VEGETABLE & FRUIT CONSUMPTION AND HEART DISEASE AND STROKE

FACTS

• The Vegetables and Fruit category is the most prominent food group in Eating Well with Canada’s Food Guide. It makes up the largest proportion of the Food Guide servings, emphasizing the important role these foods play in a healthy diet.1

• The Vegetables and Fruit category of Canada’s Food Guide includes vegetables and fruit in many forms such as fresh, frozen, as juice, canned and dried. The Food Guide recommends that Canadians have vegetables and fruit more often than juice and choose vegetables and fruit with no added fat, sugar or salt.1

• A diet rich in vegetables and fruit can reduce the risk of heart disease, stroke and some types of cancer.1-6

• Insufficient consumption of vegetables and fruit is one of the major causes of chronic or non-communicable diseases (diseases that are not contagious) including heart disease, stroke, cancers, respiratory diseases, diabetes and obesity.7-11

• Worldwide, 1.7 million deaths (2.8% of all deaths) can be attributed to inadequate vegetable and fruit consumption. Inadequate intake is estimated to cause approximately 14% of gastrointestinal cancer deaths, 11% of heart disease deaths and 9% of stroke deaths globally each year.7

• According to Canadian surveys, seven out of 10 children aged 4 to 812, and over half of adults (59.6%) eat fewer than five servings of vegetables and fruit each day, an increase for the second year in a row.13 Canada’s Food Guide recommends 5 servings per day of vegetables and fruit for children aged 4 to 8 years and 7 to 10 servings/day for adults.

• Men (33.5%) are less likely than women (47.2%) to consume five servings of vegetables and fruit each day.13

• Barriers to accessing fresh vegetables and fruit are complex and include income, education, age, geographic location, affordability, availability, quality, insufficient transportation, and gaps in food skills including preparation, handling and storage.14-17

• Low consumption of vegetables and fruit (less than 5 servings per day) is associated with lower income, and unhealthy behaviours such as cigarette smoking, a diet high in fat, and high levels of television viewing.17,18

• Canadian adults in the lowest income households are more likely than those in the highest income households to consume less than five daily servings of vegetables and fruit (58% versus 41%).12

• Canadians living in rural and remote centres are less likely to consume at least 5 daily servings of vegetables and fruit than people living in urban settings.18
RECOMMENDATIONS

The Heart and Stroke Foundation recommends that:

CANADIANS

1. Follow Canada’s Food Guide which recommends Canadians:
   a. Aim to eat the appropriate number of servings of vegetables and fruit each day (See Table 1).
   b. Eat at least one dark green and one orange vegetable each day.
   c. Choose vegetables and fruit prepared with little or no added fat, sugar or salt.
   d. Benefit from eating vegetables and fruit at all meals and snacks.
   e. Have vegetables and fruit more often than juice.
2. Identify opportunities to increase fruit and vegetable access in your community. Look for opportunities in schools, daycare centres, workplaces, retail locations and other settings to support policies and programs that make vegetable and fruit consumption an easier option.*

FEDERAL GOVERNMENT

1. In cooperation with provincial/territorial governments, develop agricultural policies and subsidies that provide incentives for enhancing the production, distribution and consumption of vegetables and fruit in order to make vegetables and fruit more affordable to consumers. For example:
   • Establish direct commodity subsidies for the production of vegetables and fruit.
   • Develop subsidized transportation and revenue insurance policies for fruit and vegetable farmers.
   • Restructure agricultural research and development funding to promote increased fruit and vegetable production.
   • Investigate the feasibility of fruit and vegetable subsidies specifically targeted for low-income people and families, for example, through grocery and debit cards directly connected with the Canada Revenue Agency for monitoring and reimbursement. Ensure that these subsidies apply to fresh, frozen and canned vegetables and fruit.
2. Continue to support and improve the Nutrition North Canada program to help ensure access and affordability of fresh vegetables and fruit in remote northern communities.
3. Provide financial, research and policy support to foster growth of food procurement initiatives and the improvement of food distribution networks that increase access to vegetables and fruit on First Nations’ reserves.
4. Ensure that trade barriers that could affect the trade of fresh vegetables and fruit are not introduced, in order to provide Canadians with adequate access to a wide range of products.
5. Conduct public awareness campaigns with allied partners targeting a variety of populations and cultural groups concerning the benefits of fruit and vegetable consumption and how to prepare them.
6. Give consideration to providing a tax credit to growers and producers for donations of fresh produce (vegetables and fruit) to food banks.

PROVINCIAL/TERRITORIAL GOVERNMENTS

1. Provide subsidies and other support for the distribution of vegetables and fruit from farms to venues such as farmer’s markets, cooperatives, schools, community/recreational centres, worksites, and hospitals in order to make vegetables and fruit more affordable to consumers. In particular, address areas with low access such as remote northern communities and low-income neighbourhoods. Where feasible, work with existing compatible programs such as those of Farms to Cafeteria Canada.
2. In cooperation with school boards, develop school food policies that provide students with easy access to vegetables and fruit. In particular, subsidize the provision of vegetables and fruit in schools and, where possible, provide vegetables and fruit free of charge to students. In part, this could be accomplished through cooperating with and supporting programs such as the Farms to Schools salad bar program.

* Programs can include farm to school or farm to venue programs, farmer’s markets, community and school gardens, and edible landscaping.
3. In cooperation with school boards, ensure that programs within school curricula teach students about the benefits of consuming vegetables and fruit and how to prepare them.

4. In cooperation with municipal governments and school boards, provide resources and support for the establishment of school and community gardens.

5. Conduct public awareness campaigns concerning the benefits of fruit and vegetable consumption, sources of affordable fruit and vegetable access, and how to prepare and grow them.

MUNICIPAL GOVERNMENTS AND REGIONAL HEALTH AUTHORITIES

1. Promote the establishment of Food Policy Councils that develop local policies, programs and strategies related to year round food access including vegetable and fruit consumption.†

2. Support the use of community food assessment tools to more effectively determine the availability of vegetables and fruit in individual communities.

3. Consider the implementation of incentives (e.g., tax incentives, grants, and low interest loans) for the establishment of stores selling vegetables and fruit, and for existing stores to increase the availability of vegetables and fruit in areas with low availability (e.g., low income neighbourhoods and near schools).

4. Establish zoning by-laws and policies designed to facilitate the establishment of farmer’s markets and stores selling vegetables and fruit in areas with low availability (e.g., low income neighbourhoods and near schools).

5. Support community programs that provide education concerning the benefits of consuming vegetables and fruit and how to grow, handle and prepare them.

6. Provide resources and support for the establishment of school and community gardens.

RESEARCHERS

1. Conduct studies to evaluate the impact of vegetable and fruit consumption on health including the role of vegetables and fruit in reducing rates of cardiovascular disease, cardiovascular disease risk, blood pressure, and preventing weight gain.

2. Design and conduct studies to evaluate fruit and vegetable policies and programs including their impact on affordability, availability, access, sustainability and consumption in various settings (e.g., in workplaces, schools, communities, or northern, rural and remote areas) and among various populations (e.g., low-income individuals, ethnic populations, aboriginal, elderly, children and youth).

FOOD MANUFACTURERS

Lower the sodium and/or sugar content of canned vegetables and fruit, vegetable and fruit juices and cocktails to the lowest level possible, taking into consideration microbial food safety, quality and consumer acceptance.

BACKGROUND INFORMATION

WHAT IS A HEALTHY DIET?

There has been much debate about the definition of a ‘healthy’ diet. In Canada, a healthy diet is defined as one that includes a variety of foods from each of the four food groups – Vegetables and Fruit, Grain Products, Milk and Alternatives and Meat and Alternatives – per Canada’s Food Guide. The Food Guide describes the number of servings to eat from each food group and guidance on the appropriate portion size. The recommended number of servings is based on age and gender.

VEGETABLES AND FRUIT

The Vegetables and Fruit category is the most prominent food group in Canada’s Food Guide, emphasizing the important role these foods play in a healthy diet. This food group makes up the largest proportion of the Food Guide servings in a healthy diet and includes vegetables and fruit in many forms: fresh, frozen, as juice, canned and dried. The Food Guide recommends that Canadians have vegetables and fruit more often than juice and choose vegetables and fruit with no added fat, sugar or salt. Health Canada further suggests that individuals divide their dinner plate and fill half the plate with vegetables, a quarter with grain products and a quarter with meat or alternatives.†

† For examples see: Toronto Food Policy Council: toronto.ca/health/tpc/index.htm, Vancouver Food Policy Council: vancouverfoodpolicycouncil.ca, or Kamloops Food Policy Council: kamloopsfoodpolicycouncil.com
TABLE 1: RECOMMENDED NUMBER OF SERVINGS OF VEGETABLES AND FRUIT PER DAY IN EATING WELL WITH CANADA’S FOOD GUIDE

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<th>Age</th>
<th>CHILDREN</th>
<th>TEENS</th>
<th>ADULTS</th>
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<td>7</td>
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Sex

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What is one Food Guide Serving of vegetables or fruit?

- ½ cup of fresh frozen or canned vegetables
- ½ cup cooked leafy vegetables
- 1 cup raw leafy vegetables
- 1 fruit (banana, apple, orange)
- ½ cup frozen or canned fruit
- ½ cup 100% juice

Vegetables and fruit have important nutrients including vitamins, minerals and fibre. In particular, vegetables and fruit provide vitamins A and C, potassium, magnesium and some B vitamins such as folate. These nutrients provide a number of health benefits. A diet rich in vegetables and fruit may help reduce the risk of heart disease, stroke and some types of cancer. Evidence also suggests that vegetables and fruit play a role in reducing the risk of obesity, diabetes, respiratory diseases and can contribute to weight loss.

**EFFECTS OF VEGETABLE AND FRUIT CONSUMPTION**

A review of evidence investigating the relationship between vegetable and fruit intake on cardiovascular disease concluded that there is a moderate inverse relationship between vegetable and fruit consumption on heart attack and stroke risk, with significantly larger, positive effects noted above five servings of vegetables and fruits per day. As the number of servings of vegetables and fruit increases, the risk of heart attack and stroke is reduced.

The InterHEART study found that an unhealthy diet (including low intake of vegetables and fruit) was one of 9 modifiable risk factors that account for 90% of heart attack risk. The study concluded that an unhealthy diet increases the risk of heart attack and accounts for approximately 30% of the population-attributable risk. Similarly, the InterSTROKE study found that an unhealthy diet (including low fruit and vegetable consumption) was one of 10 modifiable risk factors accounting for 90% of stroke risk. Studies have shown an overall risk reduction of heart attack or stroke by as much as 11% for each serving of vegetables and fruit added per day.

The European Investigation into Cancer and Nutrition (EPIC)-Heart Study followed over 300,000 men and women without heart disease or stroke for more than 8 years. Individuals who ate at least eight servings of vegetables and fruit a day had a 22% lower risk of dying from heart disease than those who consumed fewer than three servings a day. The results were adjusted for smoking, alcohol intake, body-mass index, physical activity, marital status, education, employment, high blood pressure, angina, diabetes and total energy intake.

Other large studies confirm this inverse relationship between vegetable and fruit consumption for cardiovascular death. While scientific evidence may be lacking to describe the precise pathway in which vegetables and fruit help reduce the risk of developing heart disease or stroke, it is clear that the more vegetables and fruit an individual consumes, the lower the risk of heart disease or stroke.

An evidence review published by the World Health Organization found that there is convincing evidence that vegetables and fruit decrease the risk for obesity. Research also indicates that replacing foods of high energy density (high calories per weight of food) with foods of lower energy density, such as vegetables and fruit, are an important part of a weight management strategy. Fruit and vegetable consumption contribute to increased feelings of satiety (fullness), which can help in reducing overall energy intake.

A study of risk behaviours found that inadequate fruit and vegetable consumption had an impact of 2.0 fewer years of life expectancy. The study further found that reducing this unhealthy behavior would add years to life (life expectancy) and even more life to years (health-adjusted life expectancy).
In addition to the health benefits, an increase in population levels of vegetable and fruit consumption would have a positive impact on health care costs. Reductions in diet-related disease and health care costs would be achieved if vegetable and fruit consumption were raised to recommended levels.\(^{23,24}\)

**VEGETABLE AND FRUIT COST, SALES AND CONSUMPTION IN CANADA**

Statistics Canada reports that in 2012 sales of fruits and vegetables by Canadian farmers reached $1.7 billion in 2012, up 9.2% from 2011. Fruit sales increased 13.1% to $872 million, while vegetable sales rose 5.4% to $847 million.\(^{25}\)

In 2013 Nielsen reported that fresh vegetables and fruit represent 10.4% of all food sales in Canada at major retail outlets.\(^{26}\) This represents a total of $8.8 billion in food sales and is up 3% in 2013. Fresh vegetables represented 51% of the dollars spent on fresh produce.\(^{27}\)

Despite the sales statistics, surveys reveal that less than half of Canadians aged 12 years and older (40.4%) consume servings of vegetables and fruit five or more times each day, down for a second year since 2009. Men (33.5%) are less likely than women (47.2%) to consume five servings a day, and when it comes to children, seven out of 10 children aged 4 to 8 years eat fewer than 5 servings each day.\(^{13}\)

Common reasons for not consuming vegetables and fruit are ‘it takes too much time to prepare vegetables and fruit’, ‘vegetables and fruit are not readily available at home/school/work’, ‘vegetables and fruit spoil too quickly’, ‘vegetables and fruit cost too much’, ‘it is too difficult to eat the recommended amount’, and individuals ‘don’t like the taste of many vegetables and fruit’.\(^{28}\) Children who report a greater liking to vegetables and fruit are more likely to consume higher intake levels than children who do not like vegetables and fruit. Increasing taste preference through introducing a variety of vegetables and fruit in the home and taste testing may be effective and practical approaches to improving vegetable and fruit consumption.\(^{29}\)

Price and affordability of vegetables and fruit is a growing concern as food prices rise in Canada, and around the world. Researchers forecast that in 2013 the expenditures for vegetables and fruit (fresh, preserved and prepared) will increase in the range of 1 to 3%.\(^{30}\) The increase in reported sales of vegetables and fruit could be attributed to increased price as opposed to increased volume.

Studies have found that vegetable and fruit consumption is lower among males, middle-aged, singles, smokers, individuals with weak social interaction, and households with no children. Low income-education groups are less likely to consume vegetables and fruit than high income-education groups. There are significant differences in fruit and vegetable consumption between provinces, where the Atlantic, Western, British Columbia and Ontario provinces consume vegetables and fruit less often than residents of Quebec.\(^{21}\) Surveys indicate that Canadians living in rural centres are less likely to consume at least 5 servings of vegetables and fruit each day than those living in urban settings.\(^{18}\)

**STRATEGIES TO IMPROVE VEGETABLE AND FRUIT CONSUMPTION IN CANADA**

Adequate food preparation skills are needed to prepare healthy meals. Individuals who lack basic food selection and preparation skills may be more likely to rely on convenience and fast foods. Increased consumption of pre-packaged and processed foods may also be contributing to fewer individuals cooking at home. Families with single parents or with both parents working outside the home may be less likely to pass on food preparation skills to children and may lack basic preparation skills themselves. Involving children in meal preparation in the home is associated with higher fruit and vegetable preferences and greater ability to choose healthier foods.\(^{31}\) In addition, precut, prewashed, frozen and canned vegetables and fruit can provide options for those who don’t like to cook, have limited cooking skills or ability, or have poor or no kitchen facilities.

Strategies to improve vegetable and fruit consumption need to recognize the complex food environment and address the socio-cultural, economic, education and technical challenges that exist in the vegetable and fruit supply chain.\(^{32}\) The complexity of purchasing and consuming vegetables and fruit relies on geographic food access which includes: availability, affordability, and quality. To support this complex model, a strategy that includes both domestic and imported products is necessary.

Canadians consume over 50 billion servings of fresh produce annually. Variety, quality, price and access are important and therefore local Canadian production, though an integral
part of the domestic marketplace, cannot meet this demand alone. Canadians are able to enjoy over 400 different types of fresh fruits and vegetables from over 150 different countries throughout the year.

Canadians demand variety, best quality, best price, all year round. Canadians have come to expect the same selection of affordable, quality fresh produce throughout the year at their supermarkets and grocery stores, regardless of season or weather patterns in Canada.

Improved opportunities for consumption of fruit and vegetables in various settings, partnered with a better understanding of individual eating behaviours and consumer awareness and education may further influence vegetable and fruit consumption.

Increasing the number of locations where vegetables and fruit are sold in communities can help to improve their accessibility. Making produce available in supermarkets, grocery stores, convenience stores, corner stores and specialty food stores (e.g., vegetable and fruit markets) at affordable prices will help increase consumption among individuals within the communities. Financial incentives to attract food stores to underserved areas, improved public transportation, improved facilities in existing stores and increased supply of and shelf space dedicated to affordable vegetables and fruit in existing stores are suggested methods to improve access within communities.

The home, community, workplace and school environments influence the food choices that Canadians make. Some neighbourhoods do not have stores that sell healthy foods, and not all families have transportation to travel to stores where vegetables and fruit are available. Food is at the core of a highly complex system that includes the way it is produced, processed, distributed, priced, marketed, and consumed. Each stage is influenced by various levels of government and by businesses from local to multinational levels. Access and affordability of vegetables and fruit can be altered through agriculture, building sustainable community food systems, and by exploring multi-level food policies, such as incentives to bring grocery stores or farmer’s markets to underserved neighbourhoods. Increased access to vegetables and fruit can be achieved through a number of policy and program options.

Food-to-Family programs such as Food Share in Toronto, Ontario are positive community tools, which apply a wide range of programs. These programs take a unique long-term approach to hunger and food issues. They aim to empower individuals, families and communities through food-based initiatives, while advocating for broader public policies needed to ensure that everyone has adequate access to sustainably produced, good healthy food.

The term ‘edible landscaping’ refers to the use of edible plants such as fruit and nut trees, berry bushes, vegetables, herbs and edible flowers instead of ornamental or traditional plants in various settings. Benefits of edible landscaping include increased food security, reduced food costs, convenience and sustainability at personal, community and global levels. Policies and programs that promote and support edible landscaping can contribute to improved vegetable and fruit consumption.

Farm-to-location programs allow local farms to sell vegetables and fruit directly to local establishments (e.g., schools, hospitals, worksites, or daycares). These programs provide groups and organizations with locally grown, healthy, and nutritious foods and contribute to the health of a community in season. Local produce is made available for use in cafeterias, restaurants, and catering services and at meetings, conferences and special events. These programs are often subsidized through government subsidies, local organizations or individuals. The goal of these programs is to help ensure regular access to fresh produce and promote consumption of vegetables and fruit. Farm-to-location programs can also incorporate education about vegetables and fruit, food preparation, or agriculture. For example, many farm-to-school programs include activities that provide students with hands-on learning opportunities, such as food preparation and cooking classes, school gardening, composting, and farm visits. Farm to Cafeteria Canada is an emerging national network that promotes, supports and links farm to cafeteria programs, policy and practice from coast to coast to coast. Their website (www.farmtocafeteriacanada.ca) provides information about projects and programs across Canada and is a valuable resource for policies and available funding opportunities.
Nutrition North Canada is a food subsidy program in isolated northern locations that is funded by the Federal government. It was launched in April 2011 to replace the former Food Mail Program, and seeks to improve access to perishable healthy foods. Perishable foods can be fresh, frozen, refrigerated, or have a shelf life of less than one year and must be shipped by air. A higher subsidy applies to the most nutritious options such as fresh fruit, frozen vegetables, bread, meat, milk, and eggs. A lower subsidy applies to other eligible foods such as flour, crackers, ice cream and combination foods (e.g. pizza, lasagna). To be eligible for the program a community must lack year-round surface transportation or have used the previous Food Mail program. Registered retailers are subsidized to enable them to reduce food prices for consumers. Although Nutrition North Canada is an improvement over the former Food Mail program, a report of the United Nations Special Rapporteur on the Right to Food highlighted limitations to the current program including community and food eligibility criteria. The report further emphasized the need for improved program monitoring to determine whether desired outcomes are being achieved.35

A tax credit for growers and producers who donate fresh vegetables and fruit to food banks has been introduced in several US States. Food banks distribute perishable and non-perishable food to those who have difficulty purchasing enough food to avoid hunger. Food banks in Canada have served over 700,000 individuals every month for the better part of the last twelve years.36 Introduction of a similar tax credit in Canada for producers and growers to donate unused fresh produce to food banks could help increase consumption of vegetables and fruit among low-income Canadians and families in need.

Evidence of strategies to improve vegetable and fruit consumption among Canadians continues to grow. Evidence from the tobacco control field suggests that multiple, interrelated strategies that create an environment and culture where healthier choices are normalized, are effective. To increase vegetable and fruit consumption among Canadians, a comprehensive approach that addresses multiple levels including intrapersonal factors (knowledge and skills), interpersonal processes (social supports), organizational and community factors (local rules and norms), and public policy (voluntary and/or regulatory measures, tax incentives) is required.37,38

REFERENCES
VEGETABLE & FRUIT CONSUMPTION AND HEART DISEASE AND STROKE

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32. Pollard CM, Lewis J, Binns CW. Selecting interventions to promote fruit and vegetable consumption: from policy to action, a planning framework case study in Western Australia. Australia and New Zealand Health Policy 2008;5:27.
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The information in this Position Statement is current as of AUGUST 2013