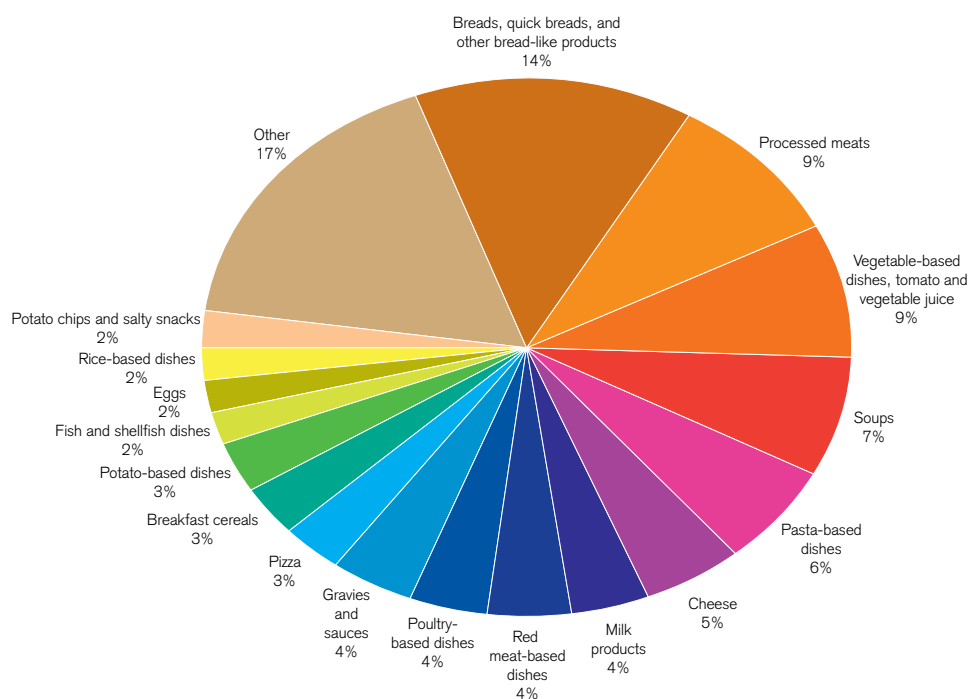
According to CCHS 2.2 data collected in 2004, on average, 16% of food consumed daily is eaten in food services establishments, including all types of establishments (restaurants with waiter service to fast food restaurants to cafeterias and vending machines). It is estimated that this food provides 18% of the

average total sodium consumed per day. However, this 18% estimate was calculated using the same food composition database used for foods consumed in the home, and in the same proportions. As data on sodium from the direct analysis of foods sold in Canadian food services establishments do not exist in the CCHS 2.2 database, it is not possible to confirm this estimate against the actual percentage of sodium consumed from this source. Although an estimate, it is reasonable to assume that food consumed in food service establishments is a contributing source to the daily sodium intake of Canadians. This provides the rationale for these establishments being included in the Strategy to reduce sodium intake.

Canadians' knowledge of and behaviour about sodium

Sodium now appears to be on Canadians' radar screens. However, very few Canadians understand what a healthy amount of sodium is, and most continue to have a high dietary intake. In a large-scale national survey, the majority of respondents believed that the Canadian diet is too high in salt, but less than half were aware of how much salt is "too much."⁴⁸

FIGURE 3:
Major food group contributors to sodium intake



Source: Data are from CCHS 2.2 (Fischer et al. 2009⁴⁷)

Similarly, public opinion research contracted by the Public Health Agency of Canada, which included both qualitative and quantitative data collection, suggests that Canadians are aware that the population's consumption of sodium is high, but believe that they, personally, are doing well compared to others.⁴⁹ Specifically, 89% of respondents said they thought that others were consuming too much sodium, while only 41% said that they, themselves, were ingesting too much. Moreover, 72% said they recognize salt in processed foods as the largest source of sodium in the Canadian diet. When asked how concerned they are about the amount of sodium in their diet, 35% indicated they were extremely or very concerned, 39% were moderately concerned, and 25% were not very or not at all concerned.

... Canadians are aware that the population's consumption of sodium is high, but believe that they, personally, are doing well compared to others.

Behaviour is not in line with awareness

Canadians indicate high levels of awareness of the relationship between high sodium intake and such conditions as high blood pressure. When questioned about what they are doing to reduce sodium intake, Canadians are much more likely to report that they reduce adding salt at the table or in home cooking than to say that they reduce consumption of processed food—despite their awareness that processed foods are a major contributor to the problem of high sodium consumption. The executive summary of this public opinion research is included as Appendix 3 to this Strategy.

In the 2008 Tracking Nutrition Trends (TNT) survey, respondents were asked to rank the importance of 12 attributes that they might consider when selecting food. Of the attributes listed, “The food is low in salt/sodium” was one of the top four that was selected.⁵⁰ Despite this indication that sodium content influences food choices, relatively few Canadians appear to be making concerted efforts to reduce sodium intake. Similar to previous TNT surveys, in 2008 about six of ten respondents reported that they had made an effort to change their eating habits over the past year. Increasing the amount of fruits and vegetables tends to be the most notable

SUMMARY OF CANADIANS' KNOWLEDGE AND BEHAVIOUR RELATED TO SODIUM

Concerned about sodium

Very	35%
Moderately	39%
Little or not	25%

Consuming too much sodium

Others	89%
Themselves	41%

Efforts made to improve eating habits

More fruit/vegetables	27%
More whole grain/fibre	17%
Less fat	17%
Less sugar	15%
Fewer calories	14%
Less salt	12%

Steps being taken to control sodium intake

No added salt in cooking	42%
Do not use salt at table	39%
Avoid processed food	24%
Read nutrition facts table	21%
Monitor use of salty food	19%
Buy low sodium food	15%

change for those who have made a change (27%), followed by consuming less fat (17%), eating more whole grains/fibre (17%), reducing sugar intake (15%), and reducing calorie intake (14%). In comparison, only 12% reported that they had tried to reduce their salt intake.⁵⁰

Issues associated with reducing sodium intake

Canadians are considering a wide range of nutrients in their choices

Canadians appear to be facing a difficult task in choosing food. Of the respondents taking part in the 2008 TNT survey, two thirds or more said they factor in each of the 12 nutrients asked about in the TNT survey, including sodium, at least sometimes, when making food choices.⁴⁸ Moreover, sodium ranks behind fat and sugar as a nutrient Canadians look for on the food product label.

Taste and nutrition are leading factors when making food choices

The TNT survey has repeatedly found taste to rank ahead of nutrition as an influence on food choice, a finding that holds for all income and education groups. It is also clear from TNT that, for some Canadians, eating poorly is at least partially driven by other considerations, particularly cost.⁴⁸ Adding taste to the list of considerations confirmed that Canadians want food to taste good and to be “good for you.” Virtually all Canadians (98%) find taste at least somewhat important when choosing food to eat; in fact, 76% think it is very important. Nutrition is clearly the second most important: 93% indicate it is at least somewhat important; 50% indicate it is very important. Smaller proportions identified cost and convenience or ease of preparation as important considerations.^{48,50}

Taste is adaptable

Despite potential perceptions about taste of sodium-reduced foods, taste does not have to be a deterrent. It is well established that people adapt quickly to changing salt levels in food. Once familiar with the taste of lower salt foods, they typically perceive salty foods as being unpleasant.⁵¹ The report from the 2006 WHO Technical Meeting on reducing salt intake, as well as many other references, make special note of this tendency to adapt.³ The Australian Sodium in Bread Study found that participants were unable to detect incremental reductions in sodium content. A 25% reduction over a six-week period in the amount of sodium included in bread was not noticed by subjects and did not affect their assessment of the flavour or preference for the product.⁵² A 2008 follow-up project to the China Salt Substitute Study found that gradual salt substitution did not appreciably affect taste or

Canadians lack knowledge about calories and nutrients, which compromises their ability to select nutritious foods.

acceptability of foods.⁵³ McCain Foods has conducted preliminary research that shows consumers cannot detect a gradual decrease in sodium levels in certain food products.⁵⁴

Misconceptions about sodium exist

The majority of Canadians seem to have a misconception that sea salt is healthier than table salt.⁴⁹ In addition, a survey commissioned by PepsiCo found that foods that are topically salted or have visible salt are perceived as being higher in sodium than many foods with hidden salt or with flavours that mask a salty taste.⁵⁴

Some lower sodium products are available

A survey of food product labels conducted by Health Canada in 2009 shows that there is a wide range of sodium content among different brands of the same foods, suggesting that consumers could find some lower sodium choices by reading labels.⁵⁵

Canadians face challenges using food product label information

Food product labels present a number of challenges to Canadian consumers, including interpretation of the % Daily Value (DV) and the specific amount of food presented on labels. Moreover, Canadians lack knowledge about calories and nutrients, which compromises their ability to select nutritious foods. Recent focus group research on the readability of food labels found that participants were unsure what the % Daily Value is. They also had little understanding of what would be considered “high” or “low” content of a nutrient.⁵⁴

Canadian efforts to reduce sodium

NGO and food industry efforts

Some non-governmental organizations (NGOs) have taken a leadership role in educating Canadians about the risks of high sodium intakes.

- » Blood Pressure Canada (now Hypertension Canada) has established a website – www.lowersodium.ca which

provides guidance on sodium reduction to both the general public and to health professionals.⁵⁶ It also developed a policy statement on sodium, endorsed by 15 other health organizations, with recommendations to the federal government to initiate a national salt reduction strategy.⁵⁷

- » The Canadian Stroke Network has established a website – www.sodium101.ca – to inform consumers about the high sodium content of the Canadian food supply, along with a description of health impacts, adequate intake levels and tips on reducing intakes.⁵⁸
- » The Centre for Science in the Public Interest has conducted a survey of the sodium levels of some Canadian foods and has made this information available to Canadian consumers. The Centre also publishes monthly food product comparisons that consider the amount of sodium and other nutrients.⁵⁹
- » The Heart and Stroke Foundation of Canada issued a position statement on dietary sodium, heart disease and stroke which contained recommendations for Canadian consumers, the federal government, health professional organizations and the food industry.⁶⁰ The Heart and Stroke Foundation’s Health Check program is working directly with the food industry to lower the amount of sodium in the food supply.

The Canadian food industry is also engaged in sodium reduction efforts. Although not all companies are actively engaged yet, many have already achieved significant reductions. Some companies have chosen to announce these reductions publicly, when eligible to do so, while others have not.

The Sodium Working Group

To help Canadians maintain and improve their health, Health Canada established the Sodium Working Group (SWG) in late 2007. In doing so it was recognized that in the area of public health and nutrition, responsibilities are shared between governments at the federal, provincial and territorial levels, food manufacturing and food services industry groups, health-focused organizations, the scientific community, consumer advocacy groups and health professional organizations. All of these stakeholders,

through representation on the SWG, are collaborating to create a national strategy to reduce sodium consumption through education and consumer awareness, reduction of sodium in the food supply and research—with the ultimate aim of lowering blood pressure and preventing cardiovascular and other sodium-related diseases in order to improve the health of Canadians.

The Working Group conducted its activities in four stages.

The **Preparatory Stage** was mainly conducted by the Health Canada Secretariat and involved collecting information required for the inaugural meeting of the Working Group. This included gathering baseline data on the sodium intakes of Canadians and the primary sources of dietary sodium. During this stage, a detailed synopsis of the U.K. Food Standards Agency’s program on salt reduction was prepared so that the Working Group could learn from the U.K. experience.³⁴

The **Assessment Stage** was primarily a process for gathering data on work that was already underway in the following areas:

- » education of consumers and health professionals on sodium, hypertension and health
- » understanding of the consumer’s perspective on sodium as a risk factor in hypertension and perception of efforts in place to reduce sodium in foods
- » understanding how taste and other mechanisms factor into food choices with respect to sodium
- » understanding the functional uses of sodium, the technical/functional challenges associated with reducing sodium levels in the food supply, and the actual and potential solutions to overcoming these challenges
- » voluntary reduction of sodium levels in processed food products and food services establishment foods
- » regulatory barriers or disincentives to reducing sodium in the food supply

A description of the data gathering activities of the Working Group is included in Appendix 4.

The third stage—**Development of the Strategy**—included consultation with the wider stakeholder community to seek input and/or commitment for action on dietary sodium reduction.

Members of the SWG participated on one or more of four sub-committees: i) Food Supply, ii) Awareness and Education, iii) Research and iv) Monitoring and Evaluation. Each sub-committee developed recommendations relevant to their particular area for consideration and adoption by the full Working Group.

The Working Group developed principles to guide the development of recommendations, as well as criteria for assessing proposed recommendations and assisting with identifying, prioritizing and choosing among the various strategy options to reduce sodium intakes. The overarching guiding principle was that the recommended options must contain elements in all three areas or prongs: food supply, awareness and education, and research. The other principles were:

1. **The recommended option must result in significant health benefits to Canadians.**

- a) The option leads to sodium intakes for all segments of the Canadian population, including children and vulnerable groups, that are in line with the IOM Dietary Reference Intake (DRI) recommendations.
- b) The option reduces sodium in processed foods and foods sold in restaurants and food services establishments to the lowest levels possible.
- c) The option decreases salt preference of Canadians and takes into consideration consumer acceptance of foods.
- d) The option helps Canadians adapt their eating habits to be in line with *Canada's Food Guide* that supports including lower sodium processed food products in the diet.

2. **The recommended option must be based on the best available evidence and current state of knowledge.**

- a) The option is evidence-based as opposed to opinion-based.

- b) The option includes ways to identify and obtain support for necessary research to address critical gaps.

3. **The recommended option is realistic, feasible, measurable and sustainable.**

- a) The option is broadly supported by stakeholders.
- b) The option is sustainable and motivates change.
- c) Timelines are reasonable to make the transition.
- d) The option must be effective.
- e) The option must be measurable.
- f) The option must be technically feasible.
- g) The option must include a mechanism to ensure accountability.

4. **The recommended option is staged, comprehensive, multi-faceted and integrated.**

- a) The option is staged and progressive.
- b) The option is comprehensive.
- c) The option takes into consideration the varying challenges associated with the food supply, education and research, including the different parts of the food industry, educators, clinicians, researchers, consumers, etc.
- d) The option may include supporting elements, incentives, regulations and other policy approaches.
- e) The option should address barriers to moving forward.

The final stage is the **Implementation Stage**, which in many aspects is already under way. This stage involves implementation of the recommendations and monitoring the progress according to set timelines and methods of assessment.

**PART II
SODIUM
REDUCTION
STRATEGY**

Population Health Template

Sodium reduction is seen as a major step towards prevention of certain chronic diseases that can be addressed in an integrated way by building healthy public policy, creating supportive environments (through collaboration between government and stakeholders), and empowering communities and individuals for action (at the local level), as well as by developing personal skills and reorienting health services.

This approach traces its origin to the *Ottawa Charter for Health Promotion*, which broadened Canadians' understanding of the multiple dimensions of health besides health care.⁶¹

In order to reach the objectives of improving population health and reducing health inequities, the integrated approach looks at and acts upon the broad range of interrelated factors and conditions that have a strong influence on the health of populations over the life course, recognizing that good health is affected by political, economic, social, cultural, environmental, behavioural and biological factors. The approach is described in the *Population Health Template*, which was developed for the Population and Public Health Branch of Health Canada and organizes and consolidates current understanding of population health.⁶² (See sidebar.)

Reducing sodium intakes would be a positive step towards improving the health of Canadians. Addressing

individual factors alone by encouraging Canadians to cook with less salt and add less at the table would not be sufficient to reduce their sodium levels to an acceptable level, since such a high proportion is added at the food processing stage. However, a multi-faceted and strategic approach that focuses on food supply, awareness and education, and research, and that takes into account the broader population health context and involves inter-sectoral collaboration, will make it easier for Canadians to make healthier choices related to sodium.

Part I outlined a strong case for the health risks related to elevated sodium intake, as well as the current situation in Canada. It provides a backdrop for over 30 recommendations that comprise the Sodium Reduction Strategy for Canada. The Strategy is both comprehensive and integrated in nature. As shown in Figure 4 it includes six overarching recommendations that set the stage for more specific recommendations in each of three areas, or prongs of the Strategy:

food supply, awareness and education, and research. A fourth area, monitoring and evaluation, includes recommendations that cut across all areas.

**SODIUM REDUCTION
IN A POPULATION
HEALTH CONTEXT**

Health Canada's Population Health Template consists of eight key elements. They are:

1. Focus on the health of populations.
2. Address the determinants of health and their interactions.
3. Base decisions on evidence.
4. Increase upstream investments.
5. Apply multiple strategies.
6. Collaborate across sectors and levels.
7. Employ mechanisms for public involvement.
8. Demonstrate accountability for health outcomes.

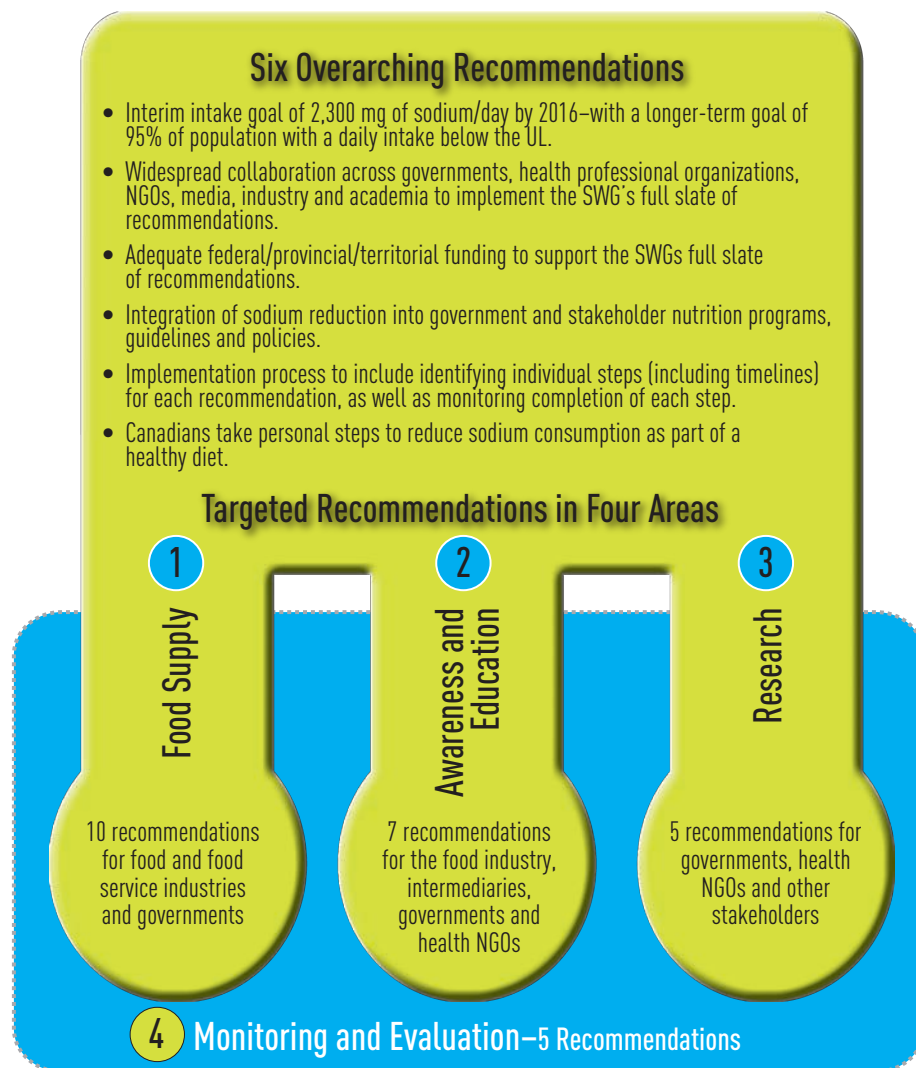
In designing a population health intervention such as the Sodium Reduction Strategy for Canada, it is important to take into consideration the context, timing, resources, mandate and evidence.

A. Overarching Recommendations

Six broad recommendations provide a framework for the more specific recommendations in each area or prong of the Strategy.

A. THE WORKING GROUP has established an interim sodium intake goal of a population average of 2,300 mg of sodium per day to be achieved by 2016. The ultimate goal of the Sodium Reduction Strategy is to lower sodium intakes to a population mean whereby as many individuals as possible (greater than 95% of the population) have a daily intake that is below the Tolerable Upper Intake Level (UL).^b

FIGURE 4:
Sodium Reduction Strategy for Canada—An Overview



The recommended interim goal is intended to be an average daily intake for the entire population. Individual Canadians are recommended to strive for an intake that is the Adequate Intake (AI) of 1,500 mg per day, or as appropriate for their age and gender (see Table 1).

The Sodium Working Group (SWG) has determined that achieving this interim goal will require: setting sodium reduction targets for foods; developing and implementing an education strategy to bring about behavioural change which will, in turn, influence the levels of reduction that are achieved; and research to support industry sodium reduction initiatives. All three components need to be implemented, monitored and measured.

In order to measure progress, 24-hour urine sodium studies should be the standard method by which overall changes in sodium intake are measured (to ensure that all sources of sodium intake are accounted for); other tools, such as dietary survey data, as well as data on the levels of sodium in foods in the market, will also provide key information with which to understand the nature of changes taking place. Food intake data, such as that collected by the Canadian Community Health Survey (CCHS), can be used to create a baseline. In addition, regular evaluation will be required to monitor progress and success and to make adjustments to the Strategy and approach, as necessary.

The interim goal must also be supported by periodic evaluation and/

b. For practical purposes, achieving this requires moving the population mean daily intake of sodium much closer to the IOM's recommended Adequate Intake (AI) which is 1,500 mg for persons aged 9 to 50 years, and less for those younger and older than that.

or appropriate surveillance in order to effectively monitor consumption levels. Goals for beyond 2016 will be established over time as progress towards the 2016 interim goal is tracked. Other requirements for achieving the interim and future goals include the application of a range of interventions (outlined in specific recommendations, below); success will also depend on effective communication of the goals to the public and to food and related industries.

B. THE WORKING GROUP recommends collaboration across all levels of government, health professional organizations, non-governmental organizations (NGOs), media, industry and academia to implement the specific recommendations in a coordinated, systematic and timely fashion.

Cooperation among all relevant sectors will be critical to achieving Strategy goals. All sectors must be involved in facilitating a decrease in sodium in the food supply, in educating and increasing awareness among both consumers and industry, and in funding and prioritizing the research needs that have been identified in the specific recommendations that follow. Health Canada should continue to provide national leadership in facilitating and coordinating the collaborative approach.

C. THE WORKING GROUP recommends that federal, provincial and territorial governments provide adequate funding to support the successful implementation of the Sodium Reduction Strategy.

Enormous cost savings from provincial and federal health care spending and benefits from economic productivity overall are expected to be achieved as a result of prudent use of policy reforms and programming investments related to sodium reduction. Without adequate resources, few of the Strategy's recommendations can be implemented. More specific identification of the funding required will be determined as the Strategy begins to be considered by the various sectors and stakeholders involved, and as it begins to be implemented. Funding information will include all sources, including costs incurred by industry and in-kind contributions by non-governmental partners. Opportunities to leverage existing funded strategies should be explored.

D. THE WORKING GROUP recommends that all levels of government and stakeholders develop and integrate sodium reduction into their nutrition programs, guidelines and policies.

All programs, guidelines and policies that are directed towards healthy eating, regardless of which body develops them, will ideally include sodium reduction. Health Canada, in collaboration with the provincial and territorial governments, should take the lead in implementing this recommendation.

E. THE WORKING GROUP recommends that the implementation process include outlining the individual steps required for each recommendation, specifying timelines and monitoring the completion of each step.

For the sodium reduction strategy to be successful, the implementation process should start by outlining the individual steps required for each recommendation, specifying associated timelines and estimating resource requirements. This activity should be completed by December 31, 2010. Regular reporting of the progress towards completion of each recommendation and its timeliness will be a key function of the implementation process.

F. THE WORKING GROUP recommends that all Canadians take personal steps to reduce sodium consumption as part of an overall healthy diet.

In order to meet the goals of the Sodium Reduction Strategy for Canada, individuals need to take action. Since almost all Canadians consume a level of sodium that puts them at increased risk of developing chronic diseases, every Canadian should make an individual effort to decrease sodium intake. Measures that can be taken by individuals include choosing more foods that are fresh and unprocessed, looking for and selecting prepared and packaged foods that contain lower sodium levels, and using little or no salt in food preparation and at the table. Canadians need to make similar wise food choices for their children.

B. Specific Recommendations in Four Areas

The Working Group believes that the success of the Sodium Reduction Strategy for Canada will depend on implementation of the recommendations in all four areas:

1. Food Supply
2. Awareness and Education
3. Research
4. Monitoring and Evaluation

The specific recommendations in each of these areas, developed by the respective sub-committees of the SWG and endorsed by the full body, are set out in the remainder of this section.

One of the key elements of the recommendations is a structured voluntary approach to achieving the sodium reduction targets. The voluntary approach envisaged by the SWG is a structured one involving published sodium reduction targets for foods, defined timelines, a mechanism for public commitment by industry to the targets, a plan for monitoring progress by a body other than the food industry, and a plan for independent evaluation of the success of the program with the option of taking stronger measures as necessary depending on progress.

1. Food Supply Recommendations

As the sodium content of commercially prepared foods is a major factor in the high sodium intake of Canadians, much of the effort to lower sodium must focus on the food supply. In order to reach the 2016 interim goal established by the SWG (a mean population consumption of sodium of 2,300 mg per day—see Overarching Recommendation A), reductions in the sodium levels of processed food products and food services establishment foods are a crucial part of the Strategy. The SWG recognizes that its interim goal is a feasible but very aggressive goal, based on the experience of other countries.

One of the primary aims of the Sodium Reduction Strategy for Canada is to develop a set of sodium targets for those foods that contribute to sodium intake in the Canadian

STRUCTURED VOLUNTARY APPROACH FOR THE FOOD SUPPLY

The voluntary approach envisaged by the SWG is a structured one involving:

- published sodium reduction targets for foods;
- defined timelines;
- a mechanism for public commitment by industry to the targets;
- a plan for monitoring progress by a body other than the food industry, and
- a plan for independent evaluation of the success of the program with the option of taking stronger measures as necessary depending on progress.

diet. The SWG recognized that targets must be carefully crafted within the Canadian context.

Efforts to reduce sodium in foods must take into consideration both food security and food safety. These issues have particular importance in Canada's remote and Northern communities, where food distribution is challenging for a number of reasons. There are shelf life

Efforts to reduce sodium in foods must take into consideration both food security and food safety. These issues have particular importance in Canada's remote and Northern communities ...

considerations related to transportation and stock rotation. Perishable staple foods—such as bread, cheese and meat—may need to be transported long distances over many days. Gravel roads may be unsuitable for refrigerated trucks; planes, ferries and barges can be delayed due to poor weather. Sodium targets need to be set at a level where they do not compromise the variety, quality, quantity and safety of foods available in these communities.

FUNCTIONS OF SALT AND SODIUM- CONTAINING ADDITIVES IN FOODS

- microbial food safety, preservation and shelf life
- protein binding, tenderness and mouth feel
- control of fermentation in cheese and bread
- maintenance of colour in meats
- flavour and texture in many foods

Reducing sodium in foods is a complex process

While most sodium added to foods is in the form of salt, there are a number of other sodium-based food additives and ingredients, as well as some naturally occurring sodium in foods. The process of reducing the sodium content of foods is complex since the role and function of salt and other sodium based ingredients in foods varies, depending on the nature of the food. Salt is used as flavouring, a preservative and an antibacterial agent; it also has many effects on the texture and structure of foods. These functions have impacts on the food, many of which are perceptible by consumers. Changes to the salt content are often detectable, although consumers may not attribute the changes to alterations in sodium levels.

Many factors can affect microbial growth in foods and they most often

work in concert to inhibit or prevent bacterial growth. The use of factors such as temperature, pH, water activity (or available water), antimicrobial food additives or ingredients, the presence of salts (including sodium chloride), oxygen and microbial load and competition must be examined by food processors in order to ascertain the right balance for the manufacture of safe foods. In general, more than one, and potentially all of these can be used in preventing microbial growth that might otherwise cause foodborne illnesses. Salt (NaCl) works as an effective preservative due to its ability to induce cell dehydration and through other mechanisms; most bacteria are susceptible to high levels of salt.⁶³ However, there are bacteria and fungi with varying degrees of tolerance to salt ranging from salt resistant and salt tolerant to halophilic (“salt-loving”). Examples of food borne bacterial pathogens that are salt tolerant, salt resistant, and halophilic, respectively, are *Listeria monocytogenes*, *Staphylococcus aureus*, and *Vibrio parahaemolyticus*. Nevertheless, salt and other sodium compounds can play an important role in preventing the growth of pathogenic bacteria (including *Clostridium botulinum*) and spoilage microorganisms. Therefore, changes to formulations to reduce sodium content must be well-researched to ensure microbial safety is not jeopardized.⁶⁴

With flavour and other sensory attributes being consistently at or near the top of the list of factors that influence consumer food choices, along with salt’s important functional

role, food manufacturers face a major technical challenge in making modifications to the sodium content of foods. Moreover, there is no single replacement for salt in all applications. Existing alternatives do not have the same flavour profile as salt; nor do they mimic all the functional roles of salt. They can also be many times the cost of salt. A food processor must identify the role that salt is playing in the food, select from possible options for reducing or replacing it wholly or in part, and test the reformulated product for microbial food safety, shelf life stability and consumer acceptance. It may need to consider the fact that salt substitutes, identified in ingredient lists, are less familiar to consumers. Finally, while food additives are subject to a scientific safety assessment prior to being authorized for use in Canada, there may be limits as to how extensively they can be used because of their particular safety profiles. In spite of these complexities, the food industry recognizes that new substances and additives may well play a role in sodium reduction and they encourage Health Canada to make the assessment of these substances a priority.

Where either food manufacturers or food service and restaurant operators use ingredients bought from others in preparing food products for sale (i.e., inputs), sodium reduction for the final product is dependent in a major way on these inputs. Sodium reduction efforts need to occur throughout the food preparation chain, from suppliers to final preparation, whether at the

manufacturing level, at retail locations where food is prepared, or at restaurants and food service establishments.

Sodium reduction in foods may create opportunities for innovation in the food industry

Importantly, sodium reduction may also create opportunities for innovation in the food industry with the development of alternative ingredients, new ingredient applications, and new food processing techniques. A recent report from the IOM on approaches to preventing and controlling hypertension supports the use of “modified” salt in food preparation, whereby part of the sodium chloride that would have been used is replaced with potassium chloride. This has the double advantage of decreasing sodium and increasing potassium intakes. Products using these substitutes should be clearly labelled for those whose intake of potassium should be limited for medical reasons. This is an issue for individuals whose glomerular filtration rate is compromised, about 0.1% of the American population.⁶⁵

Food products must continue to be acceptable to consumers

For food supply changes to be successful, food products must continue to be acceptable to consumers. So, where salt is present in foods primarily for flavour, gradual reductions in salt content are considered preferable to ensuring consumer acceptance. They will likely require repeated reformulations over time. Education is an important aspect of food supply changes. The food industry is depending on a parallel educational effort to help consumers become more aware of sodium in foods and accept the need for reduction so they will be receptive to changes to their foods and will look for foods that are lower in sodium. It is believed that it will take time for consumers to adjust taste preference towards less salty foods, although evidence indicates that individuals may adapt in a matter of weeks.³

Changes may result in increased costs to consumers

Some of the technological challenges related to sodium reduction in foods may mean increased costs for food

manufacturers which may be transferred in part to the consumer. The impact of these costs could be aggravated by competitive inequities arising both domestically and internationally. If imported products and similar domestic products sold by competitors are not also moving to lower sodium levels, consumers may make choices based on taste preferences. It is important that all levels of trade be made aware of the Sodium Reduction Strategy and its importance for the overall health of Canadians. Fortunately, there is a global recognition of the need to reduce sodium in processed foods, including in the United States and in Europe. It is hoped that this global impetus and awareness by importers will result in imported products with lower levels of sodium.

In summary, despite the various challenges outlined above, the food industry is showing strong support for sodium reduction efforts and understands the value of this public health goal. No sector has asked to be exempt from the Strategy.

Developing food supply recommendations

In developing its recommendations, the SWG’s Food Supply Sub-Committee was guided by the criteria that the approach should be voluntary, significant (with respect to the reduction in sodium content in foods and in sodium intakes of Canadians), gradual, realistic, feasible, measurable, time-delimited and sustainable. Four major elements necessary for success were identified—recommendations are aligned with each of these elements. (See sidebar next page.)

RECOMMENDATION 1-1: The Working Group recommends that Health Canada continue to work with the food industry to establish voluntary sodium reduction targets by food category.

Health Canada and the food industry should jointly lead the implementation of this recommendation.

The draft targets for a first group of foods have been published,⁵⁵ with final targets to be published along with those for a second group of foods planned for release early in 2011. The rate at which targets will be reached will vary by food category, but should occur by 2016. Milestones will be established to ensure that progress towards meeting

FOOD SUPPLY RECOMMENDATIONS: FOUR ELEMENTS OF SUCCESS

1. Sodium reduction targets for foods for achieving the interim sodium intake goal with a specific plan to measure progress towards those targets over time. In consultation with the food industry, Health Canada is working on establishing Canadian sodium reduction targets for foods, with the aim of achieving the interim mean sodium intake goal of 2,300 mg per person per day by the year 2016. These targets apply to all foods in each category, whether sold to consumers, for further manufacturing or for use by food service operations. It is important to note that reaching the interim sodium intake goal, will require not only attainment of sodium reduction targets by the food industry but also changes in consumer behaviours such as not using salt at home and consciously choosing lower sodium versions of foods.
2. Commitment by the processed food and food service industries and their members to reach these targets. A process should be established to allow the processed food and food service industries to document their commitment to the sodium reduction program, as well as their progress towards meeting the targets in a meaningful way.
3. Commitment by governments to undertake regulatory amendments where needed to facilitate sodium reduction. The successful implementation of certain aspects of the Sodium Reduction Strategy is dependent on enhancements and/or modifications of existing regulations.
4. Engaging partners in concrete ways to support industry in reaching sodium reduction targets.

the targets by 2016 is maintained. Some manufacturers, and entire food sectors, have already begun to make sodium reductions in recent years. Nevertheless, as noted above, substantial reduction in sodium will be challenging for some foods due to the functional roles that salt plays in foods such as dry cured meats, pickles, cheese and bread. The process by which targets are being set is summarized below.

Setting targets for sodium content of processed foods

Health Canada has already begun the process of establishing targets for various food categories in the food supply.⁵⁵ This is being carried out through modelling of intakes based on food consumption patterns of the Canadian population using data from CCHS 2.2.²⁶ Approaches taken by other jurisdictions, particularly the U.K., have been examined and have informed the process of developing targets in the Canadian context. This includes consideration of the current Canadian sodium levels in food categories based on market share, feasibility of targets, microbial food safety and quality needs, and knowledge of the Canadian food supply. This process includes consultations with the food industry to confirm the final targets. More detail on the setting of these targets is provided on the Health Canada website.⁵⁵

Approaches taken by other jurisdictions, particularly the U.K., have been examined and have informed the process of developing targets in the Canadian context.

The targets necessarily must apply to all products in a category, regardless of price or whether the foods were destined directly to consumers, to other food manufacturers, or to the food service and restaurant sectors. There are a large number of products introduced into the Canadian market place each year and manufacturers should make an effort to ensure that the sodium levels in these foods are in step with the reduction targets set for their

respective categories. It is important that priority attention be given to foods targeted primarily to children when companies consider the portfolio of their products. Companies must also consider balancing the lowering of the sodium in products as much as possible while ensuring accessibility and microbial safety of foods. Sodium levels in lower cost or economy food brands must also be addressed in order to ensure that there are not unintended disparities created for socioeconomically disadvantaged segments of the population.

Under the *Food and Drug Regulations*, pre-packaged products intended solely for use as ingredients in the manufacture of other pre-packaged products, whether for sale to a consumer at retail or as an ingredient in the preparation of food by a commercial enterprise or institution, must be accompanied by the same nutrition information as required for pre-packaged foods. Similarly, nutrition information must accompany pre-packaged products that are multiple-serving, ready-to-serve intended to be served in a commercial enterprise or institution. This provides a means for clearly linking sodium targets not only to pre-packaged foods sold directly to consumers but also to foods and ingredients sold to food manufacturers, restaurants and food services establishments for their use in further food preparation.

Setting targets for sodium content of toddler foods

A very high percentage of children consume sodium in excess of the Tolerable Upper Intake Level (UL), and food consumption in early childhood influences habits throughout life. The Sodium Working Group supports the development of specific targets for foods that are primarily marketed for and consumed by toddlers, although members were unable to reach consensus on whether targets for toddler foods should be mandatory or voluntary. There was substantive support for amending the *Food and Drug Regulations* to limit sodium or salt in foods intended for toddlers, in a manner similar to those regulations currently in place for foods for infants, but consensus was not achieved. Others advocated for voluntary measures, at least to start with, as per the agreement of the working group that the strategy would involve voluntary sodium reduction

in commercially-prepared foods. In order to develop either voluntary or regulatory targets, a decision would need to be made as to how to identify the foods to be addressed as there are currently no regulatory definitions for “toddler” or “toddler foods”. Regardless of the approach, steps should be taken to educate parents about sodium considerations in food choices for their young children since most foods eaten by this age group are the same foods that the rest of the family eat.

RECOMMENDATION 1–2: The Working Group recommends that Health Canada, in collaboration with the Provinces and Territories, continue to work with the restaurant and food service industries to establish voluntary sodium reduction targets for meals and menu items sold in restaurants and food services establishments.

Health Canada, in collaboration with the Provinces and Territories, and the restaurant and food service industries should lead the implementation of this recommendation. In order to benefit all Canadians, targets for meals and menu items sold in restaurant and food service establishments should be consistent across the country.

The sodium content of menu items, such as hamburgers, sandwiches or lasagnes prepared from ingredients at a restaurant or food services establishment is affected by several factors, including choice of ingredients or foods, the relative amounts of those ingredients or foods in a portion, the addition of salt by the chef and/or cook and the overall portion size. Nevertheless, in many cases, similar foods are being sold pre-packaged at retail establishments, for example, frozen dinners or pre-packaged sandwiches. There is a need to harmonize the approaches to establishing targets for commercially prepared foods from food manufacturers and those prepared by restaurateurs or at other food service operations. It must be recognized, however, that the food services industry has unique challenges, and it is imperative that a collaborative process be put in place between Health Canada, the Provinces and Territories, and representatives of the food services industry to establish targets for these foods.

RECOMMENDATION 1–3: The Working Group recommends that manufacturers lower the sodium content of their products to meet the voluntary targets and go beyond them over time to the lowest level possible, taking into consideration microbial food safety, quality and consumer acceptance.

Food manufacturers should lead the implementation of this recommendation.

In some cases, it will be necessary to find alternatives to salt or other sodium-containing ingredients due to microbial food safety or functionality reasons. However, it would be beneficial when formulating commercially prepared foods to first reduce the use of salt. Since it has been shown that, over time, the palate will condition itself to less salty tasting foods, salt alternatives should only be used when salt replacement is absolutely necessary.

RECOMMENDATION 1–4: The Working Group recommends that a mechanism be established on Health Canada’s sodium website that would allow individual companies to commit to the Sodium Reduction Strategy.

Implementation of this recommendation should be led by Health Canada.

Putting in place such a mechanism would allow companies to indicate their awareness of and commitment to meeting the sodium reduction targets for new and existing products in their portfolios. It is also a key component of the structured voluntary program of sodium reduction in foods. Specific terms and conditions would need to be agreed to in order to have a company’s name on the site. Each company’s progress towards meeting the targets in a meaningful way would need to be updated on a regular basis to maintain its online commitment.

RECOMMENDATION 1–5: The Working Group recommends that the *Food and Drug Regulations* be amended to ensure that the serving sizes used in the Nutrition Facts table (NFT) are as uniform as possible to facilitate the comparison of sodium levels in similar foods.

Health Canada should lead the implementation of this recommendation.

Nutrition Facts table (NFT) requirements were put in place as a labelling tool to allow consumers to easily compare the nutrient value of foods and to make informed purchasing decisions. When the serving sizes for similar products are not exactly or approximately the same, comparisons of the relative sodium contribution of foods is difficult.

Given that current regulatory requirements provide maximum flexibility to the manufacturer in determining the serving size displayed in the NFT for multi-portion foods, consumers often find it difficult to compare the sodium content between products. By comparison, in the U.S, serving sizes used for the purposes of nutrition labelling are more strictly regulated in the American *Nutrition Labeling and Education Act*. There is a need to undertake a comprehensive performance review and ensure that the current reference amounts and serving size presentations are achieving the intended objectives of nutrition labelling. The food industry has already been asked by Health Canada to work together to provide consumers with more consistent serving sizes in a manner that meets the intention of the nutrition labelling requirements.

RECOMMENDATION 1–6: The Working Group recommends that the *Food and Drug Regulations* be amended to change the basis of the Daily Value (DV) for sodium in the Nutrition Facts table (NFT) from 2,400 mg to 1,500 mg to reflect the Adequate Intake (AI) level.

Health Canada should lead the implementation of this recommendation.

For many nutrients in the NFT, the DV is based on the target daily intake that individuals should meet or exceed. Having the DV for sodium based on a reference standard of 2,400 mg, which is closer to the UL than the AI for sodium, promotes undesirably high intakes of sodium from a public health perspective. Ultimately, it is desirable for individual Canadians to be consuming sodium levels at or around the AI. It is therefore the opinion of the SWG that the basis of the sodium DV in the NFT should be that of

the AI and not the UL. The SWG recognizes that accompanying educational programs will be needed to explain to consumers why the sodium values expressed as a percent of DV may appear higher on food labels than prior to the change.

RECOMMENDATION 1–7: The Working Group recommends that Health Canada improve the current nutrition labelling system in Canada to facilitate consumer understanding and use, particularly as it relates to sodium.

Implementation of this recommendation should be led by Health Canada.

Recognizing the increasing call for improvements to the current nutrition labelling system in Canada, Health Canada should review current regulations governing labelling requirements. The goal of the review would be to improve the current system to enhance consumers' ability to read, interpret and use nutrition information effectively in order to make choices that support healthy eating. Such a review would require conducting a thorough environmental scan and analysis of nutrition labelling systems used worldwide, as well as research into consumer use of and needs for enhancements to the current system in Canada. Findings would form the basis for recommending and implementing changes to labelling requirements. While the SWG is focused primarily on reducing sodium intake in the population, it is recognized that nutrition labelling covers a suite of nutrients of varying public health importance and impact, calling for a holistic approach that would promote overall health.

In its research and deliberations, the SWG considered the possibility of highlighting the high sodium level of certain categories of foods. While various models have been used by other jurisdictions internationally, such as in the “traffic light” system in the U.K. and the identification of high salt foods in Finland, the context for the development of these approaches differed from that in Canada, where a comprehensive mandatory nutrition labelling system is already in place. Nevertheless, some members of the SWG agreed that front-of-package labelling of high sodium products should be one aspect of actions to improve Canada's nutrition labelling system. Other options for such identification should also be evaluated.

At the request the U.S. Congress, the IOM is currently undertaking a review of front-of-package nutrition labelling systems. Once this review is completed, the SWG calls on the federal government to consider the recommendations and implement, as appropriate, improvements to the Canadian nutrition labelling requirements.

Development of these regulatory amendments must be based on statistically sound research led by government, in conjunction with the restaurant and food services industry.

The use of health claims and nutrient content claims on food labels or in food advertising is often perceived to be marketing tools that companies can use to attract buyers based on highlighting certain nutritional aspects of a food. However, such claims are often used to highlight certain positive aspects of the food, without indication in certain cases to the negative attributes. This practice may promote consumer consumption of a food based on one characteristic without taking others into account. To avoid this consequence, it may be necessary to incorporate disqualifying criteria into the use of all types of health and nutrient content claims, so that consumers are not misled by positive claims appearing on foods that are also high in sodium.

Reforms to nutrition labelling should also consider requiring the disclosure of the amounts of potassium, especially for products to which potassium salts have been added. The *Food and Drug Regulations* do not currently require that the Nutrition Facts table disclose the amount of potassium unless a claim is made about the amount of sodium in the food. This information is necessary to allow certain vulnerable populations to avoid high-potassium foods and for government officials to track changes in the amount of potassium in the food supply, particularly as many companies may start using more potassium-based salt substitutes.

RECOMMENDATION 1–8: The Working Group recommends that the *Food and Drug Regulations* and applicable provincial regulations be amended to require the on-site disclosure of nutrition information in a consistent and readily accessible manner for standardized menu items prepared and assembled on-site at restaurants and food services establishments, where feasible (i.e., in establishments with a high degree of standardization).

Health Canada should take the lead in implementing this recommendation.

Feasibility of on-site disclosure of nutrition information should be determined by the extent to which standardized menu items are available across multiple restaurant or food service outlets of the same chain. Standardization means using a common supply chain (i.e., the same supplier), and the same standardized ingredients and recipes across all establishments of a given chain.

Development of these regulatory amendments must be based on statistically sound research led by government, in conjunction with the restaurant and food services industry. Research must support the effectiveness of new or existing formats of nutrition disclosure in use in food services establishments in Canada or elsewhere, in supporting consumers making informed food choices. Any regulations must provide enough flexibility to accommodate varying operational realities of different food services establishments.

The SWG recognizes that the restaurant and food services industry faces many challenges related to disclosure of nutrition information. Not only is a wide variety of foods prepared in these establishments, there is also variability in preparing the same foods within and among establishments. A number of members of the Canadian Restaurant and Foodservices Association have taken steps toward the provision of nutrition information at a number of large chain restaurants. In many cases, nutrition information is available on the Internet or in locations other than the point of purchase.

RECOMMENDATION 1–9: The Working Group recommends that the federal government, along with the provincial and territorial governments, where necessary, review the food additive approval process and modernize the standards of identity for foods while maintaining microbial food safety.

Health Canada should take the lead in implementing this recommendation.

It is recognized that the overall reduction of sodium in the food supply is desirable in order to achieve a meaningful reduction in the dietary sodium intake of Canadians. At the same time, it is not always possible simply to remove the salt or other sodium containing food additives because of the role they are playing in specific foods, particularly in relation to microbial food safety, food preservation, texture and flavour. In some of these cases, the salt and/or other sodium containing compounds that are removed must be replaced by other ingredients or food additives that will fulfill the same function. In order to ensure that this can occur in the food industry in a timely manner, certain regulatory changes may be needed to facilitate innovation. There is a need to streamline the current regulatory review process for food additives without compromising the rigour of the safety assessment, as well as to modernize the standards of identity for the use of ingredients to replace sodium, particularly when required for microbial food safety purposes.

RECOMMENDATION 1–10: The Working Group recommends that the federal government, together with provincial and territorial governments, develop more consistent sodium guidelines and procurement policies for use by food service operations in publicly-funded institutions such as schools, daycares, hospitals, care facilities, correctional institutions and for the armed forces.

Health Canada, working with provincial/territorial governments, should lead the implementation of this recommendation.

Government policy encompasses promoting healthy eating to the general population. This should be reflected in guidelines developed for food services in publicly funded institutions to ensure that their consumers are provided with a nutritious diet—particularly since consumers in these settings often do not have direct control over their food choices. Excess dietary sodium intake is a risk factor for chronic diseases (such as cardiovascular disease) that are a major burden on health care budgets across Canada. It is important that foods purchased for consumption by the population in publicly funded settings do not contribute to the burden of disease.

Currently, there are no consistent sodium-related guidelines for foods served in publicly-funded institutions.

Inconsistent standards and guidelines used by various food service operations can make providing a diet that does not exceed the UL for sodium difficult. Standards could help ensure that overall menu planning meets the nutrition recommendations on sodium provided by the IOM and *Canada's Food Guide*.

2. Awareness and Education Recommendations

The Consumer Awareness and Education Sub-Committee was mandated to develop recommendations for awareness and education strategic priorities and directions. The sub-committee met several times during the summer and fall of 2009 and the winter of 2010 to develop recommendations and guidance for development of key messages. The directions taken to formulate the objectives, messaging and recommendations were refined as data on Canadians' views

on sodium became available from public opinion research conducted in 2009.⁴⁹ The recommended awareness and education activities are also aimed at contributing to the health literacy of Canadians.

More specifically, the recommendations of the Sodium Reduction Strategy for Canada concerning awareness and education are intended to:

- » inform and educate Canadians about sodium and the health consequences linked to high levels of sodium intake
- » influence consumers to reduce sodium intake
- » increase consumer demand for lower sodium products

The Working Group has considered the information that should be included in key messages to support the Sodium Reduction Strategy. (See sidebar below.) Once drafted, key messages will be focus group tested with Canadians. They will then be shared as part of a subsequent progress report and will be at the core of communication programs to reduce sodium intake in Canada. It is essential that the messages be communicated in a consistent and cohesive manner by all involved in the Strategy.

SWG recommendations that support awareness and education are aimed at a range of groups and/or for specific purposes, including recommendations:

- » for the food industry—Recommendation 2–1
- » for intermediaries (those who translate and deliver messages to the consumer)—Recommendation 2–2
- » to support social marketing—Recommendation 2–3
- » to strengthen community action—Recommendation 2–4
- » to restrict marketing to children—Recommendation 2–5
- » to enhance health policies (nutrition labelling and Canada's Food Guide)—Recommendations 2–6 and 2–7

The main outcome expected from this array of recommendations is to increase Canadians' awareness, knowledge and behaviours related to sodium reduction. The multi-faceted approach recommended to achieve this goal is depicted in Figure 5, on page 30.

THE KEY MESSAGES TO SUPPORT IMPLEMENTATION OF THE SODIUM REDUCTION STRATEGY WILL NEED TO REFLECT THE FOLLOWING IMPORTANT POINTS

Individuals in Canada are consuming too much sodium in many cases, more than double the recommended amount.

- Adults should aim for 1,500 mg of sodium or less each day and should not exceed 2,300 mg per day. These numbers are lower for children.
- Canadians consume, on average, 3,400 mg of sodium daily from all sources.
- Most Canadians recognize that the population's salt intake is too high but wrongly believe that they themselves consume a healthy amount.

High sodium intake increases blood pressure which is the leading preventable risk factor for death.

- High blood pressure is the major cause of cardiovascular disease and a risk factor for stroke and kidney disease.
- There is evidence to suggest that a diet high in sodium is a risk factor for osteoporosis, stomach cancer and asthma.
- According to the World Health Organization, interventions to reduce population-wide salt intake have been shown repeatedly to be highly cost-effective.

Three quarters of the sodium Canadians consume comes from sodium added to food during processing.

- Most of the sodium consumed by Canadians comes from pre-

packaged, ready-to-eat foods, rather than from salt added at the table or in home cooking. Restaurant foods also generally contain high amounts of sodium.

- In some cases consumers will notice a change in taste in foods that have been reduced in sodium; consumers need to be made aware that taste adapts quickly to these lower levels of sodium and they need to be encouraged to not add salt back to their foods.
- Messaging should also address salt added in food preparation and added at the table.

The Nutrition Facts table can help consumers choose products that are lower in sodium.

- There is great variation in the levels of sodium among products, so the % Daily Value or mg of sodium and serving size information in the Nutrition Facts table should be used to compare products and choose the ones with less sodium.
- Ask for the sodium content of foods when eating out in restaurants, cafeterias and when taking meals home.

Eating more vegetables, fruit and whole grains contributes to better health.

- Eating Well with Canada's Food Guide provides guidance to make healthy food choices and to help reduce sodium intake.

RECOMMENDATION 2-1: The Working Group recommends that education programs be developed and adapted for intermediaries working in the various sectors of the food industry (manufacturing, distributing and food service) to inform them about sodium and the Sodium Reduction Strategy for Canada.

This recommendation should be led jointly by all levels of government and the food industry.

Guidance materials and training tools should be developed for use by a range of intermediaries, in particular, smaller food manufacturers, restaurant and food service operators who may not have access to these resources. Work with schools and training facilities having culinary or chef training programs should be undertaken to raise awareness and provide support and guidance in low sodium cooking and food preparation practices. Such tools might include: management training materials in regard to the reduction of sodium through recipe development; ingredient selection/purchasing practices and on-premises preparation practices; front-line employee training materials on the importance of adherence to on-premises preparation practices (such as signage).

For Food Manufacturers:

Training programs/tools for food manufacturers should have a focus on review and modification of product formulations to lower sodium content of foods. Food manufacturers need to communicate their sodium-reduction achievements in relation

to their commitments and promote sodium-reformulated products to increase consumer awareness.

For Food Distributors: Food distributors should actively promote sodium-reformulated products to increase their client’s awareness of their availability.

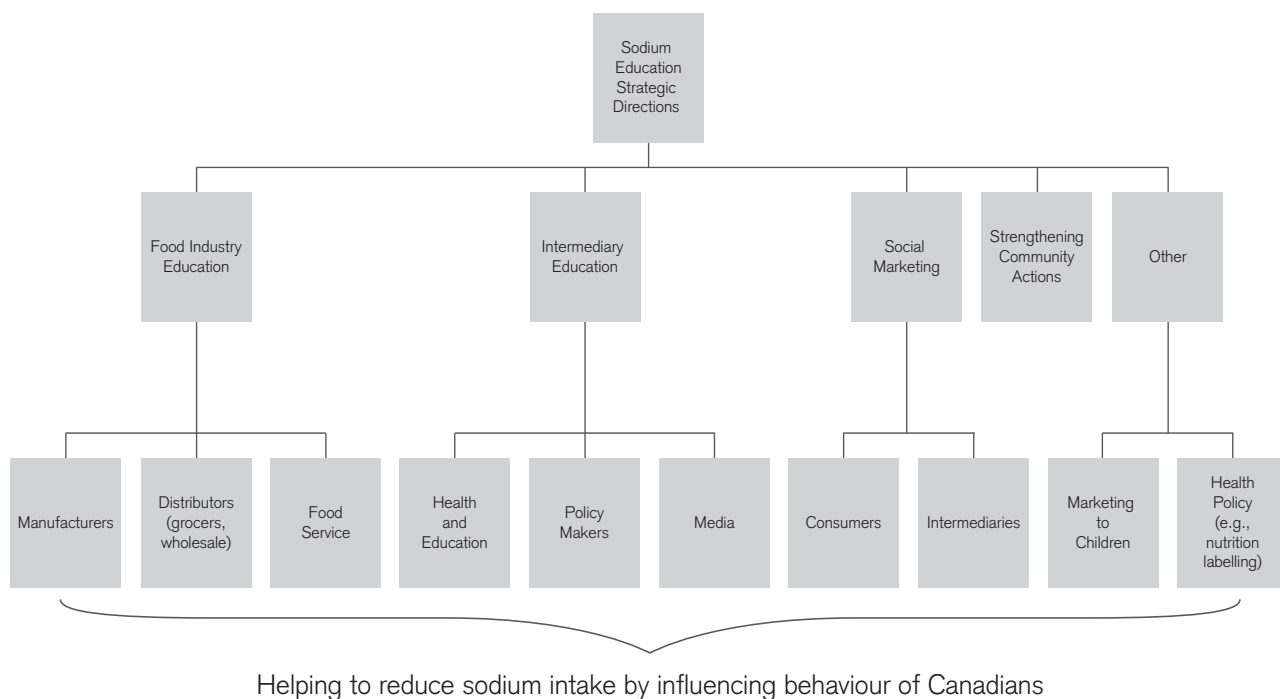
For Food Service Operators: Training programs/tools should have a focus on supporting food service operators to review and modify their recipes and salting practices to lower the sodium content of foods. Programs should also encourage food service operators to refrain from displaying salt shakers, salt packs, soy sauce and high sodium condiments. Food service operators should promote lower sodium versions of their products to clients.

RECOMMENDATION 2-2: The Working Group recommends that education programs be developed to reach key intermediaries in the health, media, education and government sectors to inform them about sodium and the Sodium Reduction Strategy for Canada.

Implementation of this recommendation should be led jointly by all levels of government, non-governmental organizations (NGOs), health professional associations and scientific organizations.

Intermediaries and educators should be proactive in integrating sodium knowledge into their practices. Specific resources for media intermediaries should be developed. The resources could be developed and disseminated in collaboration with partners to provide accurate and current information. Media intermediaries should play a proactive role in translating sodium knowledge to consumers. Tools to increase consumer

FIGURE 5: Multi-faceted approach to increase consumer awareness, knowledge and behaviour related to sodium reduction



self-efficacy of Canadians to reduce sodium intake should be developed and shared with intermediaries.

It is suggested that Ministries of Education include sodium reduction in the school curriculum when addressing healthy eating. One forum where this can be advanced is the Joint Consortium for School Health.

RECOMMENDATION 2-3: The Working Group recommends that the federal government lead the development and implementation of a social marketing campaign on sodium. This campaign should be aligned with efforts of the food industry to reformulate their products.

The initial phase of the campaign would focus on raising awareness that sodium is an issue for most individuals. Messages would also inform consumers that Canadians are eating too much sodium, about the impact of too much sodium on health and identify the main food sources of sodium. Subsequent phases should focus on using information in the NFT for sodium content and messaging related to healthy eating for better heart health. In addition, tools to increase consumer self-efficacy to reduce sodium intake should be developed and distributed. The social marketing campaign would be adaptable by and for communities. Innovative communication channels, such as social networks, should also be used.

RECOMMENDATION 2-4: The Working Group recommends that governmental and non-governmental funding bodies develop cohesive and coordinated funding mechanisms to enhance community-based activities that will support the Sodium Reduction Strategy.

Reducing consumer sodium intake will require the cooperative efforts by all stakeholders. Funding and activities should be coordinated to avoid duplication and to maximize resources and impact. Activities should be adapted and culturally sensitive to speak to various audiences.

RECOMMENDATION 2-5: The Working Group recommends that federal, provincial and territorial governments continue to explore options to reduce the exposure of children to marketing for foods that are high in sodium.

Children are a highly vulnerable population and evidence shows that extensive advertising and other forms of food and beverage marketing is aimed at children all around the world. Importantly, children lack the ability to fully understand the context of advertising aimed at them. Most of this marketing is for foods high in fat, sugar or salt.⁶⁶

A number of content analyses of commercials shown during children's television programming from Australia, New Zealand, the U.K. and the U.S. have found that calorie dense, nutrient poor foods predominate.⁶⁷

A recent review of Canadian television ads shows the same.⁶⁸ Moreover, television is the dominant source of food and beverage marketing information for children less than 12 years of age. In the Canadian context, since 1980 Québec's *Consumer Protection Act* has prohibited all advertising directed at children under the age of 13 years, including ads for all foods as well as for many toys and media products that generally promote more screen time and physical inactivity.

The Public Health Agency of Canada is examining the evidence and options to reduce children's exposure to the marketing of food and beverages. The SWG encourages the federal, provincial and territorial governments to continue this work to identify improvements that can be made to the current marketing environment for children, in order to further protect children from the marketing of foods and beverages high in fat, sugar and/or salt.

RECOMMENDATION 2-6: The Working Group recommends that, in the context of a broad education campaign on sodium, a strategy be developed to help consumers understand the current Nutrition Facts table (NFT). It should be understood that changes to the NFT will be made in the future and a comprehensive strategy will be needed to support the revised NFT.

This recommendation is based on the SWG's belief that the federal government must commit to providing adequate funding to undertake a thorough education program to assist consumers in understanding nutrition labelling.

In Canada, there are concerns that the information contained within the NFT may not always be easy for consumers to use or interpret. It is widely recognized that when the current nutrition labelling requirements were introduced in 2003, adequate resources were not put into place in Canada to educate consumers on how to use the NFT once it began to appear on food labels.

RECOMMENDATION 2-7: The Working Group recommends that the federal government review and update *Canada's Food Guide* to increase the prominence and effectiveness of advice regarding sodium and calories.

This recommendation can be implemented immediately via the Internet. As there are no scheduled plans for a review of the Food Guide, the SWG also recommends that Canada's Food Guide be reviewed on a timely basis to reflect Canadian public health needs.

At the next updating, it is recommended that current scientific literature be reviewed to ensure up-to-date messaging concerning sodium, and that this be communicated in a manner commensurate with the level of risk related to this nutrient compared to others.

Sodium intake appears to be strongly correlated with energy intake. A Finnish study reported that large portion sizes of foods, changes in snack habits and increases in the percentage of the population eating away from home, particularly in fast food restaurants, are all factors that contribute to increases in both sodium and energy intakes.³²

3. Research Recommendations

The Sodium Research Sub-Committee of the SWG was mandated to identify knowledge gaps and to establish research priorities that would engage partners and the community in generating key data to support the Sodium Reduction Strategy for Canada. In conducting its work, the Research Sub-Committee also recognized the need to explore appropriate benchmarks and indicators for measuring progress on the Sodium Reduction Strategy, in conjunction with the Monitoring and Evaluation Sub-Committee.

Three domains of research questions were identified:

- » Health aspects of sodium, including:
 - exposure to sodium in childhood or *in utero* as a predisposing factor for hypertension and cardiovascular diseases
 - the vulnerability of at-risk populations to the effects of sodium—for example, Aboriginal people, people of South Asian and African origin, infants, children and the elderly
 - the influence of sodium reduction in the population, including long-term benefits and risks other than cardiovascular endpoints, such as asthma, osteoporosis, gastrointestinal cancers, etc.
- » Food science aspects of sodium, including:
 - the role of sodium in microbial food safety
 - limits to lowering sodium in food while maintaining the functional aspects for which sodium is added
 - role of sodium in taste physiology
 - alternatives to sodium, considering safety and functionality, including technological innovations and alternative food processing strategies
- » Knowledge-to-action aspects of sodium, including:
 - the impact of regulation and policy, including questions such as how package labelling affects food choices and an examination of “natural experiments,” based on policy approaches in used in different countries
 - the effectiveness of taking action, including understanding the barriers to going from knowledge to action with respect to sodium, differences

according to segments within the general population and implications for developing enabling tools

A key component of the work of the Sodium Research Sub-Committee was a scientific symposium, jointly organized by the Canadian Institutes of Health Research (CIHR), the Institute of Nutrition, Metabolism and Diabetes, and the Institute of Circulatory and Respiratory Health in conjunction with the Research Sub-Committee. Additional support was provided by other institutes within CIHR, the Public Health Agency of Canada, the Canadian Stroke Network, the Heart and Stroke Foundation of Canada, the Kidney Foundation of Canada, and the Advanced Food and Materials Network. Entitled *Developing a Research Agenda to Support Sodium Reduction in Canada*, the two-day workshop (held January 25–26, 2010) had four key objectives:

1. To identify strengths, gaps and opportunities in research capacity in Canada for sodium reduction in the thematic areas of health, food science, knowledge to action, and evaluation and monitoring.
2. To identify a research agenda for sodium reduction in Canada that will support the work of the Multi-Stakeholder Working Group on Sodium Reduction (“Sodium Working Group”) and be incorporated into the reports of the SWG.
3. To identify opportunities for international and global collaborations for the Canadian research community in the context of chronic disease prevention and control.
4. To engage potential research funders to support the identified research agenda for sodium reduction in Canada.

The workshop included a diverse range of stakeholders from a variety of sectors, including the research community, health-related NGOs, government and the food industry, as well as international guests. Through plenary and breakout sessions, participants identified key knowledge gaps and developed priorities for research and action plans in each of three streams: health, food science and food technology, and knowledge to action. Participants were asked to pay particular attention to areas where Canada could make a unique contribution to the field.

Workshop participants also identified the need to develop benchmarks for monitoring progress towards sodium reduction targets, including what data need to be collected as a baseline and the key parameters to be monitored on a continuous basis in order to track change. Specifically, they identified: supply side data (sources and levels of sodium in foods), consumption data (consumption patterns and nutritional trends in the population); consumer behaviour data (that may include awareness parameters in different consumer segments, and stages of contemplation and action by decision makers in industry, schools and other institutions, etc.); as well as outcome data (that may include measurement of urinary sodium excretion, blood pressure in the population and cardiovascular outcomes). They also offered recommendations for monitoring and evaluation (included in subsection 4 below, *Monitoring and Evaluation Recommendations*).

A summary of the report on the research workshop is included as Appendix 5 to this Strategy, and a full report will be made available on the CIHR website (www.cihr.ca). Reports that track progress against workshop recommendations will follow.

Recommendations for research are based on workshop discussions and subsequent deliberation by the Sodium Research Sub-Committee and the SWG.

RECOMMENDATION 3-1: The Working Group recommends that the federal government provides increased resources to the granting councils and the relevant science-based departments and agencies to develop and implement mechanisms to build capacities, target research funding and improve research collaborations amongst academic, government and industry sectors, and enhance these partnerships to advance sodium reduction-related research.

The Canadian Institutes of Health Research should be responsible for implementing this recommendation.

This is a broad recommendation for changing the way research on sodium is approached. Granting councils include the CIHR, the Natural Sciences and Engineering Research Council, and the Social Sciences and Humanities Research Council. Relevant, science-based departments and agencies include Health Canada, PHAC and Agriculture

and Agri-Food Canada. Encouragement to participate should be broad and include academics, research institutes and the food industry.

At present, there is deemed to be a significant lack of coordination and a bias towards silo-based approaches in food research and health research related to sodium. There was consensus at the sodium research workshop that significant advantage would derive from closer links between the different approaches and multiple stakeholders (with sometimes competing interests), and that a “made in Canada” approach to collaboratively addressing the issue would provide significant benefit domestically and serve as a best practice example to others.

Opportunities exist, either through current programs such as the Centres of Excellence for Commercialization Research, Networks of Centres of Excellence, Industry-Agri-Food Canada Collaborative, or through development of specific programs, to bring the various sectors together to solve these challenges collaboratively.

Conflicts of interest in public-private partnerships will need to be proactively managed, such that pre-competitive information can be shared while appropriate intellectual property can be protected. When conflicts of interest arise they will need to be declared and ultimately resolved based on the common goal of maximizing the public good.

RECOMMENDATION 3-2: The Working Group recommends that the federal government empower the granting councils and relevant partners to develop and implement a program of research funding to address knowledge gaps in basic understanding of sodium physiology to inform both policy and practice.

The Canadian Institutes of Health Research should be responsible for implementing this recommendation.

Research that should be addressed in this area includes:

- » Defining basic mechanisms underlying salt-induced health risks, including the physiological bases for specific tissue and organ effects of salt (e.g., time-dependent effects of sodium on blood pressure, direct vascular and cardiovascular effects, immune system effects, gastric cancer, respiratory tract reactivity, effects on bone mineralization, calcium-containing renal stones,

- caloric consumption, central nervous system and renal mechanisms of salt effects).
- » Investigating long-term health effects of sodium in Canada using designs such as cohort studies or linkages of provincial administrative data.
 - » Examining the causality of high salt diets for broad health issues and impact of sodium reduction through intervention studies using a variety of methodologies, including international randomized trials.
 - » Determining optimal sodium intakes in pregnancy and childhood, considering long-term impacts on health outcomes, including blood pressure and cardiovascular disease.
 - » Discovering biomarkers for salt exposure and defining and validating links to health outcomes.
 - » Determining the mechanisms and controls of salt intake, distribution and excretion.
 - » Determining the physiological mechanisms of taste perception affected by sodium, including the modifying effects of different food matrices.
 - » Determining the effects of sodium forms other than sodium chloride on blood pressure and other physiological effects.

These questions can be addressed through existing research programs (with appropriate priority assigned) or through new programs specifically designed to address a coordinated set of questions.

RECOMMENDATION 3-3: The Working Group recommends that the federal government empower the granting councils, relevant departments and agencies, and the food industry to work together to better understand the minimum levels of sodium attainable in foods without sacrificing the specific functional aspects of salt in foods, with an emphasis on microbial food safety and food technology issues.

The Canadian Institutes of Health Research, Health Canada and Agriculture and Agri-Food Canada should lead the implementation of this recommendation.

Research that should be addressed includes:

- » Investigation of alternative processes or technologies to meet the microbial food safety and food technology needs at a lower level of sodium without unduly increasing cost.
- » Determining the microbial food safety consequences of decreasing the sodium concentration in foods, and how to manage them effectively.
- » Investigating the effectiveness, potential risks and benefits of non-sodium salts in food technology and food safety (e.g., potassium salts, multi-mineral salts, other flavour enhancers and flavour complements, etc.).
- » Determining the rate of change that can be achieved in reducing the sodium content of foods with minimal impact on taste-motivated consumer behaviour.

It is recognized that many of these issues will need to be addressed in many different foods, as the type of food can have considerable influence on the outcomes. The food industry is depending on these research initiatives to attain sodium reduction targets in a number of food categories.

The food industry should consider research conducted in this area as a non-competitive issue to allow greater sharing of techniques and technologies for meeting the sodium reduction targets, thus promoting the health of all Canadians.

RECOMMENDATION 3-4: The Working Group recommends that the federal government, relevant health non-governmental organizations (NGOs) and other stakeholders fund population and public health policy and program research.

The Canadian Institutes of Health Research, Health Canada and the Public Health Agency should lead the implementation of this recommendation.

Research that should be addressed includes:

- » Continuing to systematically review policies for sodium reduction around the globe, and to evaluate the effectiveness, strengths and weaknesses of those policies, including situational factors.
- » A focus on infants and children, including foods for toddlers, marketing to children, influence of packaging, school food policies, etc.

- » Evaluation of the most effective social marketing strategies to reduce dietary sodium (e.g., sodium-focused messaging alone or with heart-healthy messaging).
- » Impacts on food security and pricing, including the effects of voluntary approaches, marketing practices and innovative taxation policies on sodium reduction and food disparities.
- » The economic impact and the health cost savings to Canada of an effective sodium reduction policy.
- » Social science research on influences that impact consumer behaviour related to reducing sodium intake.

RECOMMENDATION 3–5: The Working

Group recommends that the federal government provide adequate resources to the granting councils and interested stakeholders to develop and implement a research initiative to investigate sodium reduction in the context of healthy eating patterns.

The Canadian Institutes of Health Research and Health Canada should jointly lead the implementation of this recommendation.

Research to be addressed in this area includes:

- » Examining the health impacts of different dietary patterns including sodium consumption levels, and the potential to change dietary patterns through individual and environmental influences.

- » Evaluation of which dietary patterns children and adults can and will adopt over the long term, in the presence of environmental influences.
- » Determining the potential relationship between food disparities and health disparities, with a focus on linkages through sodium consumption.

These recommendations have been gathered by the SWG from a broad spectrum of stakeholders. As such, they are not the domain of any one government department or other stakeholder group. The various stakeholders are encouraged to continue to work together to prioritize and address the research needs that underpin a successful Sodium Reduction Strategy.

These recommendations should be viewed as a first step in an ongoing effort to inform activities to reduce sodium intakes of Canadians to levels that are associated with optimal health. In addition to monitoring and evaluation of programmatic effectiveness, there should be periodic re-examination of research gaps, prioritization and elaboration of further plans to continue the process of implementation of the Sodium Reduction Strategy for Canada.

4. Monitoring and Evaluation Recommendations

The Monitoring and Evaluation Sub-Committee was tasked with proposing recommendations to monitor progress of the implementation of the Sodium Reduction Strategy for Canada, and to develop an overall plan for a monitoring and evaluation program. The sub-committee recognized the importance of:

- » planning—specifically the development of key parameters and how to measure progress on a continuing basis
- » investment—in terms of cost, time and effort
- » implementation—of an intersectoral and multidisciplinary approach for the effective and timely monitoring of short, intermediate and long-term outcomes (including policy development)

Clear indicators of success will need to be developed, monitored and reported on as part of the evaluation plan. The success of this strategy should be measured by evidence that meaningful change has occurred in not only the Canadian food supply, but also in sodium intakes and health outcomes for Canadians. Some measures of success that should be considered, among others, include:

SOME MEASURES OF SUCCESS:

- ultimately, the sodium intakes for most of the population (95% or more) is less than 2300 mg per day
- by 2016, sodium intakes have decreased to the point where the population mean intake is at or below 2300 mg per day
- food products have been reformulated to meet the sodium reduction targets
- there is an increased knowledge base regarding sodium by all stakeholders
- sodium-related research is conducted and informs the strategy

- » ultimately, the sodium intakes for most of the population (95% or more) are less than 2300 mg per day;
- » by 2016, sodium intakes have decreased to the point where the population mean intake is at or below 2300 mg per day
- » food products have been reformulated to meet the sodium reduction targets;
- » there is an increased knowledge base regarding sodium by all stakeholders; and
- » sodium-related research is conducted and informs the strategy.

The development of indicators and targets for performance measurement will include: monitoring sodium levels in the food supply; monitoring the foods Canadians consume (including salt added at the table and in cooking); monitoring the intake of sodium by Canadians; monitoring changes in morbidity and mortality from cardiovascular diseases and stroke; and evaluating the effectiveness of awareness and education campaigns.

Work is underway to determine baselines for the various indicators and to take stock of current data sources, identify additional data needs and the emerging opportunities to fill data gaps.

RECOMMENDATION 4-1: The Working Group recommends development of a comprehensive sodium monitoring and evaluation plan.

A plan for monitoring and evaluation should follow the guidelines for the development of Results-Based Management and Accountability Frameworks and reflect recent Treasury Board work on horizontal initiatives.^{69,70} More specifically, the plan should outline roles and responsibilities for data collection and coordination, costs, accountabilities, governance for monitoring and evaluation, a logic model, indicators, data sources, and reporting mechanisms and timelines, including a plan of action in the event that targets are not met. The plan should be developed in conjunction with the various partners involved in the oversight of the Sodium Reduction Strategy for Canada, and should also involve Statistics Canada and other data providers.

Further, the evaluation of the Sodium Reduction Strategy should take into account the complexity of a multi-level population intervention; issues of equity should be considered as paramount throughout. The evaluation plan should therefore include both process and formative evaluation, and seek to understand unintended consequences, contextual information, and other issues. The evaluation would make use of both quantitative and qualitative data to address such issues as the effectiveness of a voluntary program. An annual public report on the evaluation of all components of the Strategy should be released.

In developing a monitoring and evaluation plan, care will be required to ensure that the Strategy does not increase inequities. It must be recognized, however, that there is a lack of data available for certain vulnerable groups, such as Aboriginal peoples. It is thus recommended that equity issues be considered as part of the monitoring and evaluation plan and that Statistics Canada be closely involved in its development, as identified above, to assist with sourcing data that will help with understanding the impact of the Sodium Reduction Strategy for Canada on equity.

RECOMMENDATION 4-2: The Working Group recommends monitoring the sodium intake of Canadians.

Progress towards reaching the overall sodium intake interim goal of 2,300 mg per day by 2016 should be monitored regularly and reported at provincial/territorial and national levels. The monitoring of sodium intake by Canadians should use the gold standard of a 24-hour urine analysis with creatinine, to assess the completeness of the collections. Currently, this methodology is used only in small regional surveys and research studies. Work needs to be done to develop a methodology for this to be carried out on a national level as part of the monitoring program. The collection of baseline data should be completed as soon as possible.

This recommendation includes the need to focus on the monitoring of the sodium intake of children. They are a highly vulnerable sub-population and evidence shows that sodium is an important regulator of blood pressure in this

group. In Canada 77% of children aged 1 to 3 years and 93% of children aged 4 to 8 years have a sodium intake that exceeds the UL. Children with an intake that exceeds the UL are likely to be predisposed to develop hypertension later in life. In addition, a high sodium intake suppresses the salt taste receptors, which is likely to cause children to prefer foods with a higher salt content in later life.¹²

RECOMMENDATION 4-3: The Working Group recommends monitoring the foods Canadians consume using a national dietary intake survey similar to the Canadian Community Health Survey (CCHS) 2.2.

This monitoring is important to determine if there is a change in the food consumption pattern of Canadians and, in particular, if there is a shift in the consumption of foods that are generally high in sodium to those that are generally lower in sodium. The survey would also quantify sodium intake from processed foods, thereby providing useful data on this aspect of consumption of sodium by Canadians. There is a need to maintain and improve food composition databases that contain information on the sodium level of foods in the Canadian market place.

RECOMMENDATION 4-4: The Working Group recommends monitoring and evaluating the progress for each of the program components of the Sodium Reduction Strategy for Canada—specifically, the food supply, awareness and education, and research.

Activities for each component should be monitored by tracking the progress made on achieving outputs, short term outcomes and intermediate outcomes. For example, for the consumer awareness and education component, the reach and success of the education campaign would be monitored.

In addition, progress towards reaching the sodium reduction milestones for foods should be monitored. A coordinated monitoring plan to measure sodium in the food supply needs to be developed, using data available from food label reviews combined with market share information, results of Health Canada's Total Diet Study and targeted analyses of food products. Health Canada should specifically monitor the sodium in food products in collaboration with the food industry. Additional data

sources to monitor changes in the sodium content of the food supply would be identified as needed.

The level of funding to support priority research projects identified in the research plan also needs to be monitored.

RECOMMENDATION 4–5: The Working Group recommends monitoring long-term health outcomes, including blood pressure, morbidity and mortality from cardiovascular disease (acute myocardial infarction, stroke and heart failure, etc) and other sodium-related diseases (such as stomach cancer), as well as monitoring cost savings to the health system.

Some of the data required to monitor these outcomes are available through existing data sources, such as those provided by the Canadian Institute for Health Information and Statistics Canada. Additional data sources will need to be identified and indicators developed for other outcomes, such as health care cost savings.

C. Summing Up and Looking Ahead

The Sodium Reduction Strategy for Canada is the culmination of over two years of work by the Sodium Working Group to decrease the intake of sodium by Canadians to a population average of 2,300 mg per day by 2016 and, ultimately, to a point where as many individuals as possible—at least 95% of the population—have an intake below the Tolerable Upper Intake Level (UL).

This report presents the evidence that was considered by the SWG to develop the recommendations for facilitating a decrease in sodium in the food supply, for educating and increasing the level of awareness of both consumers and other interested parties, for funding and prioritizing the research needs that have been identified, as well as for monitoring and evaluating the Strategy.

The SWG consisted of a diverse group of experts from the food manufacturing and food services sector, health-focused

NGOs, the scientific community, consumer advocacy groups, health professional organizations, and various government departments and agencies. Despite the different backgrounds of the members, all agreed that high sodium intake by Canadians is an important health risk, and that a coordinated and systematic approach is needed by all the stakeholders involved to bring about a decrease in consumption. All agreed that achieving the intake goals of the Strategy will not be easy, nor will it be inexpensive; but, with appropriate and ongoing cooperation of all stakeholders, it is possible.

Scientific evidence has shown that the health benefits to Canadians of successfully implementing the Sodium Reduction Strategy are enormous. The intervention is cost-effective and is expected to lead to a very significant reduction in the number of cases of coronary heart disease, stroke, myocardial infarctions and deaths. This translates into major cost savings, both in direct health care expenses and indirect costs associated with loss of productivity and quality-adjusted life years.

The release of the Sodium Reduction Strategy for Canada marks the beginning of a process of implementation and monitoring. The implementation of the recommendations will be monitored, as well as changes in the sodium intake by Canadians over time, the progress that industry is making in achieving the sodium reduction targets, the effectiveness of the education and awareness campaigns, and the progress in funding and conducting research to address identified knowledge gaps. The results of the monitoring and evaluation process for the overall strategy will be reviewed and additional steps may be recommended in order to facilitate the success of the strategy. These steps could include additional regulations, research, policy development and, possibly, fiscal instruments. The Working Group members intend to be active and involved in implementation in their various roles as well as providing advice to those responsible for the oversight of the Sodium Reduction Strategy for Canada.

APPENDIX 1

Multi-Stakeholder Working Group on Sodium Reduction Terms of Reference

Purpose

To develop and oversee implementation of a strategy that would result in lowering the sodium content of the diets of Canadians to within the range recommended by the U.S. National Academies of Science Institute of Medicine (IOM) Dietary Reference Intake (DRI) report for sodium.⁵

Mandate of the Working Group

Under the leadership of Health Canada, the multi-stakeholder Sodium Working Group (SWG) will develop, implement and oversee a population health strategy for the successful reduction of the sodium content of the diets of Canadians to be in line with the recommendations of the IOM DRI report. The strategy will be multi-staged and will be based on a multi-faceted approach that would include education, voluntary reduction of sodium levels in processed food products and foods sold in food services establishments, and research.

The work will include the following stages:

1. Preparatory Stage (ongoing–April 2008)

Information requirements for the inaugural meeting of the SWG:

- Compile baseline data on the sodium levels in the diets of Canadians and the primary sources of dietary sodium.
- Prepare a synopsis of the U.K. Food Standards Agency's program on salt reduction so that the SWG may learn from their experiences in developing initiatives for the Canadian context.
- Prepare *It's Your Health* fact sheet related to dietary sodium.

2. Assessment Stage (April 2008–October 2008)

Initiate a data gathering process on work underway to:

- Educate/inform consumers and health professionals on sodium, hypertension and health.
- Voluntarily reduce sodium levels in processed food products and food services establishment foods.
- Understand better the consumers' perspective on sodium as a risk factor in hypertension and their perception of efforts in place to reduce sodium in processed food products and food services establishment foods.

- Understand how taste and other mechanisms factor into food choices with respect to sodium.
- Understand the functional uses of sodium and also the technical/functional challenges associated with reducing sodium levels in the food supply, and the actual and potential solutions to overcome these challenges.
- Information on regulatory barriers or disincentives to reducing sodium content of foods.

3. **Development of Strategy (November 2008–March 2009)**

- Develop a Strategy that includes goals, action plans with timelines to guide implementation and methods of assessment to determine success.
- Consult the wider stakeholder community (as needed) to seek input and/or commitment to action for dietary sodium reduction.
- The approach will be evaluated for effectiveness and will include consideration of other policy options as required to achieve the goals.

4. **Implementation Stage (April 2009 onwards)**

The multi-stakeholder Working Group will oversee implementation and monitor progress according to timelines and methods of assessment outlined in the Strategy.

Guiding Principles

- » All stakeholder communities with an interest in this public health matter will be represented on the SWG by an organization from their respective stakeholder community. The stakeholder communities that will be represented on the SWG include: government agencies, the scientific community, the health professional community, health-focused non-governmental organizations (NGOs), food manufacturing and restaurant and food services industry, and consumer-advocacy groups.
- » The individuals from stakeholder organizations sitting on the SWG representing their stakeholder community will be expected to respect the purpose of the SWG and contribute towards both the development and the implementation of the Strategy.

- » The individuals from stakeholder organizations sitting on the SWG representing their stakeholder community will be expected to keep their stakeholder community informed of the work of the SWG and consult with their stakeholder community as required by the Working Group.
- » The Strategy developed will be based on sound scientific research and analysis of information and result in goals based on the IOM DRI report recommendations. Action plans and timelines will be practical, feasible and result in making a difference in the health of Canadians.
- » Individuals on the SWG representing their stakeholder community will be expected to work together in a respectful manner with a willingness to listen to all perspectives/opinions brought to bear on how to address this public health matter.
- » Individuals on the SWG representing their stakeholder community will be expected to respect the purpose of all meetings and not use the meetings as opportunities to advance discussion on other matters.
- » Decisions will be made based on consensus amongst the SWG members (definition of consensus to be established by the SWG).

Reporting and Consultations

Health Canada will provide oversight of the SWG and be the body that confirms progress against established goals. The SWG will report back to Health Canada throughout the duration of its life with respect to development and implementation of the Strategy. The SWG will inform/involve the wider stakeholder community at key stages of its work. Also, the SWG will create opportunities for the wider stakeholder community to comment and will call for reports and presentations as needed.

Membership

The members of the SWG will be knowledgeable individuals, capable of providing advice and assistance on how to effectively reduce sodium levels in the diets of Canadians. The SWG will incorporate a balanced perspective from a wide range of interested parties with participation from government agencies, the scientific community, the health professional community,

Final stakeholder representation on the SWG:

Scientific and Health Professional Community	6
Health-Focused and Consumer Non-Governmental Organizations	5
Food Manufacturing and Food Services Industry	7
Government	7

Stakeholder organizations represented on the SWG:

Scientific and health professional community:

1. Canadian Institutes of Health Research (CIHR) Institute of Circulatory and Respiratory Health
2. Canadian Stroke Network
3. Canadian Nutrition Society
4. Dietitians of Canada
5. Council of Chief Medical Officers of Health

Health-focused and consumer NGOs:

1. Hypertension Canada (formerly Blood Pressure Canada)
2. Heart and Stroke Foundation of Canada
3. The Canadian Council of Food and Nutrition
4. Centre for Science in the Public Interest
5. Extenso—Reference Centre for Human Nutrition

Food manufacturing industry:

1. Baking Association of Canada
2. Canadian Meat Council
3. Dairy Processors of Canada
4. Food and Consumer Products of Canada
5. Food Processors of Canada
6. Canadian Council of Grocery Distributors

Food services industry:

1. Canadian Restaurant and Foodservices Association

Government agencies:

1. Office of Nutrition Policy and Promotion, Health Canada
2. Public Health Agency of Canada
3. Food Directorate, Health Canada
4. Federal Provincial Territorial Group on Nutrition
5. Agriculture and Agri-Food Canada
6. Canadian Food Inspection Agency

Meetings will be conducted face-to-face, by teleconference call and by video conference.

The communication between the SWG members will be conducted via a secure website and by electronic means.

health-focused NGOs, the food manufacturing industry, the restaurant and food services industry, and consumer-advocacy groups.

Roles and Responsibilities

Chair: Director, Bureau of Nutritional Sciences, Health Canada, facilitates the process. (The Chair was assumed by the Director General of the Office of Nutrition Policy and Promotion in 2009.)

Steering Committee: The Chair, a Working Group member from the food industry/food services stakeholder community and an SWG member from the health professional/health-focused NGO stakeholder community will comprise the Steering Committee. This committee will monitor momentum and progress against the work plan and identify areas of concern for the full Working Group to address. The Steering Committee will also be responsible for the orientation of new representatives to the SWG as required.

Secretariat: The Secretariat will be provided by Health Canada and will work with the Chair and the Steering Committee to support the SWG, including preparation and organization of meetings, maintaining records of decisions made in developing the Strategy and providing a secure website.

Working Group Members: Each member has a responsibility for participating in meetings and ensuring the success of the SWG's task at hand. Representatives were chosen for their expertise and knowledge in various areas related to dietary sodium. The views expressed in discussion are expected to be the expert opinions of the individual members and do not necessarily reflect the views of their respective organizations. Members are expected to inform the Working Group of their respective organizational views; however, they are to make decisions in the best interests of

the SWG and its stated goals. All SWG representatives will have roles in monitoring and reporting back on progress against the Strategy.

Term: Each stakeholder organization asked to become part of the SWG will appoint a representative at the onset. Each stakeholder organization with a representative on the SWG at its onset will continue on the SWG for the life duration of the Working Group. (The lifespan of the SWG will be determined in Stage 2.) While it is desirable that membership remains stable, if circumstances force the withdrawal of an organization, the SWG will suggest a suitable alternative to Health Canada. Representatives can be changed based on the needs of the specific stakeholder organization. Each stakeholder organization will be responsible for providing its new representative with an orientation to the file and all the materials associated with the business of the SWG.

Funding: Each stakeholder organization participating in the SWG will be expected to contribute to the work of the SWG either by direct financial contribution, intellectual contribution and/or in-kind services. Health Canada will provide financial support to cover the travel expenses of the SWG members who require support to participate in SWG meetings (i.e., for academia and NGO members).

Appendix to Terms of Reference

Transmission of Recommendations

The Multi-Stakeholder Working Group on Sodium Reduction will explore options for reducing the overall consumption of sodium by Canadians and provide advice to the Minister of Health. The Minister retains decision-making authority and responsibilities. Some Working Group recommendations may extend beyond the scope of the Health Portfolio. In this case, these recommendations will be provided to the appropriate parties.

Approval of Terms of Reference

The Terms of Reference of the Working Group on Sodium Reduction were approved by the Working Group and the Minister of Health.

Member Selection Process

Stakeholder organizations from the following areas: the scientific community, health professional community, health-focused NGOs, consumer-advocacy groups, food manufacturing and food services industries, and government were invited to submit one or two nominees to participate in the Working Group. Health Canada selected members, based on nominations put forward by participating organizations in the various sectors, to ensure a mix of disciplines, skill sets and perspectives. Consideration was also given to geographical representation.

Affiliations and Interests

Members of the Working Group must complete the Affiliations and Interests Declaration Form and submit it to the Secretariat. It is incumbent upon each member to update their statement in writing, should their personal situation change. In keeping with the *Privacy Act*, a completed Affiliations and Interests Declaration Form is confidential. The Health Products and Food Branch will not make public any information in the form without the member's permission, but members must agree to the online publication of a summary of their affiliations and interests. Members are expected to conduct themselves in an appropriate manner, i.e., the use of their positions cannot be reasonably construed to be for their private gain or that of any other person, company or organization.

Confidentiality

Every member participating in the Working Group must sign a confidentiality agreement. The agreement prohibits the disclosure of any protected information received through participation in the Working Group, including information received orally or in writing. The Secretariat of the Working Group will mark information according to the level to which it is protected under the *Government Security Policy*. The Chair will ensure that everyone participating in the meeting, telephone discussion, e-mail exchange or in another form of communication has received clear instructions on the confidentiality of the proceedings.

Security Clearance

All members must undergo a security clearance to the “reliability status” level.

Indemnification of Members when Serving as Volunteers

All members serve on the Working Group on a volunteer basis. In keeping with the Treasury Board’s *Policy on the Indemnification of and Legal Assistance for Crown Servants* and the *Volunteers Policy*, members are eligible for the same protection against personal civil liability as federal employees when faced with comparable risks while acting within the mandate of the Working Group and serving as volunteers.

Quorum

Advice from the Working Group is in the form of recommendations. The Working Group will not meet unless a quorum is present. Quorum will be achieved when two thirds of all Working Group members and half the representatives of each “stakeholder community” (as defined in the Terms of Reference) are present. The foregoing notwithstanding, all members should strive to be present at each Working Group meeting.

Working Group Deliberations: Consensus

As much as possible, decisions will be made based on consensus amongst the Working Group members. When consensus is not possible, the meeting record will reflect the diversity of opinions. In the case of major issues, in the absence of consensus and following the exhaustion of reasonable efforts to find a consensus-based solution, members of the Working Group who disagree with the decision will issue a minority report, stating the reasons for the disagreement.

Guests and Observers

The Chair, in consultation with the Steering Committee, may invite individuals with particular expertise or experience to provide input on a specific topic or agenda item. However, an invited guest may not participate in the formulation of advice or recommendations to the Minister. The Working Group may allow individuals, organizations or members of the general public to observe a meeting, or parts of a meeting.

Alternates

Members who are unable to attend a Working Group meeting will not be permitted to have an alternate serve as a replacement. The objective of this policy is to maximize members’ ownership of Working Group decisions and to maintain the momentum of the Working Group.

Process for Resignation and Replacement

Members will provide 14 days’ notice of their intent to resign. The resignation notice must be in writing and be addressed to the Chair, and a copy provided to the Secretariat. The letter should state the effective date of resignation. Organizations whose representatives must withdraw from the Working Group during the course of its mandate will be invited to nominate a replacement. Appointments to the Working Group are subject to approval by the Chair.

Reasons for Termination

A member’s failure to act according to the Working Group’s Terms of Reference may give cause for termination. If this is the case, the Chair, in consultation with the Steering Committee, will make a recommendation to Health Canada to end the appointment of the member. Health Canada will advise the member in writing, stating the reason for the termination and the effective date.

Notice and Agendas of Meetings

Working Group members will be notified of upcoming meetings and canvassed for agenda items at least four weeks in advance.

Transparency

The Secretariat will post meeting reports on the Health Canada website after approval by the Working Group. Reports posted online will be available in both official languages and will comply with Treasury Board's *Common Look and Feel Guidelines*, and Health Canada's *Guidelines for Presentation of Reports and Publications* and *Guidelines for Presentation of Public Involvement Activities and Consultations*. There will be no references to comments made by individual members or the public.

Media and Communications

Before the end of each meeting, the Working Group will establish the key outcomes that will be included in messaging developed for communication purposes. All media calls related to the Working Group will be directed to Health Canada, Media Relations, which will coordinate responses with the Chair, the designated spokesperson.

Review of Working Group

Health Canada and the Chair will review the Working Group mandate, activities, terms of reference and relevance upon completion of its first report to the Minister. The Department retains the prerogative to disband the committee following such review.

APPENDIX 2

Members of the Sodium Working Group

Chair

Dr. Hasan Hutchinson
Office of Nutrition Policy and Promotion, Health Canada
(Chair from September 2009)

Dr. Mary L'Abbé
University of Toronto
(Chair to September 2009, Vice-Chair from September 2009)

Scientific and Health Professional Community

Dr. Peter Liu	Canadian Institutes of Health Research
Dr. Kevin Willis	Canadian Stroke Network
Dr. Katherine Gray-Donald	Canadian Nutrition Society
Dr. Susan I. Barr	Dietitians of Canada
Dr. Eric Young (from August 2008)	Council of Chief Medical Officers of Health

Health-Focused and Consumer Non-Governmental Organizations

Dr. Norm Campbell	Hypertension Canada (previously Blood Pressure Canada)
Ms. Bretta Maloff	Heart and Stroke Foundation of Canada
Ms. Franci Pillo-Blocka	The Canadian Council of Food and Nutrition
Mr. Bill Jeffery	Centre for Science in the Public Interest
Dr. Nathalie Jobin	Extenso Reference Centre for Human Nutrition

Food Manufacturing and Food Services Industry

Mr. Paul Hetherington	Baking Association of Canada
Ms. Mary Ann Binnie	Canadian Meat Council
Mr. Don Jarvis	Dairy Processors of Canada
Ms. Phyllis Tanaka	Food and Consumer Products of Canada
Mr. Colin Farnum	Food Processors of Canada
Ms. Jackie Crichton	Canadian Council of Grocery Distributors
Mr. Ron Reaman	Canadian Restaurant and Foodservices Association

Government

Ms. Chantal Martineau	Office of Nutrition Policy and Promotion, Health Canada
Ms. Lianne Vardy	Public Health Agency of Canada
Ms. Nora Lee	Food Directorate, Health Canada
Ms. Lisa Forster-Coull	Federal Provincial Territorial Group on Nutrition
Ms. Patti Wunsch	Agriculture and Agri-Food Canada
Ms. Charmaine Kuran	Canadian Food Inspection Agency (to November 2009)

Members of the Secretariat

Dr. Konstantinia Arvaniti	Health Canada
Ms. Sarah Hatt	Health Canada (from January 2009)
Ms. Charmaine Kuran	Health Canada (from November 2009)
Mr. Liam Shaw	Health Canada (from December 2009)
Ms. Lynne Underhill	Health Canada (until 2009)

Advisors to the Working Group

Dr. Kevin Cockell	Health Canada
Ms. Elaine De Grandpré	Health Canada (from May 2009)
Dr. Peter Fischer	Health Canada
Ms. Deborah Gibson	Health Canada (from February 2010)
Ms. Heidi Liepold	Public Health Agency of Canada (from May 2009)
Ms. Jennifer McCrea-Logie	Public Health Agency of Canada (from May 2009)
Mr. Michel Vigneault	Health Canada

APPENDIX 3

Executive Summary of Public Opinion Research on Canadians' and Health Care Professionals' Views on Sodium

This summary presents the results both from quantitative and qualitative research conducted with Canadians in regard to attitudes, behaviours, and values associated with sodium consumption⁴⁹

This research provided the PHAC with a solid understanding of Canadians' views about sodium consumption and sodium information on food labelling, as well as their understanding, priorities, and expectations of governments in relation to this issue. This research also provided the PHAC with feedback on how information pertaining to sodium on labels is perceived by the general population and health professionals (dietitians and doctors). The total cost of this research was \$141,839.37 including GST.

The overall objectives of this work were to: assess perceptions and the level of knowledge about sodium and whether it is perceived as a potential risk to good health; evaluate the level of knowledge about sodium content in food; assess the ability of consumers to use labels to make healthy food choices related to sodium; and identify perceived/existing barriers to reducing high sodium intake.

To meet these objectives, Decima conducted qualitative and quantitative research. To begin, 15 focus groups were held across Canada between May 13 and June 1, 2009. Twelve groups were held with the general public in Toronto, Winnipeg, St. John's and Montreal (in French). Sessions were segmented as follows: Six groups with the general public; two groups with low income Canadians; two groups with first generation Canadians; and two groups with Canadians in rural areas. The remaining three sessions were held with general practitioners and dietitians. Decima also conducted 1,216 telephone interviews with adult Canadians between September 14 and October 2, 2009. A sample of this size can be expected to be accurate to the wider population to within $\pm 2.8\%$, at the 95% confidence level. Margins of error will be larger for subsamples.

The data reveal a growing recognition of the prevalence and negative impacts of sodium in the Canadian diet. Canadians indicate that they pay as much attention to sodium on food labels as they do to other ingredients that have health risks, such as fat and sugar. They also indicate high levels of awareness of the relationship between certain high profile conditions, like high blood pressure, and sodium intake. Older Canadians (those aged 55 and up) and females (moms) are far more engaged than other Canadians on this issue.

However, across the population, the level of understanding about a number of key issues that are critical to progress varies significantly.

Some of these include:

- » While sodium is identified as being in the upper tier of closely monitored ingredients on labels, very few have a handle on what a healthy amount of sodium is, and many

underestimate the number of Canadians who consume too much.

- » While some of the most high profile disease linkages with sodium are recognized, other linkages are not and in some cases sodium is wrongfully associated with other medical conditions.
- » Canadians correctly identify that processed foods are a major contributor to the problem of high sodium consumption, but they are much more likely to reduce adding salt at the table or in home cooking than to reduce consumption of processed food.
- » Most pay little to no attention to restaurant food when it comes to sodium, whereas experts suggest that these foods are also contributors to the problem.

Consistent with what we heard in the focus groups, many Canadians believe that significant concerns associated with sodium consumption are about “other people”, rather than themselves. As such, sodium consumption remains in the category of a health issue that is important, but not necessarily urgent enough to focus attention on.

The data provide clear evidence of a continuing need to pursue public education efforts in this area. There are critical information gaps, in terms of drivers of the problem, scope of impact, and activities that could be pursued to reduce intake that remain unknown or misunderstood among the Canadian population.

A targeted effort, focused on those aged 55 and up, as well as women, that emphasizes specific information would likely help to advance the profile of the issue.

One of the reasons to aim a targeted marketing effort at women is that the data suggests that they do most of the grocery shopping. Among the key pieces of information that we believe will resonate and catalyze interest include:

- » Three in four Canadians consume too much sodium;
- » Processed foods represent 80% of Canadians’ sodium intake;
- » Sodium is a key driver of a number of chronic diseases or conditions;
- » Reading the label for sodium content is not enough – knowing how much is too much is critically important;

- » Monitoring sodium doesn’t stop in your kitchen – restaurant food is a key issue that many Canadians don’t notice.

Below are a series of key facts and figures emanating from the survey:

- » As a point of departure, about half of Canadians say they usually or always read Nutrition Facts Tables (NFTs) when they make a food purchase for the first time. However, only three in ten will always or usually read labels on products they have previously purchased.
- » Half of Canadians have been advised or have a family member who has been advised to reduce sodium consumption by a health professional.

Objective: Perception of Sodium as a Potential Risk to Good Health

- » The level of concern about sodium intake is moderate among Canadians: two in three are moderately or less concerned. Those who express more concern are more likely to say they are more likely to pay close attention to their intake. Generally, women and those 55 years and older are more active in reading NFTs and specifically looking for information on sodium.
- » Those who read labels in general are also more likely to read labels specifically for sodium.
- » Canadians clearly understand that sodium consumption is associated with high blood pressure, heart disease, and stroke. There is less clarity on the effect of sodium on diabetes and other diseases.
- » There is a core group of Canadians who are concerned about their sodium intake. The research suggests that this group is more likely to monitor their sodium intake and avoid purchasing food items they believe are high in sodium. This segment is most likely to be female, over the age of 55, and/or have been advised to reduce their sodium intake. The data suggest that most other Canadians are neither concerned nor engaged about their sodium intake.

Objective: Ability of Canadians to Use Labels to Make Healthy Choices

- » About one in three Canadians claims to always read NFTs to determine the amount of sugar, fats and sodium. Slightly fewer always read the NFTs for calories, fibre, and carbohydrates. Meanwhile, eight percent of Canadians claim to always read labels for all the nutrients tested.
- » The findings suggest that Canadians do not use a single measure when reading NFTs. Almost 40% of the people surveyed look at both percentages and amount in milligrams when reading labels. This may be related to the fact that most Canadians do not know how much sodium they should consume daily, therefore the percentages may be easier than using a volumetric measure for them to make a decision based on the content.
- » The research indicates a very low degree of awareness among Canadians that salt and sodium are different. Indeed, only twenty-seven percent are able to state that there is a difference and among this group, one in four can accurately articulate what that difference is.

Objective: Evaluate the Level of Knowledge about Sodium Content in Foods and the Ability to Read and Understand Labels

- » The research points to a sense among Canadians that individually they are doing a better job at consuming the right amount of sodium in their diet than Canadians at large.

- » Three in four Canadians recognize that frozen/processed foods are the single largest source of sodium in their diet – however, only a minority say they avoid them when asked about actions they take to reduce sodium. Instead, Canadians are most likely to say they take smaller steps such as reducing salt added in cooking or at the table.
- » A sizeable majority would prefer to have nutritional labels based on the adequate intake level instead of the upper intake level.

Objective: Perceived Barriers

- » One in two Canadians claims to have avoided specific foods due to the sodium content while three in four say that they are more likely to choose a product marked “low sodium”.
- » There is a preference among Canadians for a mandatory labelling system by a two to one margin and a strong sense among Canadians that high sodium foods should be required to display symbols or words acknowledging this.
- » There is a broad consensus among Canadians that it is important for the government to undertake a variety of initiatives related to sodium reduction.

APPENDIX 4

Data-Gathering Activities

Data-Gathering Process within the Sodium Working Group

Internal Questionnaire

A questionnaire was developed for use by Sodium Working Group (SWG) members to identify what programs and initiatives already exist and what data and information were still needed. The questionnaire asked specific questions related to knowledge and gaps for each of: food supply, awareness and education, and research. It also included questions about the type of background information that might be relevant to the SWG.

Baseline Sodium Levels—Focus on Food Sources

To gain further background information, the SWG requested that staff in the Food Directorate of Health Canada’s Health Products and Food Branch provide consumption estimates for the various sources of sodium in the Canadian food supply. For this analysis, data files from the 2004 Canadian Community Health Survey (CCHS) 2.2 were used. The survey included over 33,000 respondents of all ages from all provinces, excluding the territories (Statistics Canada 2004). Tables 1 and 2 present highlights of the analysis. Table 1 shows the sample size and the average sodium intake of the various age and sex groups for which results were reported.

TABLE 1:

Sample sizes and overall sodium daily intake, by age-sex group

	Youth aged 1–8 years	Youth aged 9–18 years	Adult males aged 19+ years	Adult females aged 19+ years	All
Sample size	5,451	8,625	8,470	10,583	33,129
Average sodium daily intake (mg/day)	2,388	3,412	3,587	2,684	3,098

Note: The data contained in this table are based on the Canadian Community Health Survey—Cycle 2.2, Statistics Canada, 2004.²⁶

Table 2 shows the average daily sodium intakes of each of the various age and sex groups coming from the top 20 sodium contributing food groups. (For more information see Fischer et al. 2009.⁴⁷)

TABLE 2:
Sodium intake (mg/day) from the top 20 sodium contributing food groups

Food Groups	Youth aged 1–8 years	Youth aged 9–18 years	Adult males aged 19+ years	Adult females aged 19+ years	All
Breads and other bread-like products	291.2	452.6	508.3	379.0	430.1
Processed meats	232.8	349.4	355.3	184.1	275.9
Pasta dishes	197.6	226.3	184.7	145.1	175.8
Cheese	161.0	179.3	184.3	146.8	166.7
Vegetables (other)	51.9	99.3	172.2	190.5	158.8
Milk products	219.9	204.2	118.6	107.4	134.8
Red meat dishes	69.5	111.8	174.5	103.3	128.5
Poultry (other)	79.5	129.7	146.2	105.4	121.8
Gravies and sauces	80.4	151.2	141.5	89.5	116.7
Soups (other)	46.9	58.8	134.9	118.2	110.1
Potatoes (other)	62.0	127.0	129.1	85.6	105.6
Pizza	84.9	162.1	108.2	72.7	99.3
Breakfast cereals	117.6	126.5	92.8	77.2	93.4
Soups (canned)	53.5	78.2	112.7	80.9	90.2
Eggs	30.0	50.8	91.7	58.9	67.7
Fish and shellfish (other)	30.7	31.7	77.2	61.0	60.5
Rice dishes	34.0	57.5	62.8	57.9	57.5
Butter and margarine	30.1	39.7	63.3	48.0	51.1
Potato chips and salty snacks	44.3	81.4	50.2	42.3	50.7
Cookies including granola bars	58.9	61.5	39.0	32.6	41.3

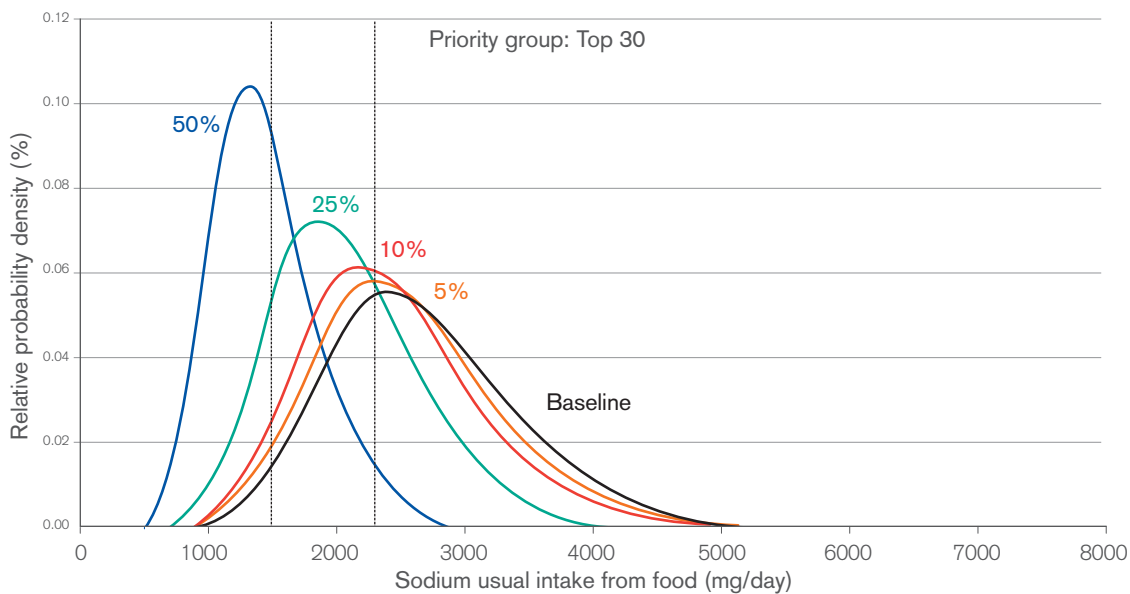
Note: The data contained in this table are based on the Canadian Community Health Survey—Cycle 2.2, Statistics Canada, 2004.²⁶

Modelling Scenarios

Several sodium reduction scenarios were also presented to the Working Group. The first modelling scenario consisted of applying “across the board” sodium reductions of 5%, 10%, 25% and 50% to the foods in the top 5, 10, 20 and 30 sodium providing food groups, using data from the CCHS 2.2. Figures 1 and 2 below summarize some of the results and show the impact on the sodium usual intake distribution curves resulting from the various reductions for females (Figure 1) and males (Figure 2) aged 19 years and older.

FIGURE 1:

Model of sodium usual intake distribution curves with reductions of 5%, 10%, 25% and 50% applied to the sodium content of all foods in the top 30 sodium contributing food groups, for females aged 19 years and older

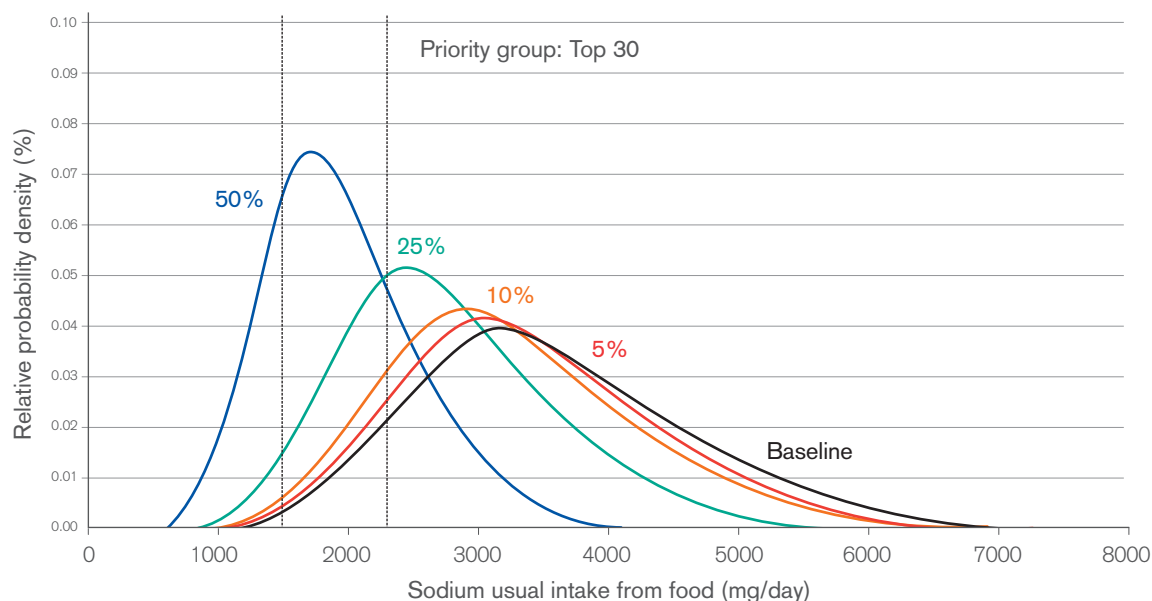


Source: Baseline data are from the Canadian Community Health Survey—Cycle 2.2, Statistics Canada, 2004.²⁶

Note: The line at 1,500 mg/day indicates the Adequate Intake (AI) and the line at 2,300 mg/day indicates the Tolerable Upper Intake Level (UL) for sodium.

FIGURE 2:

Model of sodium usual intake distribution curves with reductions of 5%, 10%, 25% and 50% applied to the sodium content of all foods in the top 30 sodium contributing food groups, for males aged 19 years and older



Source: Baseline data are from the Canadian Community Health Survey—Cycle 2.2, Statistics Canada, 2004.²⁶

Note: The line at 1,500 mg/day indicates the Adequate Intake (AI) and the line at 2,300 mg/day indicates the Tolerable Upper Intake Level (UL) for sodium.

These results indicate that reductions of 5% and 10% of sodium in the top 30 sodium contributing food groups would have little impact on the sodium intake distribution curves. The modelling exercise shows that a 25% reduction shifted the intake curves of females so that the mean fell between the AI and the UL, whereas a 50% reduction shifted the mean to below the AI. For males, a reduction of 50% was required to obtain a shift in sodium intake similar to that seen in the female group with a 25% reduction. The reduction in sodium had a greater effect on the tail of the curve at the higher intake level compared to the lower end, suggesting that those consuming larger amounts were affected more than those eating lesser amounts.

The second sodium reduction modelling scenario involved applying the United Kingdom Food Standards Agency 2012 targets to individual Canadian foods reported to have been consumed by respondents in the CCHS 2.2 and calculating the resulting theoretical decreases in sodium intake. This was done for all foods contributing over 0.01% of total sodium in the top 50 food groups. Together, these top 50 food groups provided over 99.5% of the sodium in the food supply. Table 3 summarizes the impact of applying the Food Standards Agency targets on the mean per capita sodium intake of the four different age and gender groups that were used for the modelling exercise.

TABLE 3:

Selected impacts of applying United Kingdom Food Standards Agency 2012 targets to individual Canadian foods (reported to have been consumed by CCHS 2.2 respondents) that contribute over 0.01% of total sodium in the top 50 food groups

Age/Sex groups	Per capita sodium intake (mg/day)*	Decrease intake with targets (mg/day)	Decrease resulting from targets (%)	Projected intake at targets (mg/day)
Youth aged 1–8 years	2,388	699	29.3	1,689
Youth aged 9–18 years	3,412	1,021	29.9	2,391
Adult females aged 19+ years	2,684	774	28.8	1,910
Adult males aged 19+ years	3,587	1,025	28.6	2,562
All respondents	3,098	880	28.4	2,216

* Data from Canadian Community Health Survey—Cycle 2.2, Statistics Canada, 2004.²⁶

These data indicate that if targets such as the 2012 Food Standards Agency sodium reduction targets are applied to Canadian foods, significant decreases in sodium intake can be expected. With the exception of males aged 19 years and older, the mean projected intakes approached or fell below the Tolerable Upper Intake Level (UL). Based on the results of these modelling exercises, the development of Canadian sodium reduction targets for specific food categories became a key element of the sodium reduction strategy.

A small, qualitative survey was commissioned by Agriculture and Agri-Food Canada to provide information on the progress, challenges and business impacts of sodium reduction on the Canadian food industry.

Stakeholder Consultations

In December 2008, the SWG published a questionnaire to solicit stakeholder feedback on opportunities and challenges related to sodium reduction. The questions dealt with consumer behaviour and awareness, education programs associated with sodium reduction, technical questions concerning reducing sodium, transitions to healthier alternatives, health impacts of salt/sodium alternatives, establishing targets for sodium consumption by Canadians, and policy and regulatory options regarding sodium reduction. This was followed up by a public consultation meeting held on February 19, 2009. During the meeting, the Working Group heard from a number of invited experts, who presented material on the health effects of excessive sodium, Canadian intake levels and sources in the diet, global initiatives, food supply challenges and solutions, and education and consumer awareness challenges and solutions. There were also presentations from eight stakeholders who had requested time to give their perspectives. The complete report on the consultations, with the full questionnaire text and summaries of invited speakers' presentations, appears on the Health Canada website.⁵⁴

APPENDIX 5

Research Workshop Summary Report

The following is a report of the Canadian Institutes of Health Research, Institute of Nutrition, Metabolism and Diabetes and Institute of Circulatory and Respiratory Health Workshop, *Developing a Research Agenda to Support Sodium Reduction in Canada*.

The **objectives** of the meeting were to identify:

- » strengths, gaps, and opportunities in **research capacity** in Canada for sodium reduction in the thematic areas of health, food science, knowledge to action, and in evaluation and monitoring
- » a **research agenda** for sodium reduction in Canada that will be incorporated into the report of Health Canada's Working Group on Sodium Reduction
- » opportunities for **international and global collaborations** for the Canadian research community in the context of Chronic Disease Prevention and Control
- » potential **research funders** to support the identified research agenda for sodium reduction in Canada

Approximately 100 participants attended the workshop, including the research community, representatives from voluntary health organizations, government and the food industry, as well as international participants. Participants were invited to share knowledge and to work collaboratively to generate key research recommendations to advance knowledge in relation to sodium reduction and, ultimately, improve the health of Canadians.

The workshop focused on the identification of research questions in the following four thematic areas:

1. Health and Human Physiology
2. Food Science and Food Technology
3. Knowledge to Action
4. Evaluation and Monitoring

These themes align with the work of the Working Group on Sodium Reduction, a multi-stakeholder group tasked with making sodium reduction recommendations to the federal government. The Sodium Working Group's multi-pronged approach is based on:

1. Awareness and education
2. Research
3. Voluntary reduction of sodium in the food supply

Theme 1: Health and Human Physiology

Research areas identified include:

1. Defining mechanisms underlying salt-induced health risks
2. Discovering biomarkers for salt and links to outcomes

3. Defining physiologic, immune, central nervous system and renal mechanisms controlling salt intake, distribution and excretion
4. Describing optimal sodium intakes in pregnancy and childhood with long-term impact on blood pressure and cardiovascular disease
5. Developing treatments to target salt intake and excretion
6. Defining the impact and risks of a low sodium diet, low serum sodium and low blood pressure
7. Developing focused and comprehensive research programs

Theme 2: Food Sciences and Food Technology

Research areas identified include:

1. Identifying mechanism of salty taste perception
2. Describing food safety consequences of reducing sodium concentration
3. Evaluating the effects of other forms of sodium on blood pressure and other physiological functions
4. Defining how low sodium concentration can go technologically, with limited or no impact on existing products
5. Developing greater coordination between food scientists and health researchers
6. Differentiating between needs (sodium is essential) and wants (higher sodium preferred)
7. Planning to avoid or mitigate unintended consequences of sodium reduction
8. Estimating impacts and implications of altered diets on consumption of sodium

Theme 3: Knowledge to Action

Research areas identified include:

1. Evaluating effects of voluntary approach to sodium reduction on price and health disparities
2. Describing real time monitoring of levels of sodium in food products and contribution to overall sodium intake
3. Developing information regarding the effectiveness of population interventions (especially for children)

4. Obtaining more data on broader interventions (focused on sodium alone versus total diet)
5. Developing effective policy options, and impact of various policies on different segments of the population, as well as the factors that drive policy decisions

Theme 4: Evaluation and Monitoring

Research areas identified include:

1. Monitoring and evaluating discussion focused on the need for nationally representative population-based 24-hour urine data
2. Assessing high risk groups (e.g., children and Aboriginal populations)
3. Defining medium-term indicators focused on surrogate outcomes (i.e., blood pressure, renal function measurement and hypertension)
4. Identify gaps including the need to address the lack of baseline data (particularly for vulnerable groups) and a need to assess the effectiveness of education and clinical interventions

Conclusions and Recommendations

The estimated benefits of dietary sodium reduction are considerable and warrant a public health approach to reduce sodium at the population level. A strong portfolio of research is an essential component of a national approach to reducing dietary sodium. The Canadian Institutes of Health Research Institute of Nutrition, Metabolism and Diabetes and Institute of Circulatory and Respiratory Health are pleased to provide leadership to catalyze a broad range of research including health, food science, knowledge to action and evaluation research to support sodium reduction in Canada.

Next steps will include securing funds to implement calls for research proposals in each of the four themes, which were identified and highlighted in this Workshop to support sodium reduction in Canada.

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