

**An Apple a Day Keeps the Doctor Away:
Policy Options to Increase the Consumption of
Plant-Based Foods in Canada**

**by
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Abstract

Research shows that Canadians report consuming a range of plant-based foods below recommended levels, leading to a potentially avoidable economic strain in the form of both direct and indirect health care costs. Importantly, dietary behaviour has been recognized as a function of many different determinants and contexts. As such, through analysis of publicly available data on fruit and vegetable consumption, the use of expert informant interviews, and a jurisdictional scan, this study seeks to identify possible barriers to plant-based food intake in Canada, as well as propose three federal policy options to support the increased consumption of these foods.

Keywords: plant-based foods; underconsumption; public policy

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List of Acronyms

CCHS	Canadian Community Health Survey
CFG	Canada Food Guide
DALY	Disability-adjusted life year
FDA	Food and Drug Administration
FOP	Front-of-package
FPT	Federal-Provincial-Territorial
FVC	Fruit and vegetable consumption
GBD	Global Burden of Disease Study
HDL	High-density lipoprotein
HIP	Healthy Incentives Pilot
IHME	Institute for Health Metrics and Evaluation
LDL	Low-density lipoprotein
NHSCG	National Healthy School Canteen Guidelines
NHS	National Health Service
PTs	Provinces and territories
SACN	Scientific Advisory Committee on Nutrition
SFP	School food program
SNAP	Supplemental Nutrition Assistance Program
UK	United Kingdom
USA	United States of America
USDA	United States Department of Agriculture
WHO	World Health Organization
WIC	Women, Infant and Children

Chapter 1.

Introduction

1.1. Policy problem

According to research conducted for the Global Burden of Disease, Injuries and Risk Factors Study (GBD), an estimated 11 million deaths across the world were attributable to dietary risk factors in 2017, with leading risk factors including low intake of whole grains (three million deaths), fruits (two million deaths), and vegetables, nuts and seeds, and legumes (collectively three million deaths) (Afshin et al., 2019). Diet-related deaths were linked principally to cardiovascular disease, accounting for over 90% of the total, followed by cancers and type 2 diabetes. Similarly, in 2019, dietary risk factors were responsible for just under eight million deaths globally (Institute for Health Metrics and Evaluation [IHME], 2020). Once again, a considerable proportion were attributable to risk factors such as diets low in whole grain, legume, fruit, nut and seed and vegetable intake (IHME, 2020). Despite this, research shows that Canadians have historically under-consumed healthful plant-based foods such as those listed above relative to national recommendations (Liefers et al., 2018; Loewen et al., 2019; Polsky and Garriguet, 2020; Vatanparast et al., 2017). Accordingly, the policy problem I address in this capstone research is as follows: **Canadians under-consume plant-based foods, leading to potentially avoidable negative health outcomes for the population.**

1.2. Capstone structure and overview

The following capstone will begin with a background chapter, walking readers through the benefits of plant-based food consumption, the significance of the policy problem, a brief review of the factors that influence diet choice and, finally, the general nutrition policy landscape. The background chapter will be followed by three chapters relaying findings from descriptive statistics of publicly available data from Statistics Canada, informant interviews and, finally, a jurisdictional scan of practices to support healthy eating in the United States of America, the United Kingdom and Australia. This research concludes with the analysis of three possible federal policy options to increase the consumption plant-based foods in Canada, and recommendations for moving forward.

Chapter 2.

Background

In this chapter, I define plant-based foods for the purpose of this study, highlight the benefits of consuming these foods from both a health and environmental standpoint, and illustrate the policy problem using evidence from a range of studies. I also discuss the factors that have been shown to influence dietary habits in Canada, and provide a high-level overview of the nutrition policy landscape.

2.1. What are plant-based foods?

For the purpose of this study, “plant-based foods” do not include plant-based meat substitutes that aim to replicate the taste, texture and appearance of meat. Rather, “plant-based foods” refer to vegetables, fruits, whole grains, legumes (including pulses such as dried beans, lentils, and peas), and nuts and seeds. The reason for focusing solely on these foods is because they are the plant foods that mostly make up plant-based diets (see HealthLink BC, 2016), which are defined often as consumption patterns with a proportionately greater intake of plant foods than non-plant foods (see Dietitians of Canada, 2020; McManus, 2020; Medcan, 2021). Accordingly, this research does not seek to address the possible barriers preventing greater consumption of plant-based meat substitutes, nor does it propose policy options targeting the intake of these products.

2.2. Benefits of plant-based food consumption

2.2.1. Individual health

Plant-based foods such as those listed above provide the body with fibre, phytochemicals, and nutrients such as vitamins and minerals (HealthLink BC, 2016). Some plant-based foods, including nuts, seeds and pulses, are also protein-rich (HealthLink BC, 2016). Importantly, consumption patterns that emphasize these foods confer health benefits, as they can help with weight management, in addition to reducing one’s risk of chronic diseases such as heart disease and cancer (HealthLink BC, 2016). In its 2018 Food, Nutrients and Health Interim Evidence Update, Health Canada (2019a)

outlines a number of food-health relationships for which the department considers there to be a convincing scientific evidence base.¹ This includes the association between dietary fibre – the part of plant foods that the body cannot digest and absorb (Alberta Health Services, 2020), rich sources of which include vegetables, whole fruit and pulses (Reynolds et al., 2019) – and decreased risk of colon cancer, cardiovascular diseases and type 2 diabetes.² Additionally, a series of systematic reviews and meta-analyses by Reynolds et al. (2019) found that higher intakes of total dietary fibre are associated with a reduced risk of all-cause and cardiovascular-related mortality, as well as the incidence of coronary heart disease, stroke incidence, stroke mortality, type 2 diabetes, and colorectal cancer.

This is particularly noteworthy given research by Vatanparast et al. (2020) which suggests that, if Canadians simultaneously double their consumption of plant-based meat alternatives and reduce their intake red and processed meat by 50%, dietary fibre intake would see a statistically significant ($p < 0.05$) increase, from 16.8 grams to 18.2 grams daily. Note that, in Reynolds et al.'s (2019) study, the greatest benefits were observed for individuals consuming 25 to 29 grams daily, with improvements across six of the seven health outcomes listed above,³ positing a basis for continued efforts to augment intake in Canada. Further, given that Vatanparast et al. (2020) focus specifically on legumes, nuts and seeds as plant-based meat alternatives, their results may actually understate the possible increase in dietary fibre that could accompany a doubling of all plant-based food intake among Canadians. These findings are especially relevant since diseases of the heart and cerebrovascular diseases were Canada's second and fifth leading causes of death in 2020, respectively (Statistics Canada, 2022a). Moreover, in 2018, 26.8% of Canadians aged 18 and older reported height and weight that would classify them as obese, with another 36.3% classified as overweight (Statistics Canada, 2019). This means the total population with increased health risks as a result of excess weight is 63.1%, compared to 61.9% in 2015 (Statistics Canada, 2019).

¹ This publication is released as part of Health Canada's Evidence Review Cycle for Dietary Guidance (Health Canada, 2019a).

² Health Canada (2019a) cites the United Kingdom Scientific Advisory Committee on Nutrition (2015) as the source for this finding. The SACN (2015) commissioned systematic reviews of the evidence on dietary carbohydrates and cardiometabolic health, colorectal health, and oral health.

³ Reynolds et al. (2019) compared the lowest consumers of dietary fibre with individuals consuming between 15-19 grams, 20-24 grams, 25-29 grams, 30-34 grams and 35-39 grams of fibre daily.

In addition to the individual health benefits connected to dietary fibre intake, Health Canada (2019a) has found convincing evidence of the relationship between fruit and vegetable consumption and decreased risk of coronary heart disease,⁴ as well as the association between diets high in nuts and lower low-density lipoprotein (LDL) cholesterol.⁵ Moreover, Health Canada (2019a) considers there to be convincing evidence⁶ of the relationship between lower LDL cholesterol and blood pressure and dietary patterns that: are higher in vegetables, fruits, and whole grains; include low-fat dairy products, poultry, fish, legumes, non-tropical vegetable oils, and nuts; and limit intake of sweets, sugar-sweetened beverages, and red meats.

2.2.2. Environmental sustainability

As Willett et al. (2019, p. 447) of the *EAT-Lancet* Commission on healthy diets from sustainable food systems note, “diets inextricably link human health and environmental sustainability.” Like the individual health benefits of plant-based food intake, Health Canada (2019b) has acknowledged the link between dietary patterns higher in plant-based foods and a reduced environmental footprint, pointing to a systematic review by Aleksandrowicz et al. (2016) of 63 studies measuring the environmental impacts of shifting current dietary intake to a range of sustainable consumption patterns (e.g., vegetarian, vegan, pescatarian, Mediterranean diet, the New Nordic diet, etc.). Of the 210 scenarios extracted from these studies, 197 were found to show a reduction in environmental impacts when switching from baseline to alternative dietary patterns (Aleksandrowicz et al., 2016). The average reduction in greenhouse gas emissions, land use, and water use across all sustainable diet types were 22%, 28% and 18%, respectively. Notably, the largest environmental benefits were found in diets that most reduced the intake of animal-based foods (e.g., vegan, vegetarian, and pescatarian).

⁴ Health Canada (2019a) points to their conclusion (made in 2016) that sufficient scientific evidence exists to support a health claim about fruit and vegetable consumption and reduced risk of heart disease (see Health Canada, 2016a).

⁵ Health Canada (2019a) cites findings from Anderson et al. (2016), authors of the 2016 Canadian Cardiovascular Society Guidelines for the Management of Dyslipidemia for the Prevention of Cardiovascular Disease in the Adult (hereafter the 2016 Cardiovascular Society Guidelines).

⁶ Health Canada (2019a) cites Eckel et al. (2014), authors of the 2013 American College of Cardiology/American Heart Association Guideline on Lifestyle Management to Reduce Cardiovascular Risk.

2.3. Defining the policy problem

Despite the positive health and environmental outcomes associated with consuming plant-based foods, there is a gap between actual and optimal or recommended intake. The following section explores this in both the international and Canadian contexts.

2.3.1. Global underconsumption of plant-based foods

As noted earlier, the global intake of fruits, vegetables, legumes, whole grains, and nuts and seeds fell below optimal levels in 2017, with more than eight million deaths attributable to the inadequate intake of these foods (Afshin et al., 2019). Diet-related deaths were caused largely by cardiovascular diseases, followed by cancers and type 2 diabetes (Afshin et al., 2019). Importantly, 255 million disability-adjusted life years (DALYs) – a measure which captures the overall burden of disease (World Health Organization [WHO], 2022) – were attributable to dietary risk factors, with a large proportion linked to diets low in whole grains, fruits, nuts and seeds, vegetables and legumes (Afshin et al., 2019).⁷ According to more recent data from GBD 2019, dietary risk factors were responsible for just under eight million deaths globally (IHME, 2020). Once again, a considerable proportion these deaths – over five million – was attributable to risk factors such as diets low in whole grain, legume, fruit, vegetable and nut and seeds (IHME, 2020).

2.3.2. Underconsumption of plant-based foods in Canada

Estimates from the GBD suggest that, in 2019, dietary risk factors were responsible for over 35,800 deaths in Canada, with more than a combined 20,000 attributable to diets low in whole grain, legume, fruit and vegetable intake (IHME, 2020). Importantly, studies consistently highlight the Canadian population's underconsumption of these foods, meaning there is significant room for increased intake. In both 2004 and 2015, the majority of Canadians did not usually consume the total number of fruit and vegetable servings outlined for their age-sex group in the 2007 Canada Food Guide,

⁷ DALYs are a time-based measure that combines years of life lost due to premature mortality and years of lost life due to time lived in states of less than full health, or years of healthy life lost due to disability (WHO, 2022). One DALY represents the loss of the equivalent of one year of full health (WHO, 2022).

based on data from CCHS 2004-Nutrition and CCHS 2015-Nutrition⁸ (Polsky and Garriguet, 2020), findings consistent with earlier research in this area (Black and Billette, 2007).

Of particular concern is the significant proportion of Canadian youth that have been found to under-consume fruits and vegetables relative to national guidelines. In 2015, more than 80% of males and females aged 9-13 consumed less than their recommended six servings per day, while over 90% of males and females aged 14-18 did not meet recommended intake of eight and seven daily servings, respectively (Polsky and Garriguet, 2020). Inadequate consumption across this demographic is noteworthy especially given calls from stakeholders and researchers for a national school food program in Canada (see Food Secure Canada, 2016; Roblin, 2020; Ruetz et al., 2020; Kirk and Ruetz, 2018).

The underconsumption of plant-based foods relative to national recommendations is not exclusive to fruits and vegetables. Research based on CCHS 2015-Nutrition data found that approximately 14.5% of Canadians reported consuming legumes, nuts and seeds together (Vatanparast et al., 2020), similar to Mudryj et al.'s (2012) findings that, on any given day, 13.1% of Canadian adults in 2004 consumed pulses, based on data from CCHS 2004-Nutrition. Another study, based on CCHS Nutrition-2004, suggests that more than eight in ten Canadians had inadequate whole grain intake compared to Canada Food Guide recommendations (Vatanparast et al., 2017).

2.3.3. Economic burden of underconsumption

Non-adherence with established dietary recommendations has been estimated to impose a significant economic burden in the form of both direct and indirect healthcare costs. Note that direct costs refer to healthcare spending for which the primary goal is to improve and prevent the deterioration of health status, and is comprised of hospital care expenditures, physician care expenditures and drug expenditures (Public Health Agency of Canada [PHAC], 2014). Indirect costs, on the other hand, refer to the dollar value of lost production resulting from illness, injury or premature death. Based on CCHS 2015-Nutrition data, Loewen et al. (2019) estimate that, in 2018, non-adherence with

⁸For more on these two surveys, see Appendix B.

established national food recommendations for vegetables, fruits, whole grains, milk, nuts and seeds, processed meat and red meat together was responsible for a total \$15.8 billion dollars in direct and indirect healthcare costs, driven in large part by the inadequate consumption of vegetables, fruits, whole grains, nuts and seeds (75% or \$11.85 billion).⁹ This aligns with earlier research by Lieffers et al. (2018), which, based on CCHS 2004-Nutrition data, estimates a total economic strain of CAD \$13.8 billion in 2014, over 70% was attributable to the underconsumption of these same foods.¹⁰

2.4. What influences dietary behaviour?

Having now presented the policy problem at the centre of this research, it would be helpful to briefly outline the variables that shape dietary behaviour. These include social and economic influences, including income, food prices, individual preferences and beliefs, cultural traditions, and geographical and environmental aspects (World Health Organization [WHO], 2020). As Health Canada (2019b, p. 39) notes, “decisions about healthy eating are influenced by many aspects of our social and physical environments, from household income and food skills to government food policies.”

This broader recognition of the various determinants that influence individual consumption choices is thought of as an “ecological approach” to dietary behaviour (see Herforth and Ahmed, 2015; Health Canada, 2013). The “determinants of health” – i.e., the key factors that influence health, such as income, social status, social support networks, education, employment, social and physical environments, health services, gender and culture – combine in ways that affect eating behaviour (Health Canada, 2019b). As succinctly summarized by Health Canada (2013, p. 10), “our understanding of food choices has shifted from being purely a matter of ‘personal responsibility’ to a more complex analysis, embedded within various contexts.” Crucially, a recognition of this sort permits the understanding that, while nutritional risk factors such as inadequate fruit or vegetable consumption are often labelled “modifiable,” change is made more difficult for many because their food environment or life circumstances may not support accessibility and availability of nutritious foods (Health Canada, 2019b). Indigenous peoples who live

⁹ Note that the authors’ sensitivity analysis produced a range of \$7.9 billion to \$21.2 billion.

¹⁰ Note that the authors’ sensitivity analysis produced a range of \$6.9 billion to \$18.5 billion.

in remote or isolated communities, for example, often have limited access to nutritious foods, including traditional food (Health Canada, 2019b).

Raine's (2005) synthesis of the literature on factors that influence healthy eating in Canada helpfully organizes determinants into two categories: (1) "individual" determinants of personal food choice; and (2) "collective" determinants, broken down further into "environmental" variables as context for individual behaviour, and public policy as a vehicle to create supportive environments for healthy eating.¹¹ According to Raine (2005, p. S9), "individual" determinants of personal food choice – which include physiological influences, food preferences, nutritional knowledge, perceptions of healthy eating and psychological factors – are necessary, but not sufficient alone, to explain eating behaviour, which is "highly contextual." "Environmental" determinants, meanwhile, encompass several of the contextual factors that affect consumption patterns, including interpersonal influences (e.g., family), the physical environment (i.e., the environment that determines what food is available for consumption as well as access to that food), the economic environment (i.e., where food is a commodity and marketed for profit and within which income plays a role), and the social environment (Raine, 2005). Importantly, Raine (2005, p. S12) describes public policy as "a powerful means of mediating multiple environments," including dietary guidance to support informed choice, economic measures to mediate food affordability, and social efforts that support disadvantaged Canadians becoming self-sufficient.

2.5. Policy landscape

Now that the benefits of plant-based food consumption and the negative implications of under-consuming these foods have been highlighted, in addition to key determinants of dietary behaviour, I turn to the general nutrition policy landscape in Canada. Since the focus of this capstone is on possible federal interventions, I centre primarily on the Government of Canada's role, with some discussion on provincial action in this area.

¹¹ Raine (2005, p. S9) asserts that this method of organization is "not meant to artificially separate those determinants of healthy eating that are intimately connected," but to, among other things, help readers understand the existing state of knowledge regarding determinants of healthy eating.

2.5.1. Dietary guidance

The Government of Canada's role in dietary guidance is multi-dimensional, and includes the development of resources such as *Canada's Food Guide* (CFG), communicating advice on food choices, developing regulations and standards, and delivering programs and services (Health Canada, 2016b). Each of these roles will be explored in greater detail throughout this section. Note, however, that the implementation of dietary guidance relies on stakeholders such as provincial, territorial (PT), and regional governments, as well as health professionals and non-governmental organizations (Health Canada, 2016b).

Canada's Food Guide

The CFG is an educational tool designed to promote the nutritional health of Canadians (Health Canada, 2019c), and was last updated in 2019 by the federal government. This iteration – the most recent of nine CFG installments that date back to 1942 (Health Canada, 2019c) – is made up of several online resources, including the Food Guide Snapshot (which displays the contents of a CFG-adherent plate), *Canada's Dietary Guidelines for Health Professionals and Policy Makers*, the federal government's evidence reviews for national food guide development and, finally, videos, recipes and advice (Health Canada, 2019d). As it concerns guidance, the current CFG encourages Canadians to limit their intake of highly processed foods (e.g., sugary drinks, muffins, processed meats) while simultaneously emphasizing the consumption of vegetables, fruits, whole grain foods and plant-based proteins (Health Canada, 2020b). Specifically, the CFG recommends that vegetables and fruits make up the largest proportion of what Canadians consume every day, accounting for half of each plate made, with the remainder of each plate made split equally between whole grain foods and protein foods (Health Canada, 2019e). Among protein foods, the CFG promotes choosing those that are plant-based “more often,” such as legumes, nuts and seeds (Health Canada, 2019e).

Upon release, the 2019 CFG drew media attention for its departure from the traditional four food groups and relative emphasis on consuming plant-based foods, despite lobbying efforts from Canada's meat and dairy industries (see Hui, 2019). Some have suggested that changes of this sort were enabled by lobbying safeguards put in place during the CFG revision process (Gaucher-Hold et al., 2022). For example, though online public consultations took place throughout the revision process that were open to all

stakeholders – including industry – officials from Health Canada’s Office of Nutrition Policy and Promotion did not meet with food and beverage industry representatives, citing the importance of ensuring “that the development of dietary guidance was free from conflict of interest” (Government of Canada, 2021a). Importantly, while the 2019 CFG has received praise from researchers such as Brent Loken, corresponding author of the EAT-*Lancet* Commission,¹² past research suggests that it may not be a commonly used resource. Results from the CCHS Rapid Response Module on the Awareness and Usage of Canada’s Food Guide, for example, showed that, though more than 80% of Canadians reported being aware of the CFG, only a small percentage stated that they had consulted it within the preceding six months (Slater and Mudryj, 2018).¹³ The CFG fell behind family/friends, television programs and general research as the sources of healthy eating most consulted in the preceding six months, underscoring the many influences on dietary behaviour outlined in Raine’s (2005) review. Additionally, over 20% of Canadians did not correctly identify the food group from which most servings should come, and more than half were unaware of the recommendation to consume at least one orange coloured vegetable per day (Slater and Mudryj, 2018). These findings are particularly instructive, since they point to the possible need for greater educational efforts or distribution of dietary guidance.

Regulations and standards

In Canada, the *Food and Drugs Act* primarily governs the safety and nutritional quality of food sold in the country, with a scope that includes (but is not limited to) food labelling; advertising and claims; food standards and compositional requirements; food fortification; foods for special dietary uses; and food additives (Agriculture and Agri-Food Canada, 2012). The actual requirements for the manufacture, packaging, labelling, storage and sale of foods, as well as prescription and non-prescription drugs in Canada,

¹² The Commission, comprised of 37 scientists from 16 countries, developed targets for a “healthy reference diet” that consists largely of vegetables, fruits, whole grains, legumes, nuts and unsaturated oils, with little/moderate amounts of seafood and poultry, as well as little to no red meat, processed meat, added sugar, refined grains and starchy vegetables (Willett et al., 2019). Loken (as quoted in Webster, 2019, p. e5) notes that the 2019 CFG “so closely aligns with [the Commission’s] recommendations that you could almost describe the Canadian guide as a qualitative translation of [the Commission’s] health-oriented recommendations.” See Appendix A for the Commission’s “healthy reference diet.”

¹³ The CCHS Rapid Response Module on the Awareness and Usage of Canada’s Food Guide collected data from a nationally representative sample of Canadians aged 12 and above in all ten provinces between May and June of 2012 (Slater and Mudryj, 2018).

can be found in the *Food and Drug Regulations* (Government of Canada, 2016). Examples of regulatory actions relevant to plant-based foods include Health Canada's approval of the following health claim, which can be included on the packaging of qualifying fruits and vegetables in the Canadian marketplace: "A healthy diet rich in a variety of vegetables and fruit may help reduce the risk of heart disease" (Health Canada, 2016a, p. 5). Also note that, between November 2016 and January 2017, Health Canada conducted a public consultation to receive feedback from consumers and stakeholders on policy proposals for front-of-package (FOP) labelling, as well as other labelling updates. Finalizing FOP labelling is a commitment included in the December 2021 mandate letter of Canada's Minister of Health (PMO, 2021c).

Communication of dietary guidance

The Government of Canada has employed information campaigns to communicate its dietary guidance in the past. Examples include the Nutrition Facts Education Campaign (Health Canada, 2016b), a multi-media educational initiative developed by Health Canada and Food, Health and Consumer Products of Canada that sought to increase Canadians' understanding of the Nutrition Facts table (in particular, the % Daily Value component) (Government of Canada, 2010). There was also the Government of Canada's Eat Well Campaign, which sought to promote healthy eating by providing information to help consumers make healthier choices at homes, at the grocery stores and when eating out (Government of Canada, 2013). The campaign included in-store information (provided by members of the Retail Council of Canada and the Canadian Federation of Independent Grocers), media partnerships and collaboration with other stakeholders (Government of Canada, 2013).

Programs and services

The Government of Canada also delivers programs and services such as the Canada Prenatal Nutrition Program (Health Canada, 2016b), which provides funding to community groups to help improve the health of pregnant women, new mothers and their babies (Government of Canada, 2021b). Launched in 1995, the CPNP has a reach of over 45,000 participants across Canada yearly (PHAC, 2021a) and, according to results from a participant survey conducted in 2018, a high proportion reported adopting positive health behaviours because of their participation with a CPNP project, including making healthier food choices (Health Canada and PHAC, 2021).

Other examples include Nutrition North Canada, which aims to make nutritious food and certain essential items more accessible and affordable in eligible northern communities, of which there are 122 across Canada, including in the territories, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, and Newfoundland and Labrador (Government of Canada, 2020a; Government of Canada, 2022). NNC subsidizes a set of eligible foods – including fruits, vegetables, and grain products (Government of Canada, 2020b) – and non-food products that individuals in eligible communities can purchase from registered northern retailers or directly from registered suppliers (Government of Canada, 2020a). The retail subsidy varies by community and is applied to the total cost of an eligible product (including product purchasing cost, transportation, insurance and overhead) shipped by air, ice road, sealift or barge to an eligible community (Government of Canada, 2020a). Businesses registered with NNC are required to pass the full subsidy on to consumers (Government of Canada, 2020a).

2.5.2. Canada’s Healthy Eating Strategy

In 2016, Health Canada (2016c) released its *Healthy Eating Strategy*, which aims to improve healthy eating information, strengthen labelling and claims, enhance the nutritional quality of foods, protect vulnerable populations, and encourage greater access to, and availability of, nutritious food. Launching a consultation on FOP labelling and enabling a health claim for fruits and vegetables, discussed earlier, were commitments included in the *Healthy Eating Strategy* (Health Canada, 2016c). It is important to note that some researchers, such as Olstad et al. (2019), caution that – while several of the commitments contained in Canada’s *Healthy Eating Strategy* “will position Canada as an international leader in several respects” (p. E100) – the *Healthy Eating Strategy* is still generally focused on policies supporting informed choice, which “are unlikely to substantially improve diet quality in Canada, particularly among individuals with a lower social position, because they do not address the root causes of poor diet quality in the conditions of daily life” (p. E101). These “root causes” are the factors that shape individuals’ opportunities to eat healthfully, including their childhood environments, gender, Indigenous status, income, education and occupation (Olstad et al., 2019).

2.5.3. Food Policy for Canada

Agriculture and Agri-Food Canada (2019) released its *Food Policy for Canada* in 2019, which outlines a vision for the future of food in Canada and several priority outcomes, including improved food-related health outcomes, sustainable food practices and increased connections within food systems.¹⁴ The policy also lists four key areas that require action over the short- to medium-term (i.e., 2019-2024): help Canadian communities access healthy foods; make Canadian food the top choice at home and abroad; support food security in Northern and Indigenous communities; and reduce food waste. Actions to advance each of these areas were included in the Government of Canada's 2019 budget, which announced over \$134 million in funding to support the *Food Policy for Canada* (Agriculture and Agri-Food Canada, 2019). For example, the Government of Canada committed to investing \$50 million into a Local Food Infrastructure Fund (LFIF) over five years to support infrastructure for local food projects, including at food banks, farmers' markets and other community-driven projects (Department of Finance Canada, 2019). 175 projects (up to \$8.8 million in funding) have been announced under the LFIF (see Agriculture and Agri-Food Canada, 2022).

Another announcement in Budget 2019 was the intention to work with the PTs towards the creation of a National School Food Program (SFP) (Department of Finance, 2019). Note that the responsibility for school health in Canada rests with the PT governments and school boards, and each PT develops, implements and evaluates food guidelines within their respective jurisdiction (FPT Nutrition Working Group on Improving the Consistency of School Food and Beverage Criteria, 2013).¹⁵ The commitment to pursue a National School Food Policy and to work towards a national SFP has also been included in the mandate letters of the Minister of Agriculture and Agri-Food and the Minister of Families, Children and Social Development (PMO, 2021a; PMO, 2021b). In Budget 2022, the federal government affirmed its intention work with the PTs, municipalities and Indigenous partners to develop a National School Food Policy "and to

¹⁴ The policy envisions a Canada where all have access to a sufficient amount of safe, nutritious, and culturally diverse food, with a food system that is resilient, innovative, supports the economy and sustains the environment (Agriculture and Agri-Food Canada, 2019).

¹⁵ A number of provinces have introduced mandated standards for food served in schools, dating back as far as 2003 (Hernandez et al., 2019).

explore how more Canadian children can receive nutritious food at school” (Department of Finance, 2022, p. 190).

2.5.4. Provincial policies and programs

Voucher Programs

Voucher programs to support healthy eating currently exist in certain Canadian provinces. The Farmers’ Market Nutrition Coupon Program (FMNCP) in British Columbia (BC), for example, is a healthy eating initiative that began in 2007 as a pilot project in each of the province’s regional health authorities (BC Association of Farmers’ Markets [BCAFM], 2022a). Supported by the Province of BC, community partner organizations provide coupons to lower-income families, pregnant people and seniors participating in their food literacy programs. Coupons can be used to purchase vegetables, fruits nuts, eggs, dairy, cut herbs, meat and fish at all BCAFM members Farmers’ Markets participating in the FMNCP. As of 2021, the FMNCP was in 86 communities across the province, with over 6,600 households receiving coupons for a total of more than 19,000 people (BC Association of Farmers’ Markets, 2022b). Households enrolled in the program – which runs throughout the summer months, when produce is most abundant across BC – are eligible for a minimum of \$27 per week in coupons, which can be used at any participating BC Farmers’ Market from June 4th to December 18th (BC Association of Farmers’ Markets, 2022a). Importantly, research has shed light on the positive experience of those who have participated in the FMNCP, including supplemented food budgets which permit greater amounts of produce to be purchased (Caron-Roy et al., 2021).

School Food Programs

Recent research has revealed that, despite the absence of a national SFP, approximately 35% of schools across the country offered one or more free SFPs, in which over one million JK-12 students participated in 2018/2019 (Ruetz and McKenna, 2021).¹⁶

¹⁶ Due to the limited availability of data from certain provinces, Ruetz and McKenna (2021) contend that these may be conservative estimates. Ruetz and McKenna (2021) note that school participation data was unavailable from British Columbia and only partially available from Saskatchewan. Ruetz and McKenna (2021) also note that student participation data was unavailable from Saskatchewan, British Columbia and the Northwest Territories, with only partial data available from Ontario and Quebec. Note also that Ruetz and McKenna (2021) estimate this proportion based on the total number of students in regular programs for youth, defined by Statistics

SFPs were defined in this research as school-based (or equivalent) breakfasts, mid-morning meals, snacks and/or lunches offered at no cost to JK-12 students during the school day consistently over the majority of the school year. PT funding totalled \$93 million and typically accounted for 25% or less of the total costs. Importantly, Ruetz and McKenna (2021) highlight regional variation in the delivery of these programs, with lower participation in certain jurisdictions such as Manitoba and Alberta.

Canada (2022e) as general training programs geared toward and offered primarily to similarly aged young people.

Chapter 3.

Methodology

I employ three methodologies in this capstone research – secondary data analysis, expert interviews and a jurisdictional scan – each of which are described below.

3.1. Canadian Community Health Survey Data Analysis

First, I use descriptive statistics of publicly available quantitative data from two tables produced by Statistics Canada: Table 13-10-0096-01, Health characteristics, annual estimates (Statistics Canada, 2022c); and Table 13-10-0097-01, Health characteristics, annual estimates, by household income quintile and highest level of education (Statistics Canada, 2022d). I focus specifically on fruit and vegetable consumption (FVC) at a reported frequency of five times or more daily in 2015, 2016 and 2017, using this as a proxy for those who would be most likely to meet the current CFG’s recommendation that fruits and vegetables account for the largest proportion of foods consumed each day. This analysis has three key objectives: first, to further illustrate the policy problem; second, to inform policy development and analysis by shedding light on trends in socio-demographic and regional variation in FVC at a frequency of five times or more daily across Canada over the period under examination; and third, to substantiate the findings of existing literature on FVC in Canada.

The source of these estimates is Statistics Canada’s CCHS, which collects data yearly from a sample of approximately 65,000 respondents. “Fruits and vegetables” include pure fruit juice, frozen or canned fruits and vegetables, and dried fruit, but exclude fried potatoes. As such, we are not able to draw from this data the degree to which FVC five times or more daily is driven by fruit juice intake. Note also that annual estimates in the two tables cited above do not include the territories, and reflect FVC only among individuals aged 12 years and older. Note further that national consumption data is not available for 2018 or 2019. Additionally, while national data for 2020 is available, Statistics Canada urges the use of CCHS-2020 data with caution, in particular when creating estimates for small sub-populations or when comparing to other CCHS years. This is due

to the high non-response rate resulting from COVID-19-related data collection challenges. Accordingly, due to possible issues of reliability, this data will not be presented.

3.2. Expert Interviews

Second, I analyze qualitative data from five semi-structured expert informant interviews. Participants were those who provide dietary advice (i.e., practitioners, two), those in the academic arena (i.e., researchers, two), and those employed with the federal government (one). These interviews focused generally on the possible barriers to plant-based food consumption in Canada, as well as whether Canadians understand the benefits of plant-based food consumption, the most common catalysts or motivators for plant-based eating, whether Canadians understand the impact of dietary patterns and practices on health outcomes more broadly, and opportunities for federal policy.

Prospective interviewees were researchers with academic publications on dietary practices in Canada (e.g., those related to food choice and motivations for eating certain foods, determinants of dietary behaviour, following Canada's national dietary guidelines, etc.), registered dietitians who may have written about plant-based eating, and nutrition policy professionals with the federal government. Interview participants were contacted based on publicly available information. Note that interviewees were asked to speak based on their own knowledge, research and/or professional experience. Accordingly, nutrition practitioners generally drew from their experience working with clients, while those in the academic arena referred to their own research and their knowledge based on other research. As such, I supplement this qualitative data with additional analysis, notably by incorporating relevant findings from the literature and national surveys.

3.3. Jurisdictional Scan

Finally, I conduct a jurisdictional scan to identify practices employed internationally that support or facilitate healthier dietary behaviour, including the increased consumption of plant-based foods. I focus specifically on a sample of initiatives from the United States of America (USA), the United Kingdom (UK) and Australia, with a concluding section dedicated to what Canada can learn from these jurisdictions. I selected the USA, the UK and Australia because efforts in these jurisdictions were cited as international good practices across a range of policy domains in the Federal Evidence Document that

accompanied Vanderlee et al.'s (2017) Food Environment Policy Index Canada 2017 Project (Food-EPI Canada 2017), which examined the state of food environment policy in Canada compared to internationally-established best practices. The Federal Evidence Document highlights international good practices and actions taken federally in Canada.

Note that the jurisdictional scan attempts to provide a sample of initiatives that support or facilitate healthier eating, which can provide lessons for Canada when it comes to increasing the consumption of plant-based foods. Several sources were used to initially identify best practices, including the Food-EPI Canada 2017 Federal Evidence Document, given that it is a relatively recent and comprehensive source of international efforts, as well the World Cancer Research Fund International NOURISHING database, relevant government webpages/publications, and the academic literature. When on government webpages, search terms including “nutrition,” “healthy eating,” “fruits and vegetables,” “school food,” and “school nutrition” were used. When researching the academic literature, search terms included the same terms used above combined with the name of the jurisdiction and the word “policy.” To find academic journal articles, databases such as Simon Fraser University’s library search engine, Google Scholar and PubMed were used.

Chapter 4.

Canadian Community Health Survey Data Analysis

Overall, the proportion of Canadians reporting FVC at a frequency of five times or more daily declined significantly between 2015 and 2017, falling almost three percentage points, or 9.2%, from 31.5% (95% CI: 30.8%-32.2%) to 28.6% (95% CI: 28.0%-29.2%) over this period.¹⁷⁻¹⁸ Not only does this show that a large majority of Canadians do not report frequent daily FVC, but also that the proportion of those who do report intake at this level is declining. The remainder of this section will explore frequent daily FVC across sex, age, household education, household income and province of residence. This will serve to inform policy development and analysis by highlighting socio-demographic and geographic variation in FVC. Note that this analysis does not include FVC by ethnicity or Indigenous identity and, as such, findings from existing literature on this topic will be presented for additional context.

4.1. Sex

The percentage of females reporting frequent daily FVC was significantly higher than the national average in 2015 (38%, 95% CI: 37%-39%), 2016 (36.9%, 95% CI: 36%-37.8%) and 2017 (34.7%, 95% CI: 33.7%-35.6%). The percentage of females that reported consuming fruits and vegetables at this rate was also significantly higher than that of males in all years under examination, though both groups experienced a decline between 2015 and 2017, mirroring the national trend. See Figure 4.1 on the following page. Note further that sex as a socio-demographic predictor of frequent daily FVC has emerged in the literature on FVC in Canada. Colapinto et al. (2018), in their examination of trends and correlates in the frequency of FVC among Canadians (≥ 12 years old) from

¹⁷ Note that, for brevity, “FVC at a frequency of five times or more daily” will be referred from time-to-time as “frequent daily FVC.”

¹⁸ A confidence interval (CI) is the range of possible values for a particular estimate, typically based on a representative sample of a broader population (Statistics Canada, 2022e). The CIs for each estimate presented in Chapter 4 were produced by Statistics Canada. Note further that, to identify the presence of a statistically significant difference in the estimates presented, I use whether the CIs for the estimate(s) in question overlap. Those that do not overlap are considered to be significantly different.

2007 to 2014, found that females were significantly ($p < 0.05$) more likely to report FVC five times per day or more in 2014 than males, both when including fruit juice and excluding fruit juice, after taking into account household income, body mass index and age through multivariate logistic regression analysis.

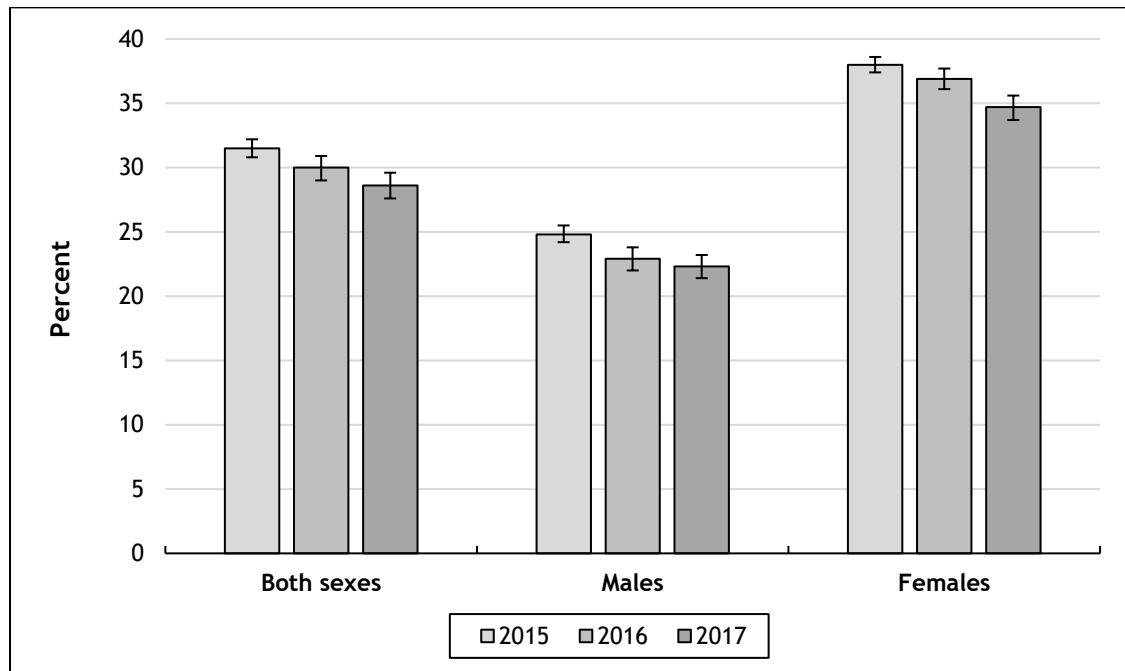


Figure 4.1. Consumption of Fruits and Vegetables (5 Times/Day or More) by Sex, Canada, 2015-2017

Source: Statistics Canada. Table 13-10-0096-01: Health characteristics, annual estimates. DOI: <https://doi.org/10.25318/1310009601-eng>

Note: Each estimate's error bars represent the 95% CI.

Colapinto et al. (2018) also determined average daily frequency of FVC by sex, age, household income and region in 2007 and 2014. Predictably, females reported consuming significantly ($p < 0.05$) more fruits and vegetables per day than males in 2007 and 2014, both when including and excluding fruit juice (Colapinto et al., 2018). It is important to note, however, that changes were made to the questionnaire used for CCHS FVC Module in 2015, meaning the data from 2015-onwards is not directly comparable with earlier years (Colapinto et al., 2018). This should be kept in mind throughout the duration of this Chapter, as Colapinto et al.'s (2018) work will continue to be cited as a valuable reference point for the presence of possible trends when it comes to FVC more broadly. Interestingly, the findings discussed thus far align with other research showing that females in Canada generally have a higher diet quality than males (Garriguet, 2009; Olstad et al., 2021).

4.2. Age

Canadians aged 35-49 years were the most likely of all age groups to report frequent daily FVC in 2015 (32.9%, 95% CI: 31.4%-34.3%) and 2016 (32.1%, 95% CI: 30.7%-33.5%), while Canadians aged 65 years and over were the most likely in 2017 (30.6%, 95% CI: 29.4%-31.8%). See Figure 4.2 below. Though the proportion of Canadians reporting frequent daily FVC fell across all age groups between 2015 and 2017, the net decline was statistically significant only for Canadians aged 18-34. Important to note is that older Canadians (i.e., ≥ 65 years) were the only group to experience an increase in the proportion reporting FVC at a frequency of five times or more per day between 2016 and 2017, meaning the net decline between 2015 and 2017 for this age group was only 2.7% (though the difference was not statistically significant). As such, this may suggest that seniors in Canada were at least partially resistant to the possible forces driving a decrease in the total proportion of Canadians consuming fruits and vegetables at least five times a day between 2015 and 2017, potentially lending credence to the notion of physiological factors as an influence on healthy eating (Raine, 2005) which could be necessitating regular FVC as a result of variables like personal health status.

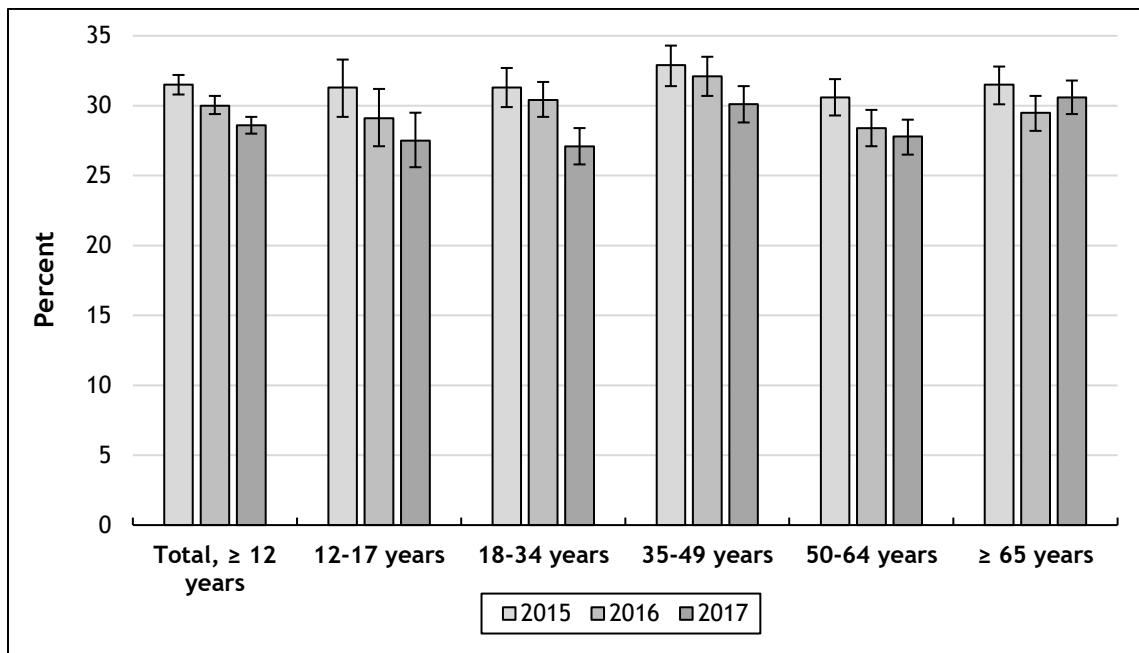


Figure 4.2. Consumption of Fruits and Vegetables (5 Times/Day or More) by Age, Canada, 2015-2017

Source: Statistics Canada. Table 13-10-0096-01: Health characteristics, annual estimates. DOI: <https://doi.org/10.25318/1310009601-eng>

Note: Each estimate's error bars represent the 95% CI.

In their analysis, Colapinto et al. (2018) also pointed to age as a correlate of FVC at least five times daily. Specifically, the odds of reporting FVC at this rate both when including and excluding fruit juice were significantly ($p < 0.05$) lower among those aged 19-50 and 51+ than for those aged 12-18, after taking into account household income, body mass index and sex. While the age groupings used by Colapinto et al. (2018) do not allow for direct comparison with the descriptive statistics in this section, it is interesting to note that, by 2017, the proportion of Canadians aged 12-17 reporting frequent daily FVC had fallen to a level several percentage points below Canadians aged 35-49 and 65+, slightly below those aged 50-64 and just above the proportion of those aged 18-34, which generally runs counter to Colapinto et al.'s (2018) findings.¹⁹ Note also that, when including fruit juice, the average daily frequency of FVC for Canadians aged 12-18 years was significantly ($p < 0.05$) greater than that of those aged 19-50 years and 51+ years in both 2007 and 2014 (Colapinto et al., 2018). Interestingly, when excluding fruit juice, Canadians aged 51 years or older were found to report a significantly ($p < 0.05$) higher average daily frequency of FVC than those aged 12-18 in 2007, while there were no statistically significant differences in average daily FVC among the age groups in 2014.

4.3. Household income

In 2015, Canadians in the fourth (high-middle) household income quintile were the most likely to report frequent daily FVC (34.4%, 95% CI: 32.9%-35.9%), while Canadians in the fifth (highest) household income quintile were the most likely in 2016 (33.0%, 95% CI: 31.7%-34.3%) and 2017 (31.2%, 95% CI: 29.8%-32.7%).²⁰ As Figure 4.3 on the following page displays, higher-income Canadians were generally more likely than lower-income Canadians to report FVC at a frequency of at least five times per day between 2015 and 2017, suggesting possible socioeconomic patterning in FVC across Canada.

¹⁹ Recall, however, that changes were made to the questionnaire used for CCHS FVC Module in 2015, meaning the data from 2015-onwards is not directly comparable with earlier years (Colapinto et al., 2018).

²⁰ Note the following, as explained by Statistics Canada (2022d): the household income quintile is based on pre-tax and deduction income received by all household members, from all sources, during the 12 months ending December 31 of the year preceding the interview. All households are ranked from lowest to highest according to the value of their pre-tax income. The ranked population is then divided into five groups of equal numbers of units (quintiles). This income is adjusted by a low income cutoff which represents the threshold at which a family would typically spend a larger portion of its income than the average family on the necessities of food, shelter and clothing. This adjusted income is divided into five quintiles at the national level (excluding the territories).

Notably, in all three years, the proportion of Canadians in highest household income quintile reporting frequent daily FVC significantly exceeded that of those in the bottom household income quintile. Additionally, by 2017, the proportion of Canadians in bottom household income quintile was significantly below that of the middle, high-middle and highest quintiles.

Examples from the literature help supplement these observations. Ricciuto et al. (2006), in their examination of data from Canada’s 1996 Family Food Expenditure Survey, found a statistically significant ($p < 0.0001$) positive association between per-capita income and fruit and vegetable purchasing. Using multiple regression analysis to control for education, household size and household composition, the authors found that a 10% increase in income was associated with a 1.64% increase in the quantity of fruits and vegetables purchased.

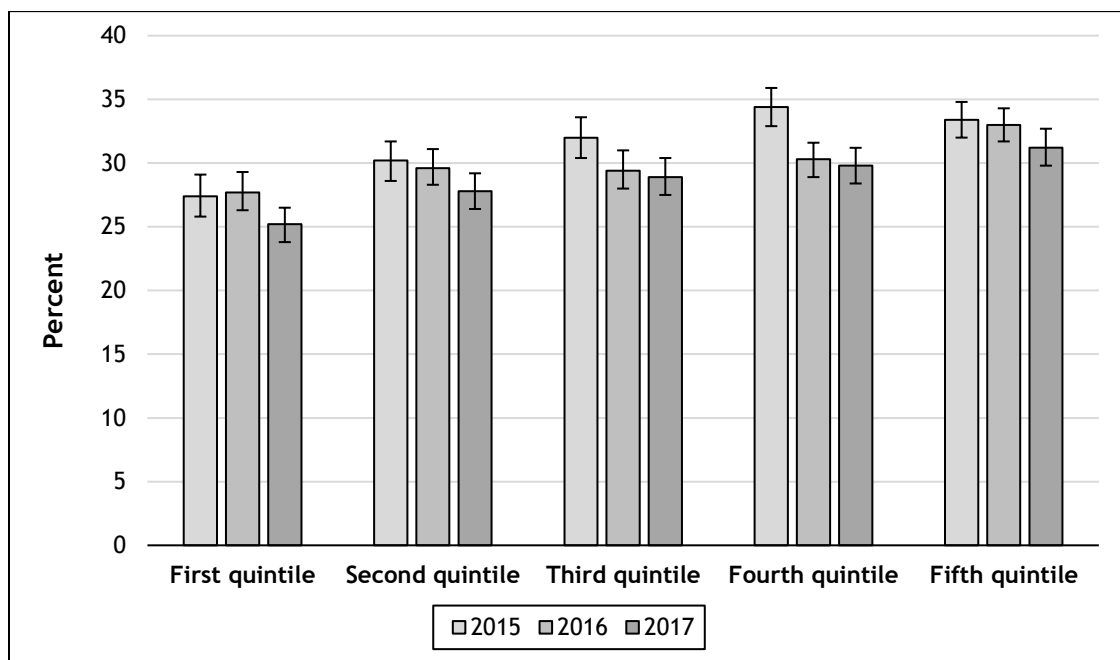


Figure 4.3. Consumption of Fruits and Vegetables (5 Times/Day or More) by Household Income Quintile, Canada, 2015-2017

Source: Statistics Canada. Table 13-10-0097-01: Health characteristics, annual estimates, by household income quintile and highest level of education. DOI: <https://doi.org/10.25318/1310009701-eng>

Note: Each estimate’s error bars represent the 95% CI.

Interestingly, Colapinto et al. (2018) found that, when excluding fruit juice, Canadians in the middle three household income quintiles were significantly ($p < 0.05$) less likely to report FVC at least five times per day than those in the bottom household

income quintile in 2014. When including fruit juice, however, Canadians in the bottom household income quintile were significantly ($p < 0.05$) less likely to report FVC at this rate than those in the top household income quintile, while those in the low-middle quintile were significantly ($p < 0.05$) less likely than those in the bottom household income quintile. Additionally, the average number of servings consumed per day was significantly lower ($p < 0.05$) among Canadians in the lowest household income quintile compared to those in the highest for both years irrespective of fruit juice inclusion (Colapinto et al., 2018).

In a review of the literature on determinants of healthy eating specifically among low-income Canadians, Power (2005) advanced that it is highly likely both socioeconomic gradients in diet and income thresholds for some food groups exist in Canada.²¹ Examples from the research on food purchasing and diet quality in Canada support this notion. Note that further investigation by Ricciuto et al. (2006) of the income-quantity relationship (based on a partial linear model) revealed that the quantities of fruits and vegetables purchased rose steadily with income, while purchasing from the remaining food groups increased only up to a per-capita income level (~\$10,000 to \$15,000 annually), holding a number of other variables constant. Importantly, Ricciuto et al. (2006, p. 787) assert that the non-linear impact of income on food selection, with the strongest effects at lower income levels, suggests “severe constraints on food purchasing in the context of low income.” This, they advance further, has important implications concerning the design of targeted interventions for low-income Canadians (Ricciuto et al., 2006).

4.4. Education

Canadians living in households with a member who has obtained a post-secondary certificate, diploma or degree were more likely to report frequent daily FVC in 2015 (33.4%, 95% CI: 32.6%-34.2%), 2016 (31.7%, 95% CI: 30.9%-32.5%) and 2017 (30.1%, 95% CI: 29.4%-30.8%) than Canadians living in households whose highest level of educational

²¹ Power (2005, p. S37) defines healthy eating as “eating practices and behaviours that are consistent with improving, maintaining and/or enhancing health,” and low-income Canadians as “those for whom spending on food, clothing and shelter takes up 20% more of their income than the relative amount spent by the average Canadian family for those necessities.” Note further that an income threshold refers to the likelihood that, beneath a given level, income is the most important determinant of consumption, while socioeconomic gradients suggest that other factors – such as education – are also likely to be important (Power, 2005).

attainment was secondary school graduation or less,²² providing further possible evidence of socioeconomic patterning in FVC in Canada. Again, since the confidence intervals for estimates in all three years among Canadians in households where a member obtained a post-secondary certificate, diploma or degree did not overlap with those for Canadians in households with secondary school education or less, we can infer that these differences are statistically significant. These findings are also congruent with earlier-cited research showing that Canadian individuals with post-secondary attainment (Olstad et al., 2021) or those living in households with post-secondary educational attainment (Garriguet, 2009) have been found to have higher diet quality than Canadians with lower levels of education.

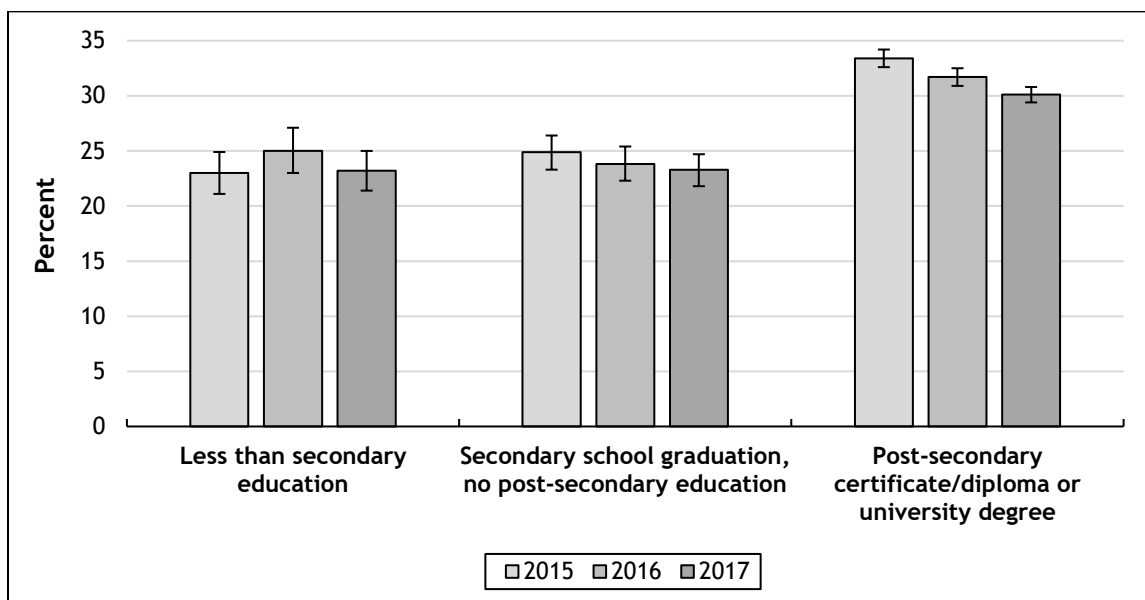


Figure 4.4. Consumption of Fruits and Vegetables (5 Times/Day or More) by Highest Level of Household Education, Canada, 2015-2017

Source: Statistics Canada. Table 13-10-0097-01: Health characteristics, annual estimates, by household income quintile and highest level of education. DOI: <https://doi.org/10.25318/1310009701-eng>

Note: Each estimate's error bars represent the 95% CI.

Like per-capita income, Ricciuto et al. (2006) found that higher education was correlated with purchasing greater quantities of fruit and vegetables, regardless of income, household size and composition. Households where the Family Food Expenditure Survey reference person had a university degree purchased 14.2% more fruit and vegetables than those where the reference person had less than nine years of schooling, a statistically

²² The highest level of education attained in the households is based on the educational attainments of all household members (Statistics Canada, 2022d).

significant ($p < 0.0001$) difference, which suggests the possible presence of a socioeconomic gradient for these foods. Note further the relationship between higher education and purchasing of “ABC-rich” fruits and vegetables,²³ as households where the reference person had a university degree purchased 23% more of these foods than those with less than nine years of schooling.

4.5. Geography

A comparison of frequent daily FVC across Canadian provinces shows that the only jurisdiction whose residents’ reported consumption that significantly exceeded the national average in 2015 (38.8%, 95% CI: 37.4%-40.2%), 2016 (38.4%, 95% CI: 37%-39.8%) and 2017 (34.5%, 95% CI: 33.3%-35.7%) was Quebec. See Figure 4.5 below.

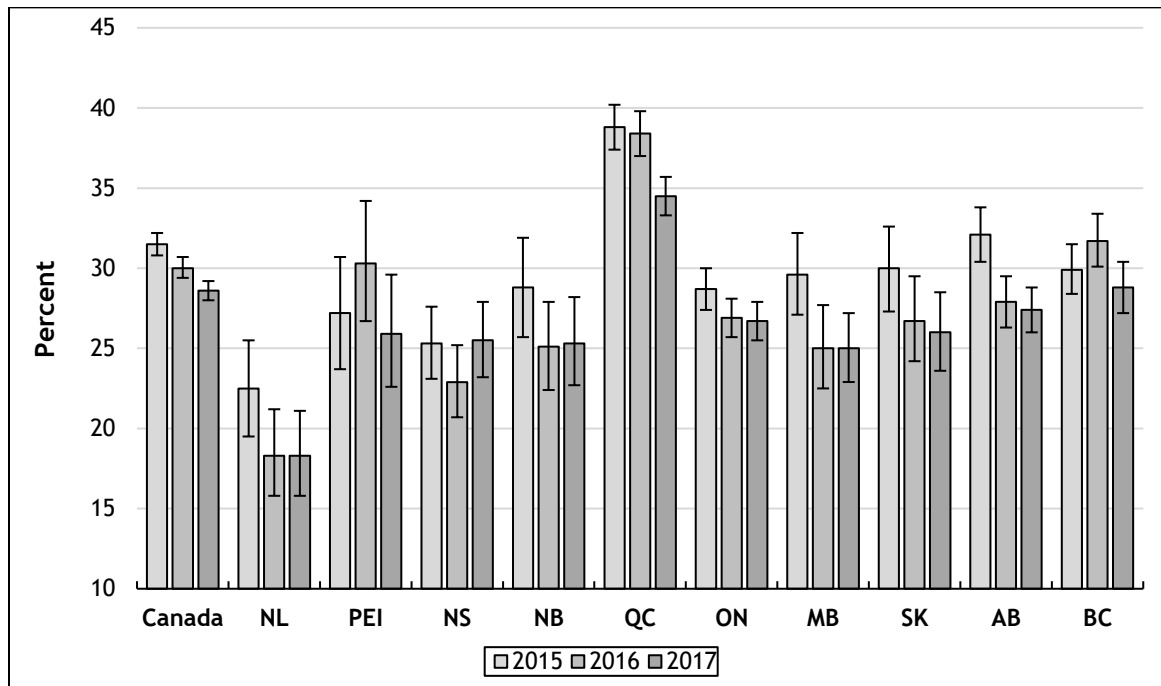


Figure 4.5. Consumption of Fruits and Vegetables (5 Times/Day or More) by Province, Canada, 2015-2017

Source: Statistics Canada. Table 13-10-0096-01: Health characteristics, annual estimates. DOI: <https://doi.org/10.25318/1310009601-eng>

Note: Each estimate’s error bars represent the 95% CI.

²³ “ABC-rich” fruits and vegetables were those containing amounts of vitamin A, C and folate at or above the 75th percentile level (Ricciuto et al., 2006).

The proportion of residents reporting frequent daily FVC in 2015 (22.5%, 95% CI: 19.5%-25.5%), 2016 (18.3%, 95% CI: 15.8%-21.2%) and 2017 (18.3%, 95% CI: 15.8%-21.1%) was lowest in Newfoundland and Labrador (NL). The proportion of residents in NL reporting FVC five times or more daily was significantly below the national average in all three years as well. Note that the 2015-2017 findings align with Colapinto et al.'s (2018) study, which found regional variation in average daily frequency of FVC, both when including and excluding fruit juice: on average, the number of servings consumed among those residing in Atlantic Canada was significantly below ($p < 0.05$) those in Quebec, Ontario, British Columbia and the Prairies in both 2007 and 2014 (Colapinto et al., 2018). This could be linked to high share of people living in rural areas in Canada's Atlantic (Statistics Canada, 2022f), possibly impacting food access and availability.

As noted earlier, this Chapter does not speak to FVC according to ethnicity or Indigenous identity. As such, it is important to highlight that over half of those residing within municipalities identified as Indigenous communities live in the most remote or more remote areas of Canada, compared to less than 5% for Canadians residing in municipalities that are not Indigenous communities (Statistics Canada, 2022f).²⁴ Remote communities face notable food-related challenges, including higher-than-average prices resulting from elevated shipping costs (Statistics Canada, 2022f). This underscores the importance of existing programs such as Nutrition North Canada, which aims to ease the economic barriers to accessing both food and non-food items in northern regions due to high costs. Importantly, research highlights the disparity in overall diet quality between non-Indigenous and Indigenous adults (Riediger et al., 2022), as well as greater odds of food insecurity among in Canada based on Aboriginal identity, after adjusting for a series of households characteristics (Tarasuk et al., 2019).

²⁴ This is based on an Index of Remoteness developed by Statistics Canada that ranges from 0 (least remote) to 1 (most remote) for every municipality (census subdivision) in Canada, classifying municipalities into five broad groups: least remote; less remote; moderately remote; more remote; and most remote (Statistics Canada, 2022f).

Chapter 5.

Expert Interviews

As noted in Chapter 3, I conducted five semi-structured informant interviews. Participants were those who provide dietary advice (i.e., practitioners, two), those in the academic arena (i.e., researchers, two), and those employed with the federal government (one). See Table 5.1 below.

Table 5.1. Expert Informants

Name	Professional Background
N1	Registered Dietitian (RD)
N2	Registered Holistic Nutritionist (RHN) and Certified Plant-Based Chef (CPBC)
R1	Researcher
R2	Researcher
F1	Federal Analyst

These interviews focused generally on the possible barriers to plant-based food consumption in Canada, as well as whether Canadians understand the benefits of plant-based food consumption, the most common catalysts or motivators for plant-based eating, whether Canadians understand the impact of dietary patterns and practices on health outcomes more broadly, and opportunities for federal policy.

5.1. Interview findings

5.1.1. Barriers to plant-based food consumption

When discussing what may be inhibiting greater plant-based food consumption, a number of key themes emerged including food skills, convenience, exposure, perceptions and personal preference. Each of these will be explored throughout this section.

Food skills and convenience

One recurring theme throughout the interviews was that of “food skills.” Among other things, food skills include the planning skills needed to organize and prepare healthy meals, as well as the technical skills needed to make meals, such as cooking and following recipes (Health Canada, 2020c). Multiple informants focused on pulses, noting that a lack

of knowledge regarding how to incorporate these ingredients into one's diet may be impeding greater uptake. One practitioner explained also that a challenge for some is not knowing where to start when they want to add more plant-based meals to their diet:

People don't really know where to start. Take one simple food that is inexpensive, incredibly nutritious and a great way to add plant protein with a whole slew of other nutrients, as well as fibre, to your diet: pulses (beans and lentils). People really don't know what to do with them, maybe beyond making a pot of chili. So that's the number one question I get, 'how do I add more plant-based meals into my diet? Give me some ideas.' (N1, RD)

These findings are congruent with those from a 2010 Ipsos Reid report on factors influencing pulse consumption in Canada, which found that barriers among non-consumers included not knowing how to cook pulses or never having tried to cook them (Ipsos Reid, 2010).²⁵ Informant observations also align with research from Uetrech et al. (1999) on variables that influence fruit and vegetable consumption, where focus group participants commented that they want certain information before purchasing unfamiliar vegetables and fruits (e.g., what they are, what they taste like, as well as how to select, store and prepare them). Additionally, participants in Uetrech et al.'s (1999) study suggested that they would acquire a greater variety of fruits and vegetables if recipes for these foods were available in stores, offering helpful direction for the possible form of information-related interventions to support consumption of these foods.

Importantly, research from Health Canada (2015) indicates that Canadians who reported having a series of food skills – including writing a grocery list before going shopping, selecting foods based on nutrition labels and having adjusted a recipe to make it healthier – were more likely to consume five or more fruits and vegetables per day compared to those who did not, based on data gathered for two modules of the CCHS–Annual Component 2013. When asked about whether not knowing how to cook with fresh produce or legumes was a barrier to the consumption of these foods, one informant noted the following regarding cooking and nutrition knowledge in general:

It's a learned behaviour. We don't come out of womb knowing how to stir-fry, or how much protein we need . . . so if you're not learning that

²⁵ Ipsos Reid indicates that 1,100 online interviews with a representative sample of Canadians aged 18 and over were conducted in December 2009, as well as 230 interviews with South Asian immigrants who have lived in Canada for 20 years. Ipsos Reid also conducted four focus groups with Canadian adults in January 2010.

in the home, and, generally speaking, we're not learning that in the home anymore because we prioritize so many different things, you're not going to get that information. (R2, Researcher)

Important to note is the inherent link between the issue of food skills and knowledge-related barriers to educational tools such as Canada's Food Guide (CFG). Multiple participants expressed that use of the CFG may not be very widespread, a notion consistent with the findings of Slater and Mudryj (2018) discussed earlier. Another concern regarding the CFG raised by one interviewee was that it might be out of touch with people in challenging economic circumstances, or those with children and limited time.

Some informants noted that barriers to greater plant-based food consumption may also include a lack of convenience associated with adopting diets richer in these foods. This includes the time required to learn a recipe, gather the ingredients, prepare them (e.g., soaking legumes, chopping vegetables) and ultimately cook the meal, which can be particularly challenging for time-constrained individuals or families. "Convenience is a huge barrier to a lot of people too. If you don't know how to cook things and you're not inclined to learn, that is enough of a barrier," R1 (Research Associate) noted, adding that there may also be a barrier arising from a lack of awareness generally about how easy it is to plant-based products in one's diet. Issues related to convenience were also highlighted Uetrech et al.'s (1999) study. Certain informants noted advances in food processing that help to address convenience-related barriers:

The other thing that is really the 'X Factor' in this particular topic is just the type of investment into different plant-based proteins across Western economies. You don't actually need to know how to cook lentils now to eat a very healthy and fulsome plant-based diet. You can actually just go to the grocery store and get ready-made meals that are plant-based or portions of meals so that you can have patties, falafel balls, stir fry mix. You can actually eat a wholesome diet without actually having to make things from scratch, and it's the 'from scratch' that I think deters a lot of people, because it seems complicated. And I think there's been so much investment on how to get the taste preferences to align with meat that that has become less of a factor over the last couple of years. (R2, Researcher)

Exposure

Certain interviewees also noted that plant-based foods such as pulses may not have been a part of peoples' culture or heritage, meaning it is not a type of food they grew up consuming. Since many people learn what they like based on what they ate as children, one participant indicated, those raised in a family that consumed these foods regularly

may be more open to including them in future meals compared to individuals with less exposure to these foods:

A lot of people learn what they like based on what they're given as children or in their family or from whatever culture they come from . . . if you come from a culture that, say, eats a lot more pulses . . . there is going to be far less resistance to eating those things mainly because people in those cultures already eat a lot of pulses in the first place. (R1, Researcher)

This is particularly important given that, when asked about possible federal policy interventions, one informant raised the potential value of school-based programs, as well as information campaigns and supporting municipal efforts encouraging people to grow and consume vegetables. Somewhat relatedly, one practitioner discussed the “social” barriers present when asked about the barriers in a transition to greater plant-based food consumption or a plant-based dietary practice such as vegetarianism or veganism:

The biggest barrier I see is how to make the change, which is why I've set my business up the way that I did; to try to help to make it seem possible and to create a social network around it, or a social support system around it, so people don't feel like they're the only people doing it . . . amongst your friends and family, often you're the only one doing it and so, you're always the outlier and that's really hard for people. (N2, RHN and CPBC)

Perceptions

Perception-related issues were also discussed. Examples include a possible hesitancy amongst the general population about the protein content of plant foods compared to animal-based forms of protein, as well as a perception that high protein plant-based foods are bland or unsatisfying. Additionally, one practitioner highlighted that misperceptions could arise regarding what a plant-based diet is:

What I see from working with clients is, for many people . . . when they hear the word 'plant-based diet,' many people assume that it means completely going vegan, eating a 100% plant-based diet, which is very, very intimidating and overwhelming and people don't want to necessarily do that, so people may stop short right there. I think there really is perhaps a lack of clarity on what it really means to eat a plant-based diet, and that's where I try to help people. (N1, RD)

N1 (RD) also noted that people can be overwhelmed by the large amount of sometimes-conflicting information available publicly regarding diet and health, as well as the emergence of “fad” diets, which makes food selection more challenging. This notion is

generally congruent with results from an Angus Reid Institute (2019) survey circulated shortly following the 2019 CFG was released, where 62% of respondents agreed that diets are always changing, and it is difficult to keep track of what is “healthy.”²⁶ Interestingly, one interviewee raised the notion of identity in the context of barriers to plant-based food consumption, noting that meat is often considered masculine while certain plant-based dietary practices such as vegetarianism are considered feminine. Another noted the possible association made between the consumption of foods like pulses with lower socioeconomic status.

Personal preferences

Several interviewees highlighted the importance of taste and flavour when it comes to food choice. R1 (Researcher), for example, noted that some may not like the taste of plant-based foods such as pulses in their raw form, as well as a possible concern among non-adopters that these foods will not align with their taste preferences; points that are again congruent with the Ipsos Reid (2010) findings noted above, which indicated that barriers among those who do not consume pulses included not liking the taste. This barrier was also found in the results of a recent narrative review by Meynier et al. (2020) on the factors that both prevent and facilitate whole grain consumption in children and adults (not specific to Canada). Among both groups, key barriers included a dislike of the taste/texture (Meynier et al., 2020). Given the importance of flavour, one informant indicated, Health Canada has made efforts to develop flavourful recipes as a way to encourage people to try healthier, plant-based options. Certain interviewees also highlighted advances in food processing (e.g., innovations in processed plant-based meat alternatives such as “beyond meat”) which have made plant-based proteins more appealing from a flavour/taste perspective, though concerns about the sodium content of these foods were also noted.

5.1.2. Environmental influences on plant-based food consumption

Beyond the barriers noted above, another recurring notion was the “environmental” influences on plant-based food consumption. These are discussed throughout the following section.

²⁶ According to the Angus Reid Institute (2019), an online survey was conducted in March 2019 among a representative randomized sample of Canadian adults who are members of the Angus Reid Forum.

The food environment

The “food environment,” which refers to the factors that affect food choices (e.g., where one is able to access food, the types and quality of foods available, and the health information one needs to make informed decisions) (Health Canada, 2020c), surfaced as an external influence on food choice. F1 (Federal Analyst), for example, noted that people cannot make healthy choices if healthy food is not available in the first place, adding that one of the recommendations in Canada’s *Dietary Guidelines for Health Professionals and Policy Makers* is for publicly funded institutions to offer foods that are aligned with Canada’s Food Guide, which helps underscore the notion that food choice is not just about the individual, but the environment that they are in. Mention was also made of pilot projects being conducted in post-secondary settings that aim to support increased plant-based food consumption. Beyond publicly funded institutions, efforts in the retail environment that make healthier options more “front and centre” were also discussed. The placement of items at the retail level was also raised in the context of processed plant-based meat replacers (e.g., “beyond meat”) as well as vegan substitutes for certain animal foods (e.g., vegan egg substitutes). Participants suggested that placing these items near their animal-based equivalents can be beneficial for uptake. Further, one informant noted that access to land can be a barrier to growing food, adding that this touches on some of the issues Indigenous peoples who do not have access to healthy food may be facing in Canada.

The economic environment

Raine (2005, p S3), in her review of the literature on determinants of healthy eating, advanced that the “economic environment, in which food is a commodity to be marketed for profit, has major implications for eating practices in Canada.” This notion also emerged throughout the interviews conducted for this capstone research. Several participants mentioned the marketing efforts of fast food companies and restaurants, or unhealthy foods in general, which one interviewee asserted can be a powerful influence, particularly among kids:

The marketing of unhealthy foods . . . undermines, constantly undermines, peoples’ choices as well. We kind of think of it as an external force, I think. But, again, it can be a very powerful influence, and especially for kids. (F1, Federal Analyst)

A similar notion was raised by one practitioner, who highlighted the difficulties some may experience making the transition to a dietary pattern rich in plant-based foods, particularly in a society that pushes consumers towards fast foods.

More broadly, price as a determinant of diet choice also arose. It was noted by one informant that people may choose a plant-based diet “if prices of meat rise exponentially.” On cost as a barrier to plant-based eating (e.g., eating more plant-based foods, transitioning to a plant-based diet), responses were somewhat mixed. “I have not heard . . . ‘if I go plant-based’ or ‘I become a vegetarian or a vegan,’ that that’s more expensive,” N1 (RD) indicated. There can, however, be the perception that adopting a “healthy diet” is a more expensive way to eat:

I think in general there is this notion, and general, I’m not talking just about plant-based diets, that eating a healthy diet, and so I’m thinking about fruits and vegetables, people think about fresh fruits and vegetables, and there’s the perception that those are more expensive, that that’s a more expensive way to eat. (N1, RD)

On cost as a barrier to plant-based eating, N2 stated the following:

Cost . . . I guess it can be, however . . . you can eat a plant-based diet and be very frugal about it, although that’s getting harder with the price of food going up. However, that’s one of the things we try to talk about a lot. Eating local, buying from our local farmers’ markets, trying to keep things as affordable as possible. (N2, RHN and CPBC)

The observation about rising food prices is noteworthy in particular given that, as of April 2022, the prices of basic plant-based foods such as fresh fruits and vegetables had increased 10% and 8.2%, respectively, compared to a year earlier (Statistics Canada, 2022g). When discussing potential federal policy interventions, certain participants were asked about the possibility of using financial incentives such as subsidies to encourage plant-based food intake. One informant noted that, while incentivizing people to make better choices can work, this would be challenging given the political and stakeholder dynamic in Canada:

Is it politically possible in our environment? I don’t know about that. I think a lot of people that are in the agriculture sector, specifically the beef, poultry, pork, and dairy sectors, would have major problems with that. Having a particular diet that is veering away from their industries supported. In an ideal world, I think incentivizing better, healthier choices is actually a very effective way of getting people to make better choices. Could even start with reducing the price of certain foods over

others. Would that fly in our current political environment? Probably not, I don't think so. I think it would be spun in a direction that would be pit liberal versus conservative, or people that are more on the left versus people on the right. So, I'm not sure if that would be politically viable. In a perfect world, I think it would be extremely helpful to get people to make better choices. (R2, Researcher)

Another informant noted the possible use of the tax system to incentivize individual consumption. One stated that "we need to stop subsidizing the meat and dairy companies . . . we need to start changing where we're putting our subsidies, and start subsidizing healthy food." (N2, RHN and CPBC)

5.1.3. Motivators and facilitators of plant-based food consumption

Health, the environment and animal welfare

Generally speaking, three individual-level reasons surfaced when discussing key motivators for greater plant-based food consumption. These were individual health, and increasingly the environment as well as animal welfare.

In my experience, the number one motivator absolutely has been personal health and, among younger clients, we're talking maybe adolescents or probably early 20s, I would say that definitely the motivator in the younger groups has been skewed from what I've seen to animal welfare, whereas the baby boomers and [Generation X] is personal health. (N1, RD)

When asked what generally drives individuals towards the nutrition consulting services offered by N2 as a RHN and CPBC, the following was noted:

I think definitely still health is the number one reason, however, environment has become more and more of a reason, especially in the last couple of years as it's been recognized by the World Health Organization and . . . you hear it on the news, and people are talking about what a difference plant-based eating can make. So, the environment . . . I'd say that would be the second one. We have a few people who come for animal rights reasons, but not as many starting for that. (N2, RHN and CPBC)

Relatedly, when asked about whether, based on their experience or research, Canadians understand the health benefits of regular plant-based food consumption, multiple interviewees indicated that it has improved over time or exists in a general sense (e.g., a general awareness about what foods are considered healthy).

I think there is more awareness and there's more credibility given to the benefits of a whole foods, plant-based diet because of all of the research that is readily available. . . . All of the doctors, dietitians, nutritionists who are raising awareness and doing a fabulous job. . . . This important work is being done and I think that it's helping, but we're not they're yet. (N2, RHN and CPBC)

Given their professional background, the two practitioners were asked about whether, based on their knowledge or experience, Canadians understand the impact of diet on health outcomes. While one indicated that, based on their professional experience, they believe this awareness has increased over the past ten to twenty years, which aligns with nationally representative (age, sex and province) survey results showing that Canadians consider nutrition and diet to be one of the most important factors related to maintaining or improving one's overall health (Schermel et al., 2014), the other noted that, in their experience, people do not pay attention to the impact that food can have on their health issues have become front and centre:

Generally, my experience with whether people understand the impact that food can have on their health, for the most part, people don't pay attention to it until they often are in a health crisis. I definitely have people who I work with who are just generally interested in being healthy, or who are interested in being plant-based for other reasons and want to make sure that they're doing it properly, but the majority of the people who come to work with me are coming because they have a health crisis. So, I think that diet doesn't necessarily become a major player for a lot of people until they're in a situation where they are desperate for change and maybe hear that a plant-based diet can help lower cholesterol levels or [bring other health benefits] and then they come to explore it. (N2, RHN and CPBC)

Chapter 6.

Jurisdictional Scan

In this chapter, I highlight various approaches employed in the USA, the UK and Australia that seek to promote healthy eating, including programs and policies targeting the increased consumption of certain plant-based food such as fruits and vegetables, as well as those that can be adapted to meet such a goal.

In their review of policy interventions that address healthy eating, Brambila-Macias et al. (2011) categorized policies into three groups: (1) policies supporting more informed choice; (2) policies aimed at changing the market environment; and (3) policy interventions not explicitly targeted at healthy eating, but relevant. Drawing from this framework, the following jurisdictional scan organizes international actions into the first two categories noted above: (1) policies supporting more informed choice; and (2) policies aimed at changing the market environment. Policies and programs highlighted in Chapter 6 also fall into a number of the intervention sub-groups identified by Brambila-Macias et al. (2011), such as public information campaigns, nutrition labelling, subsidies for disadvantaged consumers and school-based interventions. Other sub-groupings not explicitly identified in Brambila-Macias et al.'s (2011) review but noted in Chapter 6 include those improving the physical food environment. See Table 6.1 below:

Table 6.1. Policies Identified in Jurisdictional Scan

Policies supporting more informed choice
Public information campaigns
Nutrition labelling
Policies aimed at changing the market environment
Subsidies for disadvantaged consumers
School-based interventions
Improving the availability of healthy foods

Source: Adapted from Brambila-Macias et al. (2011)

See Table 6.2 on the following page for a summary of the policies covered.

Table 6.2. Jurisdictional Scan Policy Overview

Policies Supporting More Informed Choice	Policies to Change the Market Environment
<ul style="list-style-type: none">• Public information campaigns targeting the increased consumption of specific plant-based foods such as fruits and vegetables• Nutrition labelling, including front-of-packaging and Nutrition Fact labels	<ul style="list-style-type: none">• School-based interventions such as nutritional standards for school food, free or subsidized meals, and fruit and vegetable programs• Programs to improve the availability of healthy foods• Financial nutrition assistance programs

6.1. Policies or programs supporting informed choice

6.1.1. Public information campaigns

Australia has seen many campaigns and programs focused on diet and healthy eating (Goodman et al., 2021). One particularly successful example includes the 2002 Go For 2&5[®] Fruit and Vegetable campaign (i.e., two servings of fruit and five servings of vegetables per day), which was launched by the Western Australian Department of Health and implemented until 2005 (Pollard et al., 2008). Campaign objectives included increasing knowledge of the recommended number of servings of fruits and vegetables, improving perceptions of the need to eat more of these foods, and reducing barriers to intake by communication the ease of preparing and eating vegetables (Pollard et al., 2008). Over the intervention period, Western Australia saw a significant ($p < 0.05$) increase in mean vegetable consumption, rising from 2.6 daily servings in 2001 to 3.2 daily servings in 2005 among persons aged 18 years and older, before dropping to 3.0 one year post-intervention. Overall, the proportion of the population that reported eating two or more servings of fruits and five or more servings of vegetables daily rose from 7.0% in 2001 to 13.4% in 2005. The campaign included a range of different measures, including television advertisements, radio advertisements, school-based activities, public relations events, publications (including cookbooks), point-of-sale promotions and a website (Pollard et al., 2008). Additionally, the campaign logo, as well as colourful animated characters based on well-known television personalities, were used to deliver the messaging (Pollard et al., 2008).

The other jurisdictions in this scan have also employed public information campaigns that support healthy eating. One study suggests that the UK's 5-A-Day Campaign – which launched in 2003, funding a multi-media communications campaign,

in addition to other activities such as a National School Fruit Scheme (a free piece of fruit or vegetable every day for schoolchildren aged 4-6 years) and collaboration with both private and public partners; the central objective of which was for the whole of UK's population to reach five portions of fruits and vegetables per day by 2015 – was responsible for a 0.30 serving per day increase in FVC in its first three years (Capacci and Mazzocchi, 2011).²⁷ Additionally, as part of its *Healthy weight, healthy lives: a cross-Government strategy for England* plan, initiated its “Change4Life” (C4L) social marketing campaign in January 2009, which was designed to help highlight to parents the connection between poor diet and sedentary lifestyles and preventable illnesses, as well as give families tips and tools needed to eat better and be active (Government of the United Kingdom, 2009). The C4L launched with a series of television and print advertisements and, in its first phase, sought to concentrate on families with younger children whose behaviour suggests that they are at risk of weight gain (Government of the United Kingdom, 2009).

6.1.2. Nutrition labelling

In 2013, the UK introduced voluntary FOP traffic-light labelling for energy, fat, saturated fat, sugars and salt as a percentage of daily reference intake (Storcksdieck genannt Bonsmann et al., 2020). Traffic light colour coding indicates low (green), medium (amber) or high (red) levels of these nutrients. The scheme, which has been adopted by two-thirds of the packaged food and drink market in the UK, aims to facilitate consumer understanding of nutrition information and support individuals in making healthier choices (Skotarenko, 2018). Similarly, the Health Star Rating (HSR) – implemented in Australia and New Zealand in June 2014 – is a voluntary front-of-package labelling system that rates the nutritional profile of packaged food, ranging from ½ to 5 stars (Food Standards Australia and New Zealand, 2021). Implementation of the HSR system has been supported by consumer education and marketing campaigns that, among other things, seek to raise awareness and support consumers in understanding how to use the system (MP Consulting, 2019). The FOP labelling efforts employed in the UK and Australia were recognized as international good practices in the Food-EPI Canada 2017 Project Federal Evidence Document, and could serve as a way to steer consumers away from foods with

²⁷ Note that Capacci and Mazzocchi (2011) arrive at this estimate after accounting for economic factors such as price and expenditure effects.

less nutritional value. As noted earlier, finalizing FOP labelling is a commitment contained in the December 2021 mandate letter of Canada’s Minister of Health (PMO, 2021c). This could prove to be a promising policy, given results from a recent study by researchers in Canada which suggest that FOP labelling is an effective way to influence perceptions of product healthfulness (Franco-Arellano et al., 2020). Note also that the USA has made updates to the Nutrition Facts label on packaged foods and drinks, including revising the serving size and format of calories (which now appear larger and bolded), as well as ensuring added sugars, vitamin D and potassium are listed (FDA, 2020). This was identified as an international good practice in the Food-EPI Canada 2017 Project Federal Evidence Document, given that updates to the Nutrition Facts label were being proposed at the time.

6.2. Policies to change the market environment

6.2.1. School-based interventions

According to a systematic review and meta-analysis that aimed to determine the quantitative effects of school food environment policies on children’s habitual dietary intakes in interventional studies, direct provision policies (which for the most part targeted fruits and vegetables) were found to increase fruit and vegetable intake by 0.28 servings per day (Micha et al., 2018). The following section will highlight school-based interventions in the jurisdictions of interest.

Nutritional Standards

England’s most recent nutritional standards for foods served in schools, which came into force in January 2015 and apply to all maintained schools, set out the requirements for school lunches provided to registered pupils, whether on school premises or not, as well as for food and drink other than lunch provided to pupils on and off school premises, up to the early evening (including breakfast clubs, tuck shops, mid-morning break, vending and after-school clubs) (United Kingdom Department for Education, 2021).²⁸ Similarly, in Scotland, all education authorities and managers of grant-aided schools are required to comply with school food standard regulations issued in 2020

²⁸ Maintained schools are those overseen, or “maintained,” by the local authority (New Schools Network, 2015).

(Scottish Government, 2021a). Both Wales and Northern Ireland have also established nutritional standards for school food (see Welsh Government, 2014 and Northern Ireland Department of Education, 2020). In Australia, the National Healthy School Canteen Guidelines (NHSCG), intended for use in school canteens across the country and based on national dietary guidelines, categorize food into three categories based on their nutritional value: always on the menu; select carefully; and not recommended on the canteen menu (Australian Government Department of Health, 2014). Certain states have made following the NHSCG mandatory for all school food services (see Australian Capital Territory, 2021). As with FOP labelling, the nutritional standards in these two jurisdictions were cited as international good practices in the Food-EPI 2017 Canada Project Federal Evidence Document. Finally, in the USA, there are nutritional standards for the composition of the country's National School Lunch and National School Breakfast Programs, discussed in greater detail below.

Subsidized School Meal Programs

The United States of America (USA) has a federally assisted National School Lunch Program (NSLP) that operates in public and non-profit private schools, as well as residential childcare institutions (US Department of Agriculture [USDA], 2017a). The NSLP aims to offer nutritionally balanced, low-cost or no-cost lunches to children each school day, giving cash subsidies and “USDA Foods” for each reimbursable meal participating institutions serve that meets federal meal pattern requirements and is offered free or at a reduced price to eligible children (USDA, 2017a). There are different ways to qualify for free or reduced price meals under the NSLP, including participation in the Supplemental Nutrition Assistance Program (discussed later), or living with a family whose household income falls below/within certain thresholds (USDA, 2017a). The USA also offers a similar Breakfast Meal Program (USDA, 2019a).

In England, local authorities are responsible for providing free school meals; parents do not have to pay for school meals if they meet certain eligibility conditions, including being recipients of specific government benefits (Long et al., 2022). A similar program exists in Northern Ireland (Northern Ireland Department of Education, 2017). Additionally, since September 2014, free school meals have been provided to all children in certain early school years in England (Long et al., 2022). Further, in its 2022/2023 Budget, the Scottish Government pledged funding for the expansion of their free school

lunch program to provide lunches to all children in certain primary grades, and support the infrastructure required to roll-out lunches to all primary school children (Scottish Government, 2021b). Similarly, in Wales, free school meals will be extended to all primary school children over the next three years, with the rollout commencing in September 2022 (Welsh Government, 2022). Certain Australian states have also committed funding for the delivery of school food initiatives. New South Wales, for example, announced an investment of AUD \$8 million in their 2019 Budget to support the expansion of a school breakfast program to an additional 500 schools in the state (New South Wales Government, 2019).

School Fruit and Vegetable Programs

The USA has a federally assisted Fresh Fruit and Vegetables Program (FFVP), which seeks to provide free fresh fruits and vegetables to children at eligible elementary schools during the school day (USDA, 2021a). The FFVP's goals include introducing children to fresh fruits and vegetables, as well as increasing the overall acceptance and consumption of these foods among children (USDA, 2021a). Schools must operate the NSLP in order to also operate the FVVP (USDA, 2021a). Participating institutions receive \$50-\$75 per student for each school year; with these funds, schools purchase fresh fruits and vegetables to serve free of charge to children during the school day and submit monthly claims for reimbursement (USDA, 2017b). To ensure that FFVP benefits lower-income families, the FFVP prioritizes schools with the highest proportion of children certified as eligible for free and reduced-price meals (USDA, 2017b).

In Western Australia, the "Crunch&Sip" Program – which dedicates time during the school day for children to eat vegetables or fruit and rehydrate by drinking water (State of Western Australia, 2019) – has been operating since 2005 (Dana et al., 2019). Among other things, the program seeks to boost awareness of the importance of consuming fruits, vegetables and water every day, as well as encourage parents to provide their children with fruits and vegetables every day and give both students and educators the opportunity to consume fruits, vegetables and water during an allocated Crunch&Sip break during class (Dana et al., 2019). Importantly, before registering to become a Crunch&Sip School, staff must ensure that there are strategies in place to fruit, vegetables and/or water bottles for students who do not have access to these products (Cancer Council Western Australia, 2022). Generally, however, students are expected to bring their own fruit, vegetables and

water each day. The “Crunch&Sip” program is also offered other Australian states such as New South Wales (see New South Wales Government, 2020).

Farm to School

The USA also has the USDA Farm to School Grant Program, which provides funding to eligible organizations to deliver farm to school activities that improve access to local foods in eligible schools (USDA, 2021b). The 2021-2022 Farm to School Grant Program is supporting 176 grants with a reach of 6,800 schools and more than 1.4 million students, with over 65% of the children served in participating schools eligible for free and reduced price meals (USDA, 2021c). Examples of awarded projects include those aiming to develop greenhouse structures and install edible gardens (USDA, 2021b).

6.2.2. Subsidies to disadvantaged consumers

The USA’s Supplemental Nutrition Assistance Program (SNAP) provides nutrition assistance to eligible, low-income persons and households through a monthly benefit that can be used at authorized retail outlets to purchase food (USDA, 2021d). To qualify for SNAP, applicants must generally meet both a gross and net income threshold that increases with every additional household occupant (USDA, 2021e).²⁹ Eligible recipients are also typically required to meet certain work requirements, including registering for work, not voluntarily quitting a job or reducing hours, taking a job if offered, and participating in employment and training programs if assigned by the state (USDA, 2021e). Importantly, between November 2011 and December 2012, the State of Massachusetts’ Department of Transitional Assistance implemented the Healthy Incentives Pilot (HIP), wherein SNAP participants received a financial incentive of 30 cents for every dollar of SNAP benefits they expended on fruits and vegetables, up to a monthly maximum of \$60 per household (Bartlett et al., 2014). The HIP, which took place in Hampden County (~55,000 SNAP households), included 7,500 randomly selected households (Bartlett et al., 2014). Notably, according to an evaluation of the program, HIP participants reported consuming almost a quarter of a cup more targeted fruits and vegetables than non-

²⁹ The gross income threshold is 130% of the poverty line while the net income threshold is 100% of the poverty line (USDA, 2021c). To determine how much an eligible household is entitled to receive, their net household income is multiplied by 0.3 and deducted by the prespecified maximum monthly allotment for their household size (USDA, 2021c).

participants per day; a result that was found to be statistically significant and considered nutritionally relevant (Bartlett et al., 2014).

Further, the USA's SNAP Women, Infants and Children (WIC) Program was established in 1974 and provides nutritious foods to supplement diets, nutrition education and referrals to health and other social services (USDA, 2021f). It serves low-income pregnant, postpartum and breastfeeding women, as well as infants, and children and up to five years of age who are at nutritional risk (USDA, 2021f). Specifically, participants receive benefits to purchase items from a food package tailored to their nutrition needs, as well as nutrition education and referrals to other health care services as needed (USDA, 2021f). Among other options, WIC-authorized foods include fruits and vegetables, peanut butter, dried and canned beans/peas, and certain whole grain foods (USDA, 2019). Both the SNAP HIP, and certain revisions made to SNAP WIC (e.g., increased dollar amount for fruit and vegetable purchasing), were highlighted as international good practices identified in the Food-EPI Canada 2017 Project Federal Evidence Document.

In the UK, the British Healthy Start Scheme, which is targeted at those who are more than ten weeks pregnant or have a child under four years of age that also meet additional means-related conditions, provides eligible applicants with financial assistance to help purchase certain foods and beverages such as fresh, frozen and tinned fruits and vegetables, fresh, dried and tinned pulses, plain liquid cow's milk and instant formula milk based on cow's milk, as well as certain vitamin products (National Health Service [NHS], 2022). Participants are sent a Healthy Start card with money that is reloaded every four weeks and can be used in some United Kingdom shops (NHS, 2022). The program is available to those who live in England, Wales and Northern Ireland. Note that this program was one of the international good practices identified in the Food-EPI Canada 2017 Project Federal Evidence Document.

6.2.3. Increasing the availability of healthy foods

In an effort to improve access to healthy food in underserved areas, the USA's Healthy Food Financing Initiative (HFFI) – administered by a “National Fund Manager” at the USDA – provides financial and technical assistance to eligible fresh, healthy food retailers and enterprises to help these entities overcome higher costs and initial barriers to entry in underserved areas (Reinvestment Fund, 2021). The HFFI's 2021 Targeted

Small Grants Program made \$4,000,000 available for grants to eligible organizations in eligible areas to implement projects designed to improve access to fresh, “healthy foods” including vegetables, fruits, whole grains, beans, peas, lentils and unsalted nuts and seeds, through food retail (Reinvestment Fund, 2021). In the UK, the Scottish Grocer’s Federation (SGF) Healthy Living Programme was established in 2004 by the Scottish Government to promote the sale of fruit and vegetables through convenience stores in Scotland (Scottish Government, 2013). The SGF Healthy Living team has four “Development Managers” that visit stores across Scotland to share their knowledge and experience on mechanising healthier products within convenience stores (SGF Healthy Living Programme, 2020). As of 2019, the Healthy Living Programme had over 2,300 members, constituting approximately 40% of Scotland’s convenience trade, two-thirds of which are situated in the country’s most deprived areas (Scottish Government, 2022). These two efforts were highlighted as international good practices in the Food-EPI Canada 2017 Project Federal Evidence Document. Further, a recent analysis of government-led nutrition policies in Australia institutions found that all eight Australian jurisdictions have workplace nutrition policies/guidelines, while seven have a health facilities policy and four were found for other settings (e.g., policy guidelines for parks in Victoria, as well as guidelines for sport and recreation centres) (Rosewarne, 2020).

6.3. Lessons for Canada

This jurisdictional scan illuminates a set of different actions taken internationally to support healthy eating, including promoting the intake of specific plant-based foods. Importantly, there are several lessons for Canada that could be used to increase the consumption of these foods.

National School Meal Programs

First, the absence of a national SFP in Canada. While the case for a national SFP has been made thoroughly in the past (see Hernandez et al., 2019), the findings discussed so far posit a basis for the consideration of further federal action to support this. Beyond the research presented in Chapter 2, the descriptive statistics in Chapter 4 show a drop in the proportion of Canadians aged 12-17 consuming fruits and vegetables five times daily or more. Further, expert informants pointed to lack of exposure and issues related to food skills as possible barriers to plant-based food consumption, and school-based

interventions were raised. Paired with research which shows that there is room for the greater inclusion fruits, vegetables and whole grains specifically in the school day intake of Canadian children aged 6 to 17 years old (Tugault-Lafleur et al., 2019; Tugault-Lafleur and Black, 2020) and findings from the Food-EPI 2017 Project which identified universal fruit and vegetable programs, as well as food literacy and food skills education, as priority actions for the PTs (see Vanderlee et al., 2017), it is reasonable to consider what form federal action could take in service of its commitment to work towards a national school nutritious meal program and its viability as a strategy to increase plant-based food consumption.

Nutrition Assistance Programming

Second, while there is overlap with certain jurisdictions when it comes to targeted nutrition assistance programming (e.g., Nutrition North Canada and the Canada Prenatal Nutrition Program), lessons can be learned from broader interventions such as the SNAP HIP, which resulted in increased fruit and vegetable consumption among those participating in the pilot (Bartlett et al., 2014). The literature on financial incentive programs for healthy foods more broadly suggests that desirable outcomes are possible. One systematic review and meta-analysis regarding the prospective impact of food pricing on improving dietary consumption found that each 10% decrease in the price of healthful foods (including fruits and vegetables) increased their consumption by 12% (Afshin et al., 2017). Accordingly, there is reason to consider a targeted incentive program to support the increased consumption of plant-based foods.

Public Information Campaigns

Third, the use of public information campaigns to support informed food choice. Research from efforts undertaken in certain jurisdictions targeting the increased consumption of specific plant-based foods suggest that these can yield positive results. Further, food skills emerged as a theme during this study's informant interviews, with possible gaps including helping overcome barriers related to understanding how to incorporate a greater volume of plant-based ingredients into daily meals.

Chapter 7.

Policy options

The following chapter will outline three proposed federal policy options for increasing the consumption of plant-based foods in Canada. Given findings from Chapters 4-6, the options relate to school food programming, financial incentives and public information campaigns.

7.1. Creating a universal school food program transfer

As noted earlier, the commitments to pursue a National School Food Policy and work towards a national school nutritious meal program were included in the December 2021 mandate letters of two federal ministers (see PMO, 2021a; PMO, 2021b). In step with the latter commitment, option one proposes creating a new federal transfer to help fund cost-shared PT-implemented universal (i.e., all students are eligible to participate) SFPs across the country for students in all publicly funded elementary and secondary schools, supported by bilateral FPT agreements that codify each subnational jurisdiction's expectations and objectives. This resembles recommendations by researchers in this space, who have argued that the Government of Canada should begin developing FPT accords similar to those established for early learning and child-care (see Ruetz, 2022). The core deliverable will be the provision of CFG-adherent lunches at no cost to students on a daily basis for the full school year. Given the current emphasis placed on regularly consuming plant-based foods in the CFG, this is an ideal standard for the provision of school lunches. PTs would also need to establish objectives related to the quantity of healthful foods consumed and monitor their progress, reporting annually to the federal government. Secondary requirements in exchange for participation in the program could include the delivery of educational initiatives that seek to improve students' nutrition knowledge, or the possible promotion of cooking courses and nutrition science education into the secondary school curriculum.

There are a number of reasons for targeting the publicly funded elementary and secondary school population to increase the consumption of plant-based foods in Canada. First, universally available school lunches for public elementary and secondary school

students offer a potential reach of over 5.2 million individuals (Statistics Canada, 2022e).³⁰ Further, a recent systematic review examining research on Canadian elementary school nutrition programs found that multi-component interventions (i.e., those designed with more than a single element such as food provision, including an education component like classroom activities to promote healthy eating) generally had positive impacts on children’s nutritional knowledge, dietary behaviour (e.g., food preferences, willingness to try new foods, self-efficacy), and consumption of healthy foods (Colley et al., 2019).

7.2. Means-tested financial assistance for food purchasing

Option two proposes the implementation of a means-tested financial incentive program for healthful food purchasing. Specifically, each household living in low income as defined by Canada’s Market Basket Measure (2018 Base) (MBM-2018) would be entitled to a 25% discount on qualifying fruits, vegetables, whole grain foods, and plant-based proteins up to a maximum total monthly saving of CAD \$20 per household occupant, paired with a limit of CAD \$5 per occupant for discounts on eligible protein foods that are not plant-based. Accordingly, a family of three would be entitled to \$75 per month in discounts, \$60 of which would be for plant-based foods, and the remainder for non-plant-based protein foods. This would include those currently presented in the CFG, such as lean meat and poultry (e.g., lean cuts of beef, pork and wild game; turkey; chicken), fish and shellfish, etc.

Note that, in 2020, just under 2.4 million persons lived in low income as defined by MBM-2018 (Statistics Canada, 2022i).³¹ As with the British Healthy Start Scheme and

³⁰ In 2019/2020, there were 5,254,992 students in all public elementary and secondary schools (i.e., publicly funded schools that are operated by school boards or the PT) (Statistics Canada, 2022h). Of this, 4,975,797 were enrolled in “regular programs for youth,” which are defined as general training programs geared toward and offered primarily to similarly aged young people. There were also 167,226 in “general programs for adults,” defined as programs geared toward and offered primarily to adults within the elementary-secondary system, with the remaining 111,969 in “vocational programs for youth and adults,” which refer to professional and technical training programs designed for students to acquire the practical skills, know-how and understanding necessary for employment in a particular occupation or trade or class of occupations or trades, offered at the secondary level.

³¹ Note that this figure does not include the territories and has been marked as “very good” data quality (meaning a coefficient of variation [CV] between 2% and 4%) (Statistics Canada, 2022i). Note also that Canada’s Official Poverty Line is in an indicator measuring the proportion of Canadians who live in poverty, based on the MBM-2018 (Statistics Canada, 2022j). The MBM is based on the cost of a specific basket of goods and services that represents a “modest, basic

SNAP, participating households would receive a benefits card for use at authorized outlets such as grocery stores and supermarkets. Where possible, this program would be automated, meaning that participants would present their benefit card at an authorized setting and have their discount applied, updating their remaining savings limit instantaneously. This is unlikely to be the case, however, for all retailers. During the earlier-noted SNAP HIP, for example, retailers that did not have integrated electronic cash register technology needed to use manual processes such as separating eligible foods and manually crediting households (Bartlett et al., 2014).

The primary objective of this option is to incentivize and support the consumption of plant-based foods among Canadians in vulnerable socioeconomic positions, which could be a particularly beneficial vehicle for increasing consumption in regions where the cost of certain healthful foods may be a barrier to greater intake. Additionally, and as noted earlier, the average frequency of fruit and vegetable consumption in Canada was found to be significantly ($p < 0.05$) lower in both 2007 and 2014 among Canadians in the bottom household income quintile compared to the top household income quintile (Colapinto et al., 2018). The descriptive statistics in Chapter 4 also reflect a lower likelihood of FVC five times or more daily among lower-income Canadians than those in the top two household income quintiles between 2015 and 2017. Importantly, the World Health Organization (2020) has also identified economic incentives (e.g., subsidies) as one way for governments to create a food environment that enables the adoption of healthy dietary practices. As Mozaffarian et al. (2018) note, price has a strong influence on food choice, and fiscal incentives can help bring the price of foods closer to their true societal cost, including both direct and indirect costs on health.

This option draws from practices observed internationally (e.g., the USA's SNAP HIP) and would serve to supplement ongoing efforts domestically, such as British Columbia's Farmers' Market Nutrition Coupon Program, the Canadian Prenatal Nutrition Program and the Nutrition North Program. With forecasts from Dalhousie's Agri-Food Analytics Lab that, in 2022, fruit prices will increase by 3% to 5% and vegetable prices will rise by 5% to 7% (Charlebois et al., 2021), this option could provide relief for lower-income

standard of living." (Statistics Canada, 2022j) It includes the costs of food, clothing, shelter, transportation and other items for a reference family which are compared to the disposable income of families to determine whether or not they fall below the poverty line (Statistics Canada, 2022j).

Canadians and better enable them to consume plant-based foods such as fruits and vegetables more regularly.

7.3. National public information campaign

This option entails the delivery of a multi-year nationwide public information campaign aimed at the general population that seeks to help overcome information-related barriers to plant-based food consumption, specifically by showcasing the 2019 CFG. This would leverage a variety of dissemination channels (e.g., social media, traditional television, online advertising and in retail settings) and focus on highlighting the health and environmental benefits of consumption habits that align with the current CFG, as well as how to consume in a manner consistent with this guidance. Importantly, this effort would be able to leverage existing educational resources such as those developed by Health Canada for the current CFG package, including breakfast, lunch and dinner recipes, as well as ways for households with children to get all members of the family involved with meal preparation.

Key messages would include what each ideal plate in a given day should look like and why, particularly given research following the earlier-noted Go For 2&5® Campaign on the importance of informing people as to the rationale that underpins nutritional recommendations, especially when it comes to the necessity of certain daily serving guidelines (Carter et al., 2010). Messages could also centre on the different ways to incorporate healthful plant-based foods into Canadians' everyday diet, as was observed with the Go For 2&5® Campaign, which advertised that "it's easy to get an extra serving of veggies into your day" (Pollard et al., 2008, p. 315). This option draws primarily from the jurisdictional scan, as well as from the informant interviews, given that the issue of food skills was a recurring theme and educational efforts could help address this while providing information about Canada's dietary guidance.

Chapter 8.

Policy Objectives, Criteria and Measures

The following chapter will establish the key societal objective being sought by increasing the consumption of plant-based foods, as well as the secondary objectives (which include both societal and government management objectives) that may be impacted. It will also set out the criteria and measures used to assess the impact of each alternative on all of the outlined objectives.

8.1. Policy objectives, criteria and measures

Table 8.1 below sets out the objectives, criteria and measures used to assess the proposed alternatives. These will be described in greater detail throughout this subsection.

Table 8.1. Policy Objectives, Criteria, Measures and Scoring Index

Objective	Criteria	Measure	Scale (Max. 20 points)
Key societal objective			
Effectiveness – Protection	Impact on consumption of plant-based foods	Number of individuals reached and/or participating	1 < 2.5M Canadians 2 2.5 – 5M Canadians 3 > 5M Canadians
		Anticipated increase in weekly consumption (servings of plant-based foods/week)	1 < 2 servings/week 2 2-4 servings/week 3 > 4 servings/week
Secondary objectives			
Fairness	Benefit to Canadians experiencing food insecurity	Extent to which food access improves for Canada’s food-insecure population	1 No direct support 2 Direct support, partial population coverage 3 Direct support, significant population coverage
Budgetary cost	Fiscal commitment required	Dollars expended on an annual basis as a proportion of the federal 2022/2023 budgetary balance	1 > 1.5% of balance 2 0.75%-1.5% of balance 3 < 0.75% of balance
Administrative complexity	Implementation feasibility	Administrative burden from stakeholder coordination and need for additional capacity	1 Significant 2 Moderate 3 Light
Stakeholder acceptance	Expected position of key stakeholders	General level of support for the measures identified through surveys and position statements	1 Minimal support 2 Mixed support 3 Broad support

8.1.1. Effectiveness – Protection

The central objective being sought by increasing the consumption of plant-based foods in Canada is public protection through the promotion of healthful eating that may guard against negative health outcomes. Accordingly, the key criterion for this objective is degree to which plant-based food consumption could increase. I employ two measures to assess each alternative against this criterion. First, to account for the fact that certain options have a narrower target population than others, is the expected program/policy reach, in number of Canadians. Scores for this measure are: 1 (< 2.5 million Canadians), 2 (2.5 million – 5 million Canadians), and 3 (> 5 million Canadians). These cut-off points were determined based on the size of each option's target audience. The second measure is the expected increase in the frequency of plant-based food consumption among each option's intended audience. Scores for this measure are: 1 (< 2 servings per week), 2 (2 – 4 serving per week increase), and 3 (> 4 serving per week increase).³² Together, these two measures capture how broad-based the policy is in terms of reach, and how significant the potential increase in plant-based food consumption will be.

8.1.2. Fairness

In Fall 2020, over three million Canadians aged 12 and older reported experiencing some level of food insecurity in their household in the last 12 months (Polsky and Garriguet, 2022). This ranged from marginal food insecurity, meaning there was one indication of difficulty with income-related food access (e.g., concerns about running out of food or limited food selection), to severe food insecurity, meaning there was indication of reduced food intake and disrupted eating patterns. As such, each option will be evaluated based on the degree to which Canadians experiencing food insecurity are impacted. This will be measured by the degree to which each option improves food access for food-insecure Canadians. Scores for this measure are: 1 (no direct support to this population), 2 (direct support, partial population coverage), and 3 (direct support, significant population coverage).

³² Note that servings are referred to here as they are in the 2007 CFG. For example, one serving of fruit and vegetables could be 125 mL (½ cup) of fresh, frozen or canned vegetables, or one whole fruit (e.g., an apple, banana, orange). One serving of grain products is a slice of bread (35g), ½ a bagel (45g), or 125 mL (1/2 cup) of cooked rice. One serving of meat and alternatives could be 175 mL (3/4 cup) of cooked legumes, or 60 mL (1/4 cup) of shelled nuts and seeds.

8.1.3. Budgetary cost

All policy options will be evaluated according to their resource requirements. This will be measured as expected annual program or policy expenditure in dollars as a proportion of the Government of Canada's 2022-2023 budgetary balance, which is a deficit of \$52.8 billion (Department of Finance, 2022). Scores for this measure are: 1 (> 1.5% of projected budgetary balance), 2 (0.75% – 1.5% of projected budgetary balance), and 3 (< 0.75% of projected budgetary balance). Accordingly, higher scores reflect lower budgetary cost.

8.1.4. Administrative complexity

Administrative complexity refers to the ease of each option's implementation, measured by the number of stakeholders (e.g., subnational jurisdictions, implementation partners) that must be engaged and whether existing resources can be leveraged to support implementation and monitoring. Scores for this measure are: 1 (significant administrative burden), 2 (moderate administrative burden), and 3 (light administrative burden). Lower scores reflect the need to engage with a greater variety of stakeholders, more time to implement the option, as well as the likely requirement to augment internal operational capacity. Conversely, options with a higher score are expected to require relatively minimal stakeholder engagement with resources that can be readily deployed and a shorter implementation period.

8.1.5. Stakeholder acceptance

Each option will be assessed against the likely level of support that it will garner from key stakeholders. Specifically, expected support will be assessed across the following three stakeholder groups: (1) health professionals that provide dietary advice; (2) the animal food production sector; and (3) the general public. To gauge the positions of these groups, I draw where possible from statements of: (1) the Dietitians of Canada; (2) the Canadian Cattleman's Association, the Chicken Farmers of Canada and the Dairy Farmers of Canada; and (3) public opinion surveys of the broader Canadian public. Scores for this criterion are: 1 (minimal support, meaning support from only one key stakeholder group), 2 (mixed support, meaning support from two stakeholder groups) and 3 (broad support, meaning support across all stakeholder groups).

Chapter 9.

Analysis of Policy Options

9.1. Creating a universal school food program transfer

Effectiveness – Reach

Ruetz and McKenna (2021) estimate that, in 2018/2019, just over one million students in publicly funded elementary and secondary schools across Canada participated in partially PT-funded SFPs that provide free breakfasts, snacks and/or lunches. Importantly, Ruetz and McKenna (2021) note that demand for SFP programming in Canada often exceeds supply, and indicate that their student participation estimates are likely understated given that full participation data was not available from several provinces. As such, under the assumption that at least 50% of all students in publicly funded elementary and secondary schools were to participate in universal SFPs across the country, this would translate to just over 2.5 million students. Accordingly, option one scores 2/3 on expected reach.

Effectiveness – Weekly Consumption

Research on the diet quality of Canadian children aged 6 to 17 during school hours shows that there is room for the greater inclusion of vegetables and fruits, as well as whole grains (Tugault-Lafleur et al., 2019). In 2015, mean lunchtime intake of total fruit and vegetables among this population was found to range from 0.81 to 1.43 servings, depending on age (i.e., 6-13 years or 14-17 years) and eating location (i.e., school, home or off campus), while mean lunchtime grain product consumption, which varied between 1.67 to 2.13 servings depending on age and eating location, was driven in large part by non-whole grains (Tugault-Lafleur and Black., 2020). As such, under the assumption that a CFG-adherent lunch would increase average school day intake of total plant-based foods as defined in this research by an average of at least one serving, the expected impact would exceed four servings per week. Accordingly, this option scores 3/3 on weekly consumption.

Fairness

Estimates from Statistics Canada (2022k) suggest that, in 2020, there were over 2.6 million food insecure persons either in couple families with children or in lone-parent families.³³⁻³⁴ Accordingly, while it is reasonable to expect that a significant proportion of this population would be reached due to the universal availability of school lunches in publicly funded elementary and secondary schools, this is still only partial coverage of the entire food-insecure population. Given that it provides direct support in the form of daily food provision, however, option one scores 2/3 on fairness.

Budgetary cost

Ruetz and McKenna (2021) loosely estimate that the cost of a free meal service comparable to that of Finland, where, each school day, all pupils and students attending pre-primary, basic and upper secondary education are entitled to a free-of-charge, full meal (Pellikka et al., 2019), would be approximately CAD \$4.3 billion annually. Others, such as the Coalition for Healthy School Food (2022), have calculated the possible yearly cost of a universal SFP to be \$5.4 billion (\$5 per student, per day, across the entire elementary/secondary student population), noting, though, that the federal government must undertake a full costing exercise with the PTs to determine an accurate annual resource requirement. Based on these general estimates, it is reasonable to expect that an annual federal transfer of at least \$1 billion would need to be in place to support the PTs. Since \$1 billion would account for more than 1.5% of the projected budgetary deficit for 2022-2023, option one scores 1/3.

Administrative complexity

Given that school health falls under PT jurisdiction (FPT Nutrition Working Group, 2013), negotiating and implementing a federal transfer and individual bilateral accords in

³³ This figure is based on Statistics Canada (2022j) estimates of household food insecurity by economic family type. Estimates do not include the territories. Note that persons in couple families with children and persons in lone-parent families are those where the child of children (by birth, adoption, step or foster) of the major income earner are under the age of 18 (other relatives may also be in the family) (Statistics Canada, 2022j).

³⁴ Note that 2020 estimates for the number of persons experiencing marginal, moderate or severe food insecurity in couple families with children were marked as “good” data quality (meaning the CV is between 4% and 8%). Similarly, for persons in lone-parent families, estimates for those experiencing moderate or severe household food insecurity were marked as “good,” while estimates for the number experiencing marginal household food insecurity were marked as “acceptable” (meaning CV between 8% and 16%) (Statistics Canada, 2022j).

exchange for action in this domain will require a significant degree of intergovernmental and coordination and engagement. Coming to bilateral agreements with each subnational jurisdiction could take a considerable amount of time and resources, particularly if challenges emerge throughout this engagement. Further, stakeholders other than solely the PTs would also likely be involved in the discussions. As Ruetz and McKenna (2021) highlight, the administration of SFPs in Canada is already complex and includes a variety of stakeholders. It is also likely that greater internal capacity would be needed for the purpose of monitoring and progress tracking with respect to objectives that are set in each agreement. As such, it is reasonable to expect that option one would impose a significant administrative burden, meaning option one scores 1/3 for this criterion.

Stakeholder acceptance

Given their support for the CFG, the Dietitians of Canada (see Dietitians of Canada, 2019) are likely to react positively to the introduction of a federal transfer and negotiated FPT agreements that will support the creation of a universal school food program offering CFG-adherent meals daily. Reactions in the animal food production sector, however, may be mixed, given the concerns expressed by certain stakeholders such as the Dairy Farmers of Canada (2019, para. 1) that Canada's Food Guide "does not reflect the most recent and mounting scientific evidence available." Further, in response to the 2019 CFG's release, the Canadian Cattleman's Association (2020) developed a social media campaign with posts that highlighted facts about the nutritional benefits of beef, as well as beef sustainability. Similarly, the Chicken Farmers of Canada (2020) reported deploying advertising efforts regarding how chicken fits within the CFG following its release. However, given that the CFG does not exclude animal-based sources of protein in their guidance, the animal food production sector may still stand to benefit from a CFG-based national SFP. Accordingly, while members of this sector may generally support the policy being proposed, it is reasonable to expect lobbying for the regular inclusion of foods they produce. Finally, though reactions from parents may vary depending on support for certain CFG recommendations, it is likely to alleviate the burden for many families/students that comes with preparing lunches every day. As such, this option scores 3/3.

9.2. Means-tested financial assistance for food purchasing

Effectiveness – Reach

According to estimates from the USDA (2021g), approximately 82% of eligible people received SNAP benefits in 2018. It is therefore reasonable to anticipate that the uptake of an income-tested nutrition assistance program in Canada may not be full. Under the assumption that household participation is such that at least 70% of persons living under Canada's MBM-2018 are reached, the number of possible recipients is just under 1.7 million. Accordingly, option two scores 1/3 on reach.

Effectiveness – Weekly Consumption

As noted earlier, those participating in the SNAP HIP reported consuming almost a quarter of a cup more of the targeted fruits and vegetables per day (just under 1.7 cups per week) than non-participants (Bartlett et al., 2014). Given the narrower nature of this intervention (i.e., focusing specifically on fruits and vegetables), overall consumption may be greater with a wider range of subsidized foods available to eligible recipients. Accordingly, using this as a baseline and accounting for the possible increase in consumption of other discounted plant-based foods, it is reasonable to anticipate that weekly intake of all plant-based foods covered under this option would exceed four servings per week. As such, option two scores 3/3 on weekly consumption.

Fairness

While this option provides direct support in the form of a discount for specific healthful foods which can improve food access for those who experience barriers due to financial constraints, targeting Canadians living in low income as defined by the country's MBM-2018 means there would only be partial coverage of the total food-insecure population. Accordingly, this option scores 2/3 on fairness.

Budgetary cost

To estimate the budgetary cost of this program, I multiply the monthly per person discount benefit by the number of Canadians expected to be reached. As such, the annual financial commitment based on the above-noted participation estimate is approximately

\$495 million.³⁵ Importantly, the estimated cost assumes full use of total allowable monthly savings per month. There would also need to be additional resources devoted to ensuring that retailers are technically equipped to roll out this program. Estimates from the SNAP HIP evaluation were that nationwide expansion would come at a one-time cost of less than USD \$5 per SNAP household (Bartlett et al., 2014). Assuming a rate of CAD \$10 per possible recipient in Canada, then this would add CAD just under \$24 million to the cost. Since the estimated cost is 0.94% of Canada's 2022-2023 budgetary balance, this option scores 2/3.

Administrative complexity

Given the nature of option two, there is likely to be a significant degree of engagement and outreach with Canada's retail sector for the purpose of nationwide policy implementation and roll-out. It is reasonable to expect that this engagement will be very complex, including the need to ensure that the retail sector is technically equipped to deliver this program and, in instances where automated services may not be technically feasible, have manual practices in place. While Canada has experience with food/non-food subsidy programs at the retail level such as Nutrition North Canada, the program being proposed differs slightly in that it is targeted to specific consumers and food products. Further, there will likely need to be greater internal capacity to manage this benefit program. Accordingly, this option scores 1/3.

Stakeholder acceptance

Stakeholder acceptance of this option is expected to be mixed. As with option one, the Dietitians of Canada are likely to support a form of income assistance that may both help increase intake of CFG-adherent foods and partly address food insecurity. However, members of the animal food production sector may take issue with action that can be perceived as discouraging or de-prioritizing the consumption of their products, which could be the case with financial support that is directed at augmenting the consumption primarily of plant-based foods. Recall that this was also noted in the informant interviews when discussing a possible financial incentive for plant-based foods. Finally, in an Angus Reid Institute (2018) poll on poverty in Canada, over half of the respondents expressed that there should be more public support for the poor, the disadvantaged and those in

³⁵ [(1,649,900 persons x \$25/month) x 12 months] = \$494,970,000

economic trouble.³⁶ Accordingly, given that support would be reasonably expected from two of the three key stakeholder groups, this option scores 2/3.

9.3. National public information campaign

Effectiveness – Reach

Given that this public information campaign would take place through a variety of dissemination channels, including retail settings, broadcast media and the Internet (e.g., social media, online advertising) and is aimed at the general population, it is reasonable to expect that the campaign messaging will reach over five million Canadians. Accordingly, this options scores 3/3 for the reach measure.

Effectiveness – Weekly Consumption

As noted earlier, there are promising results from public information campaigns employed internationally (e.g., Western Australia) targeting the consumption of specific plant-based foods such as fruits and vegetables. As of 2020, however, mean fruit consumption among was 1.7 servings per day in Western Australia (aged 16 and older), compared to 1.6 (aged 18 and older) before the Go For 2&5® Fruit and Vegetable campaign period, while mean daily vegetable intake was 2.5 in 2020 (aged 16 and older), compared to 2.6 in 2001 (aged 18 and older) (Pollard et al., 2008; Government of Western Australia Department of Health, 2021). Challenges regarding public information campaigns have been outlined by Brambila-Macias et al. (2011, p. 368), who note that social marketing efforts generally need long periods of time to achieve change in attitudes among people and through society, with campaigns alone potentially needing decades to have a real impact on healthy eating or other outcomes, necessitating “constant and adequate funding from governments for a long period of time.” As such, it may be difficult to increase plant-based food consumption over the long term with solely educational efforts. Accordingly, this option scores 1/3.

³⁶ According to the Angus Reid Institute (2018), this was an online survey from May to June 2018 among a representative sample of 2,542 adults from Maru Voice Canada, an online market research community. The Institute notes that the sample plan included a special booster sample of 242 respondents with household incomes below \$35,000.

Fairness

Since this option targets increased understanding of the benefits of consuming healthful plant-based foods and does not provide resources to alleviate the financial burden those experiencing food insecurity may be facing (e.g., either via direct food provision as in option one or a targeted financial incentive as in option two), this option is not expected to be of direct benefit to the food-insecure population. Accordingly, it scores 1/3.

Budgetary cost

The cost of a national public information campaign is not expected to be significant, particularly compared to the cost of options one and two. According to an evaluation of Canada's Nutrition Policy and Promotion Program, Health Canada invested approximately \$1.6 million in the Nutrition Facts Education Campaign (NFEC, another information campaign discussed earlier) over three years, with additional contributions totalling \$2.6 million for media buy from members of Food and Consumer Products Canada (Health Canada and PHAC, 2015). This equates to \$1.4 million per year. Assuming that the public information campaign being proposed would be similar in scale to the NFEC, which included multiple components such as advertising, web content supported by a printable consumer factsheet, public relations and an in-store retailer element (Health Canada and PHAC, 2015), and that funding would come solely from the federal government at a rate double that of the NFEC (given the NFEC was said to have leveraged additional outside resources), then annual expenditure is expected to be CAD \$2.8 million, which is significantly below 0.75% of the projected 2022/23 budgetary balance. Accordingly, this option scores 3/3.

Administrative complexity

Pursuing a public information campaign would entail engagement with stakeholders in the retail sector to identify willing partners for the distribution of CFG resources, as well as the deployment of campaign messaging. Examples from the Canada's earlier Eat Well Campaign included the Retail Council of Canada and the Canadian Federation of Independent Grocers (Health Canada and PHAC, 2015). While burdensome, there currently exists a range of resources that have been developed for the 2019 CFG, which offers a wide range of existing materials to leverage. Accordingly, this option scores 2/3 on administrative complexity.

Stakeholder acceptance

As with options one and two, stakeholders such as the Dietitians of Canada are likely to support efforts that boost awareness of the CFG and its contents. Additionally, given that animal proteins are still featured in the CFG, those in the animal food production sector may support educational efforts that could include their foods, though also deploy their own messaging efforts, as discussed in option one. As it concerns public opinion, an Angus Reid Institute (2019) survey circulated following the 2019 CFG's release shows general support for the recommendation to eat more plant-based foods and products (66% expressing that this is a positive choice for Canadians when it comes to their cooking and/or eating habits), though there was less support for consuming less meat as a protein source (52% expressing that this is a positive choice for Canadians) and far less concerning reduced dairy consumption. Additionally, 40% of respondents agreed that it is not the government's role to suggest or encourage people to follow certain eating habits. Accordingly, given that support for this option may be mixed (i.e., from two groups), option three scores 2/3.

Chapter 10.

Recommendations and Conclusion

10.1. Summary of policy analysis

Table 10.1 below captures the scoring of each option along each criterion. The highest scoring options were number one and three, a universal school food funding transfer to the provinces and territories and national public information campaign, followed by a means-tested benefit program.

Table 10.1. Policy Scoring Matrix

Objective	Universal School Food Funding Transfer	Means-Tested Incentive Program	Public Information Campaign
Key societal objective			
Effectiveness – Protection / 6	2	1	3
	3	3	1
Secondary objectives			
Fairness / 3	2	2	1
Budgetary cost / 3	1	2	3
Administrative complexity / 3	1	1	2
Stakeholder acceptance / 3	3	2	2
TOTAL / 18	12	11	12

10.2. Recommended approach and implementation

In summary, all three options are recommended. Given that each option targets a certain population, these programs would be best implemented in unison and as part of a broader effort targeting improved food environments, financial support and awareness. First, however, given the potential influence that the Government of Canada could have on the consumption of CFG-adherent meals among elementary and secondary school students across the country, it is recommended that the federal government solicit input

from the provinces and territories regarding the development of universal school funding transfer and bilateral agreements as part of their ongoing talks regarding the commitment to work towards a national nutritious school meal program. Priority could first be given to schools in low-income neighbourhoods as well as remote regions, where greater economic barriers to healthful food access may be present. Note that, based on Ruetz and McKenna's (2021) research, this is currently the "dominant" to universality in school food programming across Canada, referred to by the authors as "nested universality," meaning schools in lower socioeconomic areas are targeted for funding, with all students in those schools eligible to participate. This "nested universality," however, carries important drawbacks, such as the exclusion of potentially food-insecure populations residing outside of eligible areas, as well as the broader need to address nutrition intakes of all Canadian students (Ruetz and McKenna, 2021), positing a basis for long-term, wider-reaching action. Secondly, it is recommended that a pilot version of option two proceed as well. This would allow for monitoring of the impact of a program of this sort in Canada without the significant financial outlay that could be required under a full plan. Consideration could also be given to expanding existing programming to capture more communities under the Nutrition North Canada program. Finally, it is recommended that efforts devoted to increasing awareness be undertaken, particularly as it concerns the rationale that underlies dietary guidance in Canada, and the exact protective health and environmental benefits that increased plant-based food consumption can confer.

10.3. Conclusion

As highlighted early in this capstone, the underconsumption of healthful plant-based foods is an issue of significance not just in Canada, but globally. Estimates suggest a considerable economic burden extending from non-adherence with established dietary recommendations for these foods, positing a basis for government action. Importantly, food and diet choice are a function of many different variables. Accordingly, actions must be taken together, addressing different elements of the food and nutrition policy space, to be effective. The recommended approach here is to take steps that will improve Canada's food environment, particularly as it concerns the availability and provision of nutritious foods in schools across Canada, as well as provide targeted support for those who may be experiencing financial barriers to accessing plant-based foods and, finally, broadening awareness across the general population.

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Appendix A.

EAT-*Lancet* Commission Healthy Reference Diet

The EAT-*Lancet* Commission's healthy reference diet places an emphasis on plant-based foods, with a suggested daily macronutrient intake of 232 grams of whole grains, 50 grams of tubers or starchy vegetables, 300 grams of all vegetables, 200 grams of all fruits, 250 grams of dairy foods, 209 grams of protein sources (125 of which come from legumes and tree nuts), 51.8 grams of added fats, and 31 grams of added sugars (Willet et al., 2019). For more information, see Willet et al. (2019) and EAT (n.d.).

Appendix B.

Methodological Notes

CCHS 2004-Nutrition

CCHS 2004-Nutrition (formally “CCHS Cycle 2.2”) had a target population of all individuals aged 0 or above living in private dwellings in the 10 Canadian provinces, but did not include individuals who were full-time members of the Canadian Forces or who lived in the Territories, on reserves and other Aboriginal settlements, in some remote areas or in institutions such as prisons or care facilities (Health Canada, 2006). The development and implementation of CCHS 2004-Nutrition was a joint initiative between Health Canada and Statistics Canada, with data collection between January 2004 and January 2005 (Health Canada, 2006). In total, 35,107 individuals took part in the survey, and its response rate was 76.5% (Health Canada, 2006). The response rate, paired with statistical adjustments for non-responses, “suggest that the results of the survey can be considered representative of the population” (Health Canada, 2006, p. 6). CCHS 2004-Nutrition collected information on food consumption using a 24-hour dietary recall for the total group and a repeat sub-sample (Health Canada, 2006).

CCHS 2015-Nutrition

In 2015, Statistics Canada partnered with Health Canada to repeat the CCHS, Nutrition focus. Like its predecessor, the 2004 CCHS-Nutrition, CCHS 2015-Nutrition provides information at the national and provincial levels on food consumption using a 24-hour dietary recall for the total sample and a repeat sub-sample (Government of Canada, 2021c). CCHS 2015-Nutrition was a nationally representative survey of the nutrition of people in Canada, with a target population that included all individuals aged one year and above living in private dwellings in the 10 Canadian provinces, but did not include individuals who were full-time members of the Canadian Forces or who lived in the Territories, on reserves and other Aboriginal settlements, in some remote areas or in institutions such as prisons or care facilities (Health Canada, 2017). In total, 20,487 individuals took part in the survey, and the response rate was 61.6%.