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Novelty bullets: points that summarize the key findings in the work:	• An updated Canadian regulatory framework is needed for protein labelling and content/health claims, • There are knowledge gaps about protein foods consumption and food literacy needed to optimize nutritional health, • Mandatory nutrition policies are needed to safeguard the provision of high-quality 'protein foods' across institutions t
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Translating 'protein foods' from the new Canada's Food Guide to consumers: Knowledge gaps and recommendations

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Abstract

The revised version of Canada's Food Guide, released in January 2019, issued new guidance by combining meat and alternatives with milk and alternatives into a single group called 'protein foods' and emphasized selecting plant-based foods from this category more often. Though the changes represent a simple depiction of a healthy plate, the new Food Guide has opened knowledge gaps about 'protein foods' and exposed new concerns about the interpretation and implementation of the Food Guide among vulnerable groups, particularly children and the elderly. To address key knowledge and research gaps, nutrition leaders need to reach a consensus on key messages to best inform the development of tools and resources to support practitioners in translating messages to consumers, including foodservice standards. Among consumers, families with young children are a primary target for these resources as they develop their life-long habits to ensure they have the knowledge and skills to select, prepare, and consume nutrient-rich protein foods. The new Food Guide provides an opportunity to address the existing knowledge gaps, develop tools and resources to support health

professionals, and design interventions that will help Canadian families choose, prepare, and eat nutrient-rich protein foods.

Novelty bullets

- An updated Canadian regulatory framework is needed for protein labelling and content/health claims
- There are knowledge gaps about protein foods consumption and food literacy needed to optimize nutritional health
- Mandatory nutrition policies are needed to safeguard the provision of high-quality 'protein foods' across institutions that serve children and older adults

Keywords

Protein, Canada's Food Guide, Food-based dietary guidelines, Nutrient requirements, Food literacy, Children, Families, Older adults, Plant-based

Introduction

National food-based dietary guidelines (FBDG) are intended to promote healthy eating by enacting a framework for food and nutrition policies and education programs. The overall goal of FBDGs has been to provide guidance about food, food groups, and dietary patterns that optimize the intake of nutrients to promote health and prevent chronic diseases for healthy individuals (FAO, 2019). However, FBDGs have not been effective in maintaining population

health or preventing diet-related diseases. In 2017, 11 million deaths and 255 million disability-adjusted life years (DALYs) across 195 countries were attributed to dietary risk factors, with the highest proportion coming from high sodium intake, low intake of whole grains, fruits, nuts and seeds, and vegetables (Afshin et al., 2019). Furthermore, the current food system has not been successful in providing an adequate variety, accessibility or affordability of healthy foods, contributing to both obesity and undernutrition worldwide (Mozaffarian, 2020), and it is a major contributor to climate change, exacerbating health and nutrition concerns for global food and water security (Swinburn et al., 2019). Sustainable diets and healthy dietary patterns are compatible and there is a call for FBDGs to integrate both health and environmental concerns (Gonzalez Fischer and Garnett, 2016).

Like many older FBDGs, the previous version of Canada's Food Guide (2007) was not developed with food sustainability in mind. Given the impact of the food system on the environment and long-term morbidity and mortality, there is interest in modernizing FBDGs to provide better guidance that supports healthy eating decisions and environmental policies (Gonzalez Fischer and Garnett, 2016). A diet consistent with human health is largely plant-based with modest amounts of fish, meat and dairy foods, and limited amounts of refined grains, processed foods, and added sugars (Mozaffarian, 2020). These diets can be adapted to geographic and demographic profiles of different populations and individuals (Willett et al., 2019).

In 2019, Health Canada published a new version of Food Guide, the first revision in over a decade. The new Food Guide introduced a healthy plate with three food groups represented by proportions on the plate and provided practical recommendations about how to select,

prepare, and consume food (Health Canada, 2019a). It is accompanied by Canada's Dietary Guidelines, a document intended for health professionals that includes messages about the environmental impact of food choices (Health Canada, 2019b). Compared to the 2007 Food Guide, one of the most marked changes in the new guide was the merger of two food groups (milk and alternatives and meat and alternatives) into a single group called "protein foods". In Canada's Food Guide's history, food group mergers have occurred twice; once in 1944 when the egg group was combined with the meat and fish group and a second time in 1977 when the fruit group was combined with the vegetable group. Though updating the Food Guide and merging food groups is not a novel concept, it has created controversy and uncertainty about 'protein foods' (Barr, 2019). The purpose of this review is to outline knowledge gaps exposed by the formation of the "protein foods" group. In particular, because protein needs vary across life stages, the effects on vulnerable target populations, such as children and the elderly, will be highlighted. It is also recognized that foods within the new protein foods category vary substantially with respect to other nutrients beyond protein that they provide, which in some cases are nutrients that are frequently under-consumed by vulnerable groups (Phillips et al., 2015). Furthermore, recommendations, developed following an expert and stakeholder workshop organized by the Canadian Nutrition Society (October 2019, Ottawa) to identify research and knowledge gaps about protein foods, will be summarized.

Context: Canada's Food Guide

The first FBDGs developed in Canada in the 1940's focused on preventing malnutrition based on providing foods in sufficient quantities to meet "Dietary Standards" for minimum amounts of essential nutrients required by healthy individuals (Health Canada, 2019c). The nutrient-specific focus of Canada's FBDGs shifted in 1992 to emphasize a total diet approach that considered both energy and nutrient requirements. Furthermore, the 1992 guide recognized that these needs varied with life stage (e.g., pregnancy), activity level, and gender, providing a range of recommended portions for each food group (Health Canada, 2019c). By 2007, policy shifted substantially with increasing evidence of the effects of nutrition on the burden of chronic diseases, and there was an overwhelming need to prevent increases in diet-related diseases, namely obesity. The 2007 Food Guide was updated to encompass a foldable six-page document that included reference amounts for portions of different foods, numbers of servings recommended for each food group for nine different ages and life-stages, guidance on amounts of added fats to consume, and physical activity recommendations (Bush et al., 2007). The food groups in the 2007 Food Guide that contributed high-quality sources of protein included meat and alternatives, milk and alternatives, and to a lesser degree, grain products. A variety of protein-rich foods (meat, dairy, fish, eggs, soy, nuts, etc.) contained in these food groups are commonly used as the basis of dietary patterns: omnivore, vegetarian, pescatarian, or vegan (Willett et al., 2019).

Evidence of existing gaps

While the 2007 version of the Food Guide was hailed as a "tool for the times" (Bush et al., 2007), short-term indicators of its awareness have been mixed. For example, two studies with data collected in 2013 reported that >85% of Canadian adults were aware of the Food Guide (Slater and Mudryj, 2018; Vanderlee et al., 2015); however, another study reported that only 42% of Canadian adults could recall the four food groups and <1% could correctly identify the number of servings recommended in each food group (Vanderlee et al., 2015). Another study conducted with data collected in 2014 noted that only 36% of Canadian parents reported applying the Food Guide to make dietary decisions. Parents who used the Food Guide had higher healthy index scores than parents who did not use the Food Guide (Fernandez et al., 2019a). Although the Food Guide appears to be widely recognized by Canadians and its use is associated with healthier diets, it is not utilized by the majority of Canadians. This may be due to knowledge gaps as supported by a review that found that consumers generally do not act on portion size and serving size guidance because of a lack of understanding (Faulkner et al., 2012).

Another major role of the Food Guide has been to inform nutrition policies, particularly healthy eating standards in institutional settings, including childcare facilities, schools, long-term care homes, and hospitals. The evidence for the adoption and compliance of healthy eating standards based on the Food Guide has been mixed and depends on the province and institution type. For example, in Alberta, the Alberta Nutrition Guidelines for Children and Youth use the Food Guide to provide recommendations for different types of settings (i.e.,

childcare facilities, recreation/community centres) (Alberta Health Services, 2012); however, the guidelines are voluntary and a recent study found that only 27% of childcare settings provide an appropriate balance of healthy foods (usually or always) and many schools do not have a written nutrition policy ("Alberta's 2019 Nutrition Report Card on Food Environments for Children and Youth," 2019). Though the Ontario School Food and Beverage policy, based on the Food Guide, is mandatory across the province, many schools were non-compliant with regards to healthy beverage policies (Vine et al., 2017). While there is evidence that implementing mandatory school nutrition policies improves dietary intakes of children and adolescents, six out of ten provinces in Canada have voluntary policies (Acton et al., 2018). In Nova Scotia, the implementation of a mandatory provincial school nutrition policy was associated with greater consumption of milk products among grade five students (Fung et al., 2013). These studies suggest that although the Food Guide is integrated into institutional nutrition policies, implementation and adherence to the policies are highly variable. Given that one-third of daily energy intakes are consumed during school hours (Tugault-Lafleur et al., 2017), these institutions are critical environments to ensure adequate access to healthy 'protein foods' and food literacy education. In addition to greater adoption of Food Guide recommendations into school nutrition policies, monitoring and enforcement are also needed.

Despite intentions to address growing chronic disease burden with the 2007 Food Guide, dietary intakes of Canadians remain inconsistent with the Food Guide recommendations. For example, between 2004 and 2015, fewer daily servings of vegetables and fruits and milk and alternatives, as well as more processed meats were consumed (Tugault-Lafleur and Black,

2019). Furthermore, there is a substantial economic burden attributed to poor diets in Canada. In 2014 an estimated 13.8 billion dollars were spent on direct and indirect healthcare costs related to poor diet (i.e., not meeting dietary recommendations), and this may underestimate the true burden (Lieffers et al., 2018). A need for improved translation of dietary guidance into action in Canada was evident.

The new Canada's Food Guide

The 2019 edition of the Food Guide continues to aim towards improving health, meeting nutrient needs and reducing risks of diet-related diseases by helping Canadians make healthy food choices (Health Canada, 2019d). The changes in the 2019 version of Food Guide were intended to strengthen dietary guidance and communicate recommendations in a way that is more appropriate for different groups' needs (public, policy makers and health professionals). In accordance with established international recommendations for developing and updating FBDG, the Food Guide is intended to provide practical, dynamic, and flexible guidance rather than a prescriptive diet (World Health Organization and Food and Agricultural Organization of the United Nations, 1996). Like the American MyPlate, the Canadian Food Guide Snapshot provides simpler guidance making it easier for the public to understand and assimilate the information (Webb and Byrd-Bredbenner, 2015). The Food Guide Snapshot also fits within a broader Canadian Healthy Eating Strategy designed to provide greater support to Canadians in making healthy eating choices and provide opportunities for multilevel public health nutrition interventions (Health Canada, 2019e). A shift in the format of the Food Guide from a single

multi-purpose resource that served as both a policy document and educational tool to multiple guidance documents will help clarify and tailor messages for the needs of different groups (Health Canada, 2019e). From a communications perspective, the simplified Food Guide Snapshot format provides a better opportunity to translate healthy eating information to the public by providing understandable and accessible messages, taking into account health literacy and numeracy (Bernhardt, 2004). For the public, the Food Guide 2-page Snapshot is accompanied by a 1-page Healthy Eating Recommendations document and a suite of resources online that include tips for healthy eating, recipes, and short vignettes. There are also separate documents for professionals: Canada's Dietary Guidelines for health professionals and policy makers, evidence behind the food guide, and documents that outline revision process. Table 1 lists key differences between the 2007 and the 2019 versions of the Food Guide. Arguably the most notable difference is the shift from four food groups in 2007 to three food groups in 2019 by combining meat and alternatives with milk and alternatives into a single 'protein foods' group. This change is expected to have broad implications for different groups of consumers and knowledge users that depend on the Guide to serve food in institutions and develop food products.

What is known about protein foods?

Protein is found in most foods but it is only present in a limited group of foods in higher amounts (Mariotti and Gardner, 2019). Major sources of protein include meat, fish, eggs, dairy, legumes, nuts and seeds. Additionally, grains, despite their marginal protein content, still

contribute significant amounts of total protein to the diet due to levels of consumption. The 2019 Food Guide's emphasis on consuming whole 'protein foods' that come mostly from plants aligns with a controversial global reference diet (Willett et al., 2019). While the shift away from a dairy and meat-focused diet may seem extreme in comparison to Canadians' current dietary patterns, it is consistent with dietary priorities to reduce obesity and diabetes and the Global Burden of Disease dietary risk factors (GBD 2016 Risk Factors Collaborators, 2017; Mozaffarian, 2020). Nevertheless, combining milk and alternatives with meat and alternatives into a single comprehensive 'protein foods' group has, however, exposed potential gaps in the understanding of this food group and the capacity of health professionals to bridge these gaps. In particular, there are concerns that the public has adequate food literacy to transition to a diet recommending greater plant-based protein intake, as recommended by Canada's Food Guide, without depending on ultra processed foods or compromising the nutritional adequacy of the diet.

Protein requirements

The current Recommended Dietary Allowance (RDA) for protein is estimated, from nitrogen balance, at 0.8 g/kg per day for adults of all ages, except pregnant and lactating women (Institute of Medicine, 2005). The Acceptable Macronutrient Distribution Range (AMDR) for protein is very large, representing between 10% to 35% of total daily energy intakes (Institute of Medicine, 2005). The higher RDA for children and youth, between 0.85-1.1 g/kg per day, depending on age, is extrapolated from the adult RDA (Institute of Medicine, 2005). Though the

RDA (0.8 g/kg per day) is the same for all adults, increasing evidence supports higher protein requirements are needed for older adults to maintain optimal physical function (Bauer et al., 2013; Baum et al., 2016; Phillips et al., 2016; Rodriguez and Garlick, 2008). Additionally, stable isotope-based studies also suggest that protein requirements may actually be higher (1.1-1.2 g/kg per day) than the established RDAs for adults (Elango et al., 2010; Humayun et al., 2007) and children (Elango et al., 2011). Furthermore, total protein requirements need to be balanced against the RDAs for individual indispensable amino acids, which may vary depending on life stage, age, and disease state (Layman et al., 2015).

Protein sources and dietary adequacy

Typically, protein quality is characterized by its digestibility and its indispensable amino acid content that are needed to support amino acid requiring processes specific to life stage (e.g., growth, development, pregnancy) (Millward et al., 2008). Protein quality is commonly measured using the protein digestibility-corrected amino acid score (PDCAAS) or the digestible indispensable amino acid score (DIAAS) (Pencharz et al., 2016). Consumption of protein foods, rich in indispensable amino acids and nutrient density, is associated with greater overall diet quality and nutrient adequacy (Phillips et al., 2015). Major sources of dietary protein such as dairy, meat, legumes, nuts, and seeds also contribute substantially to other nutrients that are frequently deficient in North American diets, including: calcium, vitamin D, potassium, fibre, as well as iron and folate for women of childbearing age and vitamin B12 for older adults (U.S. Department of Agriculture and U.S. Department of Health and Human Services, 2010). The

source of protein will obviously differ in terms of its contribution to different nutrients, with animal proteins being a substantial source of zinc, vitamin B-12, and iron, whereas plant proteins provide a source of vitamin E, fibre, and magnesium. Essentially, a diet that includes proteins from a variety of sources is ideal to provide a variety of nutrients in sufficient amounts to the diet—animal and plant proteins are complementary sources of dietary nutrients (Phillips et al., 2015). However, the bioavailability and digestibility of amino acids within protein foods can be affected by various factors including antinutritional elements (dietary fibre, phytates, and reaction of amino acids such as lysine with carbohydrates) within the food matrix, especially in plant proteins (Butts et al., 2012; Sarwar Gilani et al., 2012). Thus, dietary sources of protein may vary significantly in quality in terms of their contribution to RDAs of individual indispensable amino acids and intakes of complementary vitamins, minerals, and fibre. However, even with a plant-based diet, eating a variety of plant proteins is key to accommodate this variability in protein quality and levels of indispensable amino acids. Different food sources (dairy, animals, and plants) of protein will provide a diverse range of nutrients, making it important to consume a variety of protein food sources (Phillips et al., 2015).

Different sources of protein vary in quality with plant-based proteins generally providing lower anabolic potential than animal proteins, because of a less complete amino acid profile and/or a lower digestibility (van Vliet et al., 2015). Of note, the average protein quality score for a plant-based diet has been reported at 61% based on DIAAS, which is significantly lower than the average for animal protein (Ertl et al., 2016). Given that the current RDA is meant to represent

grams of higher quality, utilizable protein, individuals consuming exclusively plant-based diets would need to consume protein in an amount greater than the RDA compared to individuals consuming mixed diets (animal and plants). For example, an individual consuming a plant-based diet may theoretically need to consume a higher quantity of protein to meet the RDA of 0.8 g/kg/d with high quality, utilizable protein (1.31 g plant-based protein x 0.61 protein quality score = 0.8 g). In addition, lower quality protein from plant sources can result in the need to consume more calories to achieve amino acid requirements compared to animal proteins (Pencharz et al., 2016). Despite the lower quality of plant-based proteins, vegetarian diets based on legumes, nuts, and seeds provide sufficient protein for adults; however, further research is needed on the relative importance of protein food complementarity for different protein-based plant diets (e.g., vegan) among specific populations (e.g., children, pregnant women, the elderly) that may have different requirements (Mariotti and Gardner, 2019).

Protein consumption and trends

In developed countries, population intakes typically exceed the RDA for total protein intake (U.S. Department of Agriculture and U.S. Department of Health and Human Services, 2010). Protein intakes reported in epidemiological studies are relatively consistent across populations—Americans, British, and French consume approximately 13-17% of total energy intake from protein foods (Mariotti and Gardner, 2019). Similarly, Canadians who consume mixed diets (i.e., a combination of animal and plant foods) are thought to consume more than enough protein (Health Canada, 2019f). The percentage of energy intakes from protein

reported in the 2015 Canadian Community Health Survey was within a similar range reported by other populations at 16% and 17% for children and adults, respectively (Statistics Canada, 2017). In the EPIC-Oxford Study, dietary intakes of 30,251 adult meat eaters, fish eaters, vegetarians, and vegans were compared. Overall, researchers found significant differences in adherence to dietary recommendations. Meat eaters had the highest intakes of saturated fatty acids (SFA) and were the only group to consume an average intake that was slightly above the 10% of the daily energy threshold (10.4 ± 2.2 % energy from SFA). Among vegans, micronutrient inadequacy was low, but there were higher estimates of inadequacy for vitamin B12, iodine, calcium and zinc. Unsurprisingly, protein intake was highest among meat eaters and lowest among vegans, but all groups had adequate intakes ranging between 0.99 g/kg per day for vegans to 1.28 g/kg per day for meat eaters (Sobiecki et al., 2016). Based on data from the 2011-2014 National Health and Nutrition Examination Survey (NHANES), average protein intakes among Americans were above the RDA, representing 14-16% of daily energy intakes across all age groups. However, more than 15% of certain subgroups had protein intakes below the RDA such as in 14 to 18-year-old females, women ≥51 y, and men ≥80 y, indicating that some groups are at risk of suboptimal protein intakes. Should an increase to the protein RDA be recommended, there would be very little risk of exceeding the acceptable macronutrient distribution range (AMDR) for protein which is between 10-35% of total energy intake (Berryman et al., 2018).

While no Canadian data are currently available on different dietary patterns, it would be reasonable to assume that a shortfall of nutrients will vary according to different protein-based

dietary patterns, and similar groups (e.g., adolescent women, older women and older men) could be vulnerable to not meeting the RDA of these nutrients. While overall, protein intakes are likely to be adequate in Canada, even among individuals who consume plant-only protein foods, there may be deficiencies (or excesses) of other nutrients, associated with specific protein-based dietary patterns. For example, because dairy products account for 50% of calcium intakes, the trend towards consuming less fluid milk in Canada from 2004 to 2015 among all age groups, especially children (Tugault-Lafleur and Black, 2019), may be concerning if Canadians are not replacing milk with alternate foods/beverages that are fortified with both calcium and vitamin D, which is required for proper calcium absorption (Hanley et al., 2010). There are concerns that this trend will be compounded by not highlighting milk and alternatives in the 2019 Food Guide. However, it also appears that over the same time period, Canadians increased intakes of other protein-rich foods such as dairy products (e.g., yogurt), legumes, nuts and seeds, and eggs, potentially mediating the impact of nutrient deficiencies through reduced milk consumption, and indicating a shift in population-wide protein dietary patterns (Tugault-Lafleur and Black, 2019). Dietary intakes in Canada need to be regularly monitored for macro- and micro-nutrient adequacy as new protein-based dietary patterns become more common and new plant-based products enter the mainstream food supply.

Knowledge gaps about protein foods

In a workshop hosted by the Canadian Nutrition Society, experts and stakeholders gathered to comprehensively examine the research and knowledge gaps related to positioning protein

foods to Canadians. From these discussions, existing and new research gaps on protein foods were identified in line with each of Canada's Dietary Guidelines. Concerns associated with each guideline are highlighted in Table 2, along with potential opportunities for action. Overall, identified research gaps broadly encompass four key areas: 1) consumer studies, 2) knowledge translation methods and tools, 3) protein requirements and protein quality, and 4) updated regulatory framework for assessing protein content and applying health claims. Because dietary patterns are established early in life and persist into adulthood (Montano et al., 2015; Scaglioni et al., 2018), there was a general agreement among workshop attendees that a key priority should be to protect and educate younger consumers by targeting children, adolescents, and their families for interventions.

1) Consumer studies

Little is known about consumers and the information they need to select and prepare nutrient-rich protein foods. Food and nutrition knowledge, a key component of food literacy, is needed by consumers to develop awareness about protein-rich foods and to understand how to select and integrate them into their diet within an increasingly complex and evolving food environment (Thomas et al., 2019). The communication environment is overwhelming, with multiple food trends, marketing and health claims, and contradictory nutrition information that confuses consumers, which may negatively impact dietary choices (Clark et al., 2019). Contradictory messages not only create consumer confusion about which foods to consume, but can also generate doubt about the soundness of valid nutrition recommendations,

undermining the potential success of healthy eating guidance and communication campaigns aimed at educating the public (Nagler, 2014). Lack of consumer knowledge about protein requirements and nutrient-rich protein sources could result in selection of foods based on food trends (e.g., processed foods fortified with extra protein), health claims on packaging, or misinformation in the media. Nutrition experts and other health practitioners need to consider the overload of information that consumers face, address confusion, and develop simplified messaging that is realistic and actionable to improve adherence to Food Guide guidelines (Ramondt and Ramirez, 2019; Webb and Byrd-Bredbenner, 2015). A consumer-centered research program is needed to assess information needs and develop communication strategies, such as surveys, market research, environmental scans, and needs assessments.

2) Knowledge translation methods and tools

Nutrition information is difficult to communicate to the public in an age of information overload, misinformation, and mistrust of science (Garza et al., 2019). Nevertheless, nutrition leaders have the responsibility for ensuring that accurate information reaches the public in formats that are accessible and easy to understand (Garza et al., 2019). The new Food Guide Snapshot and additional tips available online provide basic information and instructions to the public about what and how to eat; however, a few gaps are exposed that could contribute to consumer confusion and misinterpretation. First, consumers may lack the knowledge to select nutritionally adequate sources and combinations of proteins for optimal health without turning to highly processed foods. Second, consumers may lack the skills to integrate plant-based

protein foods such as legumes, lentils and dried peas into their habitual diets. Without additional guidance, consumers may turn to convenient but highly processed plant-based foods (e.g., meatless burgers or meat-free chicken nuggets) that are typically high in nutrients of concern, including sodium, saturated fats and added sugars. Finally, consumers, particularly parents, cite chronic time deficits as a barrier, and may not have the skillset to cook and prepare meals that are nutritious in a time-efficient manner on a regular basis (Fernandez et al., 2019b). Additional resources and tools (e.g., infographic, pamphlets, webinars, YouTube videos, cookbooks) for professionals and the public are needed to support food literacy and reduce Canadians' current dependence on highly processed foods, particularly among busy families. Highly processed foods often supply higher than desired amounts of sodium, fats, free sugars and low amounts of protein, fibre, and vitamins to the diet (Nardocci et al., 2019). Messaging about eating less processed foods needs to be supported with guidance about how to define and identify processed foods to enable the public to select foods that are protein-rich and nutrient-dense (Dwyer et al., 2012). Tools, resources, and messaging need to be tailored to the needs of different media and user groups: children, parents, educators, health professionals, food service professionals. Short instructional online modules or webinars would be appropriate media to convey messaging to educators and health professionals, whereas YouTube videos, cookbooks, and hands-on workshops would be more appropriate for children and parents. Intermediaries like health professionals and educators who have direct contact with the public also need educational resources such as infographics, fact-sheets, posters, and recipes.

Though little is known about the most effective methods to translate nutrition information to the public and elicit enduring behaviour change, general science and public health communication tools and interventions should have theoretical underpinnings that may include diffusion of innovation theory (Rogers, 2003), social cognitive theory (Bandura, 1998), or social marketing (Andreasen, 2002). Existing tools can facilitate the process of identifying goals for different audiences and tailoring strategies accordingly with available expertise and resources (Canadian Institutes of Health Research, 2012). To improve lifelong dietary habits, children should be the main target audience and efforts to develop effective communication and education strategies for this population are needed. These efforts should be implemented in schools, childcare facilities, and directed at parents. While several tips and ideas to integrate Food Guide messages are available online, consumers have to actively seek them out. Increased visibility of existing tools would also help support the assimilation of current messages; however, awareness and consumer education is not enough, nutrition leaders (e.g., Canadian Nutrition Society, Dietitians of Canada, Health Canada) must be recognized as credible authorities on nutrition by proactively differentiating themselves from unreliable sources of nutrition information (Cornish and Moraes, 2015).

Though undocumented, there are also concerns about the potential misinterpretation of the 2019 Food Guide Snapshot. Milk and alternatives are no longer distinctly named, the number of servings of foods are not mentioned, and, unlike the American MyPlate, a glass of water is illustrated next to the healthy plate instead of a glass of milk. The public, the media, foodservice professionals, and nutrition critics are open to interpret or misinterpret the Food Guide

Snapshot. For example, the food and agriculture sector, politicians and the media have suggested that the new Food Guide has eliminated dairy foods completely from its guidance (Gold et al., 2019; Kirkup, 2019). There are even published observations that the foods as depicted in the Food Guide Snapshot would not meet dietary requirements of nutrients such as calcium and vitamin D (Barr, 2019). However, the new Food Guide Snapshot is not intended to function as standalone dietary advice, but rather a flexible tool that is meant to provide simplified dietary guidance to the general population. Additionally, it should be specified that the Food Guide Snapshot is a simple depiction of a plate, which is meant to represent a "rule of thumb" regarding proportions of foods to eat that is easy to apply. It is not intended to convey that every food on the plate should be eaten at every meal, nor that the plate should be used for every single meal. A suite of tools and resources available on the Food Guide website (https://food-guide.canada.ca/) provides additional information about eating that fits with different populations and lifestyle contexts, including how to adapt and apply the messages to breakfast and snacks (Health Canada, 2020). To make it easier to find information about healthy eating a dedicated search bar on the Food Guide website is recommended.

While the new Food Guide has simplified guidance and provided tailored information for different contexts, the shift from portions to proportions has left institutions that serve food to the public with a large gap in guidance about how to apply the information to their menus. Canada's Healthy Eating Patterns, meant to be released in 2019, was intended as complementary resource that would fill the gap by providing guidance on amounts and types of foods to eat, which would help guide food procurement policies in institutions (Health Canada,

2019b). In the absence of the highly anticipated Canada's Healthy Eating Patterns resource, the public and stakeholders are left to make assumptions about the Food Guide Snapshot, which could undermine its efforts. Additional guidance to translate the Food Guide Snapshot is needed, particularly for institutions and food service providers that use it to inform food service policies in childcare centers, schools, long-term care facilities, and primary care institutions.

3) Protein requirements and quality

Studies are needed to understand protein requirements and different protein-based dietary patterns of Canadians. Studying population-wide protein intakes of Canadians is important to identify which subgroups may be at risk of micronutrient deficiencies in association with different levels of protein intake or protein-based dietary patterns. This is particularly important given that vulnerable populations, such as youth and older adults, may be at risk of not meeting current protein RDAs (Berryman et al., 2018). To further understand whether consumers are eating sufficient protein for optimal health, dietary intake data according to dietary protein patterns are needed at different life stages to inform public health messaging and ensure protein or associated nutrients, including calcium, iron, vitamin D, and B12 do not become nutrients of concern. Additionally, there is a need to understand the impact of timing of protein ingestion in relation to the intake of quality protein (protein complementation) and the resultant ability to meet human protein/amino requirements. Monitoring dietary patterns will help tailor specific messages and guidance for different at-risk populations. Tools to measure diet quality and adequacy according to Canada's Food Guide 2019 are needed to

assess and monitor protein status of Canadians over time. A protein calculator that accommodates protein quality and indispensable amino acid profiles could be a useful tool to guide protein assessments of populations at risk of deficiencies.

By 2030, ~9.5 million Canadians will be over the age of 65 (almost 1 in 4 persons) emphasizing a demographic shift that highlights the need to focus on elderly persons (Government of Canada, 2014). There is controversy over the protein needs for this segment of the population that highlights a need for resolution of this controversy and clear messaging in the protein foods category (Courtney-Martin et al., 2016; Traylor et al., 2018). Evidence-based practice guidelines, developed by professional associations (Canadian Nutrition Society and Dietitians of Canada), would also be needed to consider the protein needs of different institutionalized populations and life stages, including older adults.

4) Updated regulatory framework for assessing protein content and applying health claims

For several years, many experts have been calling for an updated process to evaluate protein content of foods to develop more accurate health claims that align with contemporary diets and our food supply (Marinangeli et al., 2017). In Canada, protein content claims are substantiated by the Protein Rating system, based on the protein efficiency ratio (PER) value in conjunction with reasonable daily intakes of a given food; ratings ≥20 represent a “good source” and ratings ≥40 represent an “excellent source” of protein (Canadian Food Inspection Agency, 2018). The official Protein Rating method was positioned by Health Canada in 1981 and

is based on rat growth bioassays (i.e., growth of young rats following the consumption of a reference amount of a protein for 28 days). However, values are based on animals that have different indispensable amino acid requirements than humans, are undergoing a phase of rapid growth, and the quantity of protein actually consumed by the animals may depend on hedonic responses to the type of protein (Marinangeli et al., 2018). Of note, the biggest challenge of the Protein Rating system is that very few PER values are available for foods consisting of two or more protein sources (i.e., mixed proteins) and the information on novel protein foods is very limited.

The limitations of the PER method are well known and it is rarely used by regulators in other countries (Marinangeli and House, 2017). The implications of using the PER method in Canada is a regulatory framework that is prohibitive and does not support nor incentivize innovation within the food industry. Manufacturers are restricted to the types of proteins with known values to include in products, as current methods limit the ability to label whole-plant sources of proteins as a “source of protein”. The new ‘protein foods’ group, which also encourages greater consumption of plant proteins, presents an opportunity to modernize the Canadian regulatory framework. An updated framework that recognizes different sources of protein and better interprets protein quality (particularly for plant and mixed-protein sources) is needed to avoid misleading health claims and to encourage transparency when marketing new food trends. The United States uses the protein PDCAAS, which also has limitations, but is less restrictive.

To overcome PDCAAS limitations, the Food and Agriculture Organization recommends the DIAAS. DIAAS represents the percentage of the total daily requirement of the most limiting indispensable amino acid that would need to be consumed if the estimated average requirement (EAR) for daily intake of a test protein is consumed (Wolfe et al., 2018). As such, DIAAS treats individual amino acids as the nutrients of interest, not crude protein. Unlike PER, both DIAAS and PDCAAS enable complementary protein profiles of mixed meals (e.g., beans and rice) to be ranked as high quality, whereas PER values for each food separately would be low based on the limiting indispensable amino acids - lysine and methionine in rice and beans, respectively (Wolfe et al., 2018). Moving away from PER in favour of DIAAS or even PDCAAS, would need to be evaluated in the context of the Canadian food supply (Marinangeli and House, 2017). Key issues remaining to be solved include the need to harmonize protein quality evaluation processes and interpretation between Canada and the United States, given the strong integration of food supply chains. Economic opportunities do exist to develop innovative nutrient-dense protein foods that are not highly processed, but need to be balanced with transparent protein content claims that are based on accurate assessments not only of content, but of the physiological and health consequences of consuming those proteins.

Recommendations

1) Form a consensus over key messages and devise a comprehensive and regular communication strategy for the protein foods category of the Food Guide

Using a collaborative approach, key messages about translating protein foods to the public need to be developed to avoid consumer confusion.

National public leadership (Health Canada, Public Health Agency of Canada) and collaboration of stakeholders (e.g., Canadian Nutrition Society, Dietitians of Canada, Provinces and Territories, Helderleigh Foundation) are needed to develop evidence-informed key messages about protein foods. These messages should be simple, clear, and take into consideration: 1) protein quality and nutrient density, 2) incorporation of a variety of animal and plant protein sources into the diet, 3) limiting nutrient-poor highly processed protein foods that are high in saturated fats, sodium and/or sugars, and 4) focus on combinations of foods and food groups. A proactive, collective, and transparent approach to messaging that involves consensus from various stakeholders will dampen the potential for consumer misinformation, confusion or mistrust and maximize message credibility. As front-line knowledge translators, registered dietitians and educators are important conduits to support message development. An example of an appropriate message that builds on Food Guide documents is: Eating a combination of protein from whole plant, dairy, and animal foods provide a variety of nutrients that support growth of children and adolescents and help maintain the health of older adults.

National public leadership (Health Canada, Public Health Agency of Canada) and collaboration of stakeholders (e.g., Dietitians of Canada, Canadian Nutrition Society, Provinces and Territories, Helderleigh Foundation) are needed to develop a multi-faceted multi-level communication strategy that includes an array of tools and resources to translate key messages directly to Canadian consumers and via intermediaries such as health professionals and educators. To have the greatest impact on nutritional literacy, special resources and tools are needed to teach educators how to incorporate key messages into curricula and deliver age-appropriate messages to children and youth. Social marketing/public health campaigns developed in partnerships with communication experts (e.g., professional ad agency/media) are needed to get messages to various age-groups of the public in an effective manner through platforms that are relevant to different Canadians audiences. An innovative and relevant social media strategy that builds on the momentum of the revised Canada's Food Guide is key to communicate messages using YouTube/videos, Instagram, Twitter, infographics, recipes, podcasts, and apps. The credibility of messages can be enhanced by partnering with influencers or celebrities promoting evidence-based nutritional practice. Additional resources and tools are needed to train health professionals in communicating evidence-based facts and key consistent messages to patients and consumers. Using multiple communication channels and intermediaries will ensure that key messages are repeated and reinforced, maximizing their potential for exposure and impact. Intermediaries that have contact with the public regularly (educators and health professionals) need readily available good quality resources such as lesson plans and fact-sheets.

2) Review and enforce institutional nutrition policies

Implementation of and adherence to nutrition policies that safeguard the quality of protein food offerings within institutions

Universal Canadian guidelines are a resource that is necessary to set standards for institutions that serve food to vulnerable populations, including childcare facilities, schools, long-term care homes, and hospitals. These guidelines will help institutions reviewing their current nutrition policies to align with the new Food Guide. A universal set of food service standards for institutions will also make guidance clear around how to prioritize 'protein-rich' foods for the needs of different populations (early childhood, children, youth, and older adults). Specific and clear guidance for different populations will eliminate the possibility that institutions will misinterpret the Food Guide and deprioritize protein-rich foods from menus at the expense of cheaper foods. For example, replacing milk with water in childcare settings or long-term care centers. Provinces are encouraged to establish mandatory implementation of nutrition policies that incorporate the universal standards in all institutions that serve food to vulnerable populations.

3) Focus on children and families

Youth are vulnerable to unhealthy food environments and intervening at a young age will support nutrition health later in life

Targeting the home and school environments will ensure that young consumers are getting consistent messages. Educators need to have adequate training to provide consistent messaging. Interventions that occur in early childhood care setting are likely to be most successful in instilling lifelong food literacy and adequate knowledge about the food environment to make independent decisions about healthy foods later in life. Food literacy education directed at youth supports child development, socialization and mental health. Youth are seen as influencers; exposing them to protein-rich plant foods and educating children about the new food guide is expected to have an impact on improving home food environments and creating consumer demand for minimally processed protein-rich foods. Generating interest in sustainable food systems among youth is a key strategy to influence change in society at large.

In alignment with Canada's Dietary Guidelines, it is recognized that food skills and food literacy are needed to select, prepare, and consume protein foods as a component of a healthy diet and is the foundation of nutritional health. Food literacy programs will help build positive relationships with food and is key to developing practical skills that are needed to navigate increasingly complex food environments. Schools are a key institution to educate the new generation of consumers about the new Food Guide and instill lifelong healthy eating practices. Food literacy needs to be supported by provincial policies that includes mandatory home-economics classes or similar programming, adequate funding and resources to support community programs that target vulnerable populations, and training for educators/community leaders. Program content needs to include education and awareness about the food system,

sustainable agriculture, integrating nutrient-dense whole plant-based proteins into the diet, selecting and preparing foods from minimally processed ingredients.

4) Build capacity through training, tools, and resources

Registered dietitians, health professionals, diet technicians and educators need training, tools and resources to educate the public

Intermediaries (registered dietitians, health professionals, and educators) are key conduits involved in educating the public. They need training, appropriate tools and resources to translate credible evidence-informed messages around nutrition and protein foods specifically. Cross-sector partnerships between government, health organizations, professional associations and industry should be leveraged to develop a suite of tools and resources to accommodate the learning needs of different groups of intermediaries. Different strategies can be used to ensure consistent training for groups of intermediaries: education through university course curricula in relevant programs (e.g., medical school), continuing education through webinars and workshops for accredited professionals, train the trainer programs, and expert champions within workplaces. Retailers can develop training modules for in-store dietitians to provide education at point of purchase to consumers. Clinical practice guidelines or a position statement about protein consumption with Canada's Food Guide 2019 would help ensure messages are interpreted and delivered in a consistent and coherent manner among different groups of health professionals. Diet technicians in hospitals and cooks in schools and long-term care centers likely need training about how to prepare appetizing plant-based protein-rich

meals for patients and students. Educators are health professionals and may not have the knowledge or skills to translate nutritional guidance about protein to students without specific guidance; therefore, educator-friendly resources are needed for this group of intermediaries.

5) Address knowledge gaps across the research continuum

Creating a research program dedicated to exploring protein foods research gaps

Evidence is needed across the research continuum from clinical to epidemiological to consumer studies. The formation of an expert group is needed to develop research priorities around protein foods. Research priorities that need to be investigated include:

1) Supporting protein literacy in families with young children
2) Protein needs and dietary adequacy of a growing population of older adults
3) Healthy transition to a diet that places greater emphasis on plant-based proteins, including vegan or vegetarian diets
4) Impact of processed plant-based products on caloric intakes and nutrient adequacy
5) Development of an updated regulatory framework to assess the protein quality of foods from across the processing spectrum (minimally- to highly-processed) and their subsequent positioning as sources of dietary protein

Conclusion

Canada's new Food Guide now depicts all dietary sources of protein, dairy, fish, poultry, meat, tofu, nuts and seeds, as a single 'protein foods' group and emphasizes selecting plant-based

protein sources more often. The new simplified Food Guide and its messages are a shift to a potentially healthier dietary pattern that align with a more sustainable food system. However, with the new Food Guide there are gaps in dietary research on protein requirements and adequacy that have been exposed. There are also concerns about the public's ability to follow new dietary guidance without adequate food literacy, the lack of resources to integrate the new food guide into institutional food policies is troublesome, and an inadequate regulatory framework to guide product development and health claims is restrictive. To address key knowledge and research gaps, nutrition leaders need to come to a consensus over key messages to develop an appropriate strategy and suite of tools and resources to support practitioners in translating messages to the public. Furthermore, children and families should be the primary target population for protein food literacy to ensure the public has the knowledge and skills, to select, prepare and consume nutrient-rich sources of protein without resorting to ultra-processed foods. Finally, research is needed to uncover the most appropriate dietary protein recommendations for mixed and plant-based diets.

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Tables

Table 1. Comparison of Canada's Food Guide 2007 to 2019 (adapted and updated from Bush et al., 2007)		
	Canada's Food Guide, 2007	Canada's Food Guide, 2019
Title	Eating Well with Canada's Food Guide	Canada's Food Guide Snapshot
Format	6-page comprehensive foldable document	2-page snapshot with simple key messages Complementary information available online
Layout	Complicated	Simple
Philosophy and context	Description of a healthy eating pattern intended to reduce the risk of chronic disease and obesity, and meet nutrient requirements for most Canadians. Focuses on the amount and types of foods to eat.	Description of a healthy eating pattern intended to reduce the risk of chronic diseases and meet nutrient requirements for most Canadians. Focuses on a variety of foods to eat and provides guidance on selecting, preparing and consuming food.
Dietary patterns	Nine patterns depending on age and gender for Canadians two and older	One pattern for all Canadians two years and older
Food groups	Vegetables and fruit Grain products Milk and alternatives Meat and alternatives	Vegetables and fruits Whole grain foods Protein foods
Depiction	Rainbow	Plate
Number of portions	Ranges depending on gender, age, and life-stage	Replaced by universal recommendations based on proportions of the plate. Canada's Healthy Eating Patterns are a separate resource for health professionals and policy makers to provide additional guidance and should have been released in 2019
Serving sizes	Specified for each food group and type of food within each group	Replaced by universal recommendations based on proportions of the plate. Canada's Healthy Eating

		Patterns are a separate resource for health professionals and policy makers to provide additional guidance and should have been released in 2019
Key messages	Enjoy a variety of foods from the four food groups Eat at least one dark green and one orange vegetable each day. Choose vegetables and fruit prepared with little or no added fat, sugar or salt. Have vegetables and fruit more often than juice. Make at least half of your grain products whole grain each day. Choose grain products that are lower in fat, sugar or salt. Drink skim, 1%, or 2% milk each day. Select lower fat milk alternatives. Have meat alternatives such as beans, lentils and tofu often. Eat at least two Food Guide Servings of fish each week. Select lean meat and alternatives prepared with little or no added fat or salt.	Eat a variety of healthy foods each day* Have plenty of vegetables and fruits* Choose whole grain foods* Eat protein foods*
Oils and fats	Oils and fats: Include a small amount – 30 to 45 mL (2 to 3 Tbsp) – of unsaturated fat each day. This includes oil used for cooking, salad dressings, margarine and mayonnaise. Use vegetable oils such as canola, olive and soybean. Choose soft margarines that are low in saturated	Advice to choose foods with healthy fats available online only

	and trans fats. Limit butter, hard margarine, lard and shortening.	
Beverages	Satisfy your thirst with water! Drink water regularly. It's a calorie-free way to quench your thirst. Drink more water in hot weather or when you are very active.	Make water the drink of choice*
Physical activity	It is recommended that adults accumulate at least 2 1⁄2 hours of moderate to vigorous physical activity each week and that children and youth accumulate at least 60 minutes per day. You don't have to do it all at once. Choose a variety of activities spread throughout the week. Walk wherever you can – get off the bus early, use the stairs. Spend less time being inactive such as watching TV or playing computer games.	Activity recommendations available online*
Body weight	To be active every day is a step towards better health and a healthy body weight. Another important step towards better health and a healthy body weight is to follow Canada's Food Guide by: Eating the recommended amount and type of food each day.	No messages about body weight
Discretionary foods/Processed foods	Limiting foods and beverages high in calories, fat, sugar or salt (sodium) such as cakes and pastries, chocolate and candies, cookies and granola bars, doughnuts and muffins, ice cream and frozen desserts, french fries, potato chips, nachos and other salty snacks, alcohol, fruit flavoured drinks,	Limit foods high in sodium, sugars or saturated fat Limit highly processed foods (online only)

	soft drinks, sports and energy drinks, and sweetened hot or cold drinks	
Nutrition Facts Table and labelling	Read the label: Compare the Nutrition Facts table on food labels to choose products that contain less fat, saturated fat, trans fat, sugar and sodium. Keep in mind that the calories and nutrients listed are for the amount of food found at the top of the Nutrition Facts table. Limit trans fat: When a Nutrition Facts table is not available, ask for nutrition information to choose foods lower in trans and saturated fats. Request nutrition information about menu items when eating out to help you make healthier choices	Use food labels*
Eating with others and food enjoyment	Enjoy eating with family and friends!	Eat meals with others* Enjoy your food* Healthy eating is more than the foods that you eat
Mindful eating	Take time to eat and savour every bite!	Be mindful or your eating habits*
Food marketing	None	Be aware of food marketing*
Food preparation	None	Cook more often Limit highly processed foods
Health professionals and policy makers	Included in the 6-page document	Three foundational guidelines about how and what to eat in a separate document
Environmental considerations	None	The Canadian Dietary Guidelines acknowledge that food choices can have an impact on the environment and provide advice about reducing food waste and increasing intake of plant-based foods

Website and additional guidance documents	Ready-made presentations Worksheets/handouts Practical tips to help follow Canada's Food Guide Interactive tools and resources Background information	Interactive mobile-friendly website Expanded guidance on key messages including benefits and how to follow guidance Recipes and Vignettes Tips for healthy eating
Languages	English/French	English/French, Arabic, Dene, Farsi (Persian), German, Greek, Gujurati, Hindi, Inuinnaqtun, Inuktitut (Baffin, Nunatsiatvut, Nunavik), Italian, Korean, Michif, Ojibwe, Oji-Cree, Plains Cree Polish, Portuguese, Punjabi, Russian, Simplified Chinese (Mandarin), Spanish, Tagalog, Tamil, Traditional Chinese, Ukrainian, Urdu, Vietnamese
Adaptation	First nations, Inuit and Métis	Publication of a guide adapted for indigenous populations expected
Consultations	Yes	Yes
Industry involvement	Yes	No
***additional information available in guidance documents or on the website**		

Table 2. Summary of knowledge gaps and concerns about protein foods in the new Canada's Food Guide and opportunities for action

Recommendations from Canada's Dietary Guidelines	Concern	Opportunities for action
Guideline 1: Nutritious foods are the foundation for healthy eating.		
Vegetables, fruit, whole grains, and protein foods should be consumed regularly. Among protein foods, consume plant-based more often. Protein foods include legumes, nuts, seeds, tofu, fortified soy beverage, fish, shellfish, eggs, poultry, lean red meat including wild game, lower fat milk, lower fat yogurts, lower fat kefir, and cheeses lower in fat and sodium.	It is uncertain that consumers are able to identify or understand how to select nutrient-rich sources of protein foods. Plant-forward food trends, marketing, and lack of knowledge may lead consumers to select nutrient-poor plant foods that replace traditional protein-rich foods (e.g., nut-based beverages instead of milk). Additionally, plant-based, animal-based, and highly processed sources of protein foods are not equivalent in nutritional quality and consumers may lack the knowledge to select the best combination of foods to avoid nutrient deficiencies (or excesses). There is a research gap about the optimal quantity and combinations of protein foods to consume, particularly in the context of a mixed-diet or plant only diet. Furthermore, without explicit guidance, institutions will misinterpret the Food Guide to provide non-nutritionally adequate sources, combinations or quantities of protein to vulnerable populations.	Ensure consistent translation of Food Guide messages about protein foods to the public that include: 1) Clarity on nutrient-rich protein foods 2) Importance of consuming a variety of protein-rich foods from various sources (animals and plants) for optimal nutrient intakes 3) How to substitute animal proteins for nutritionally adequate and complementary plant proteins for individuals who follow mainly plant-based diets Provide consumer education that focuses on how to select and prepare nutrient-rich protein foods from a variety of sources (animals, plants, dairy). Focus on educating young consumers (children, youth and their families) for lifelong healthy eating practices, through home economics classes in schools. Clear guidance for food service in childcare institutions, schools, hospitals, and long-term residences.
Foods that contain mostly unsaturated fat should replace foods that contain mostly saturated fat.	Messages around unsaturated fat have not been successful in reducing saturated fat intake, primarily due to high intakes of processed foods.	Consumer education and awareness about know how to select and prepare a variety of nutrient-rich protein foods that are minimally processed (meats, eggs, dairy, tofu, nuts, seeds and legumes)
Water should be the beverage of choice.	Misinterpretation that milk has been removed from the Food	Consumer education and awareness that milk is nutrient-

	Guide or is 'unhealthy'. Institutions may be inclined to remove milk (or fortified alternatives) as a beverage choice at lunch or snack.	rich beverage that contributes important vitamins to the diet. Unsweetened fortified soy beverages may be alternate sources of protein and nutrients; however, many grain or nut-based beverages contain little protein and may contain excess free sugars. Low-protein nut beverages should not replace milk and fortified soy for children. Clear explicit guidance for institutions to include protein-rich unsweetened beverages
Guideline 2: Processed or prepared foods and beverages should not be consumed regularly		
Processed or prepared foods and beverages that contribute to excess sodium, free sugars, or saturated fat undermine healthy eating and should not be consumed regularly.	The term processed foods is ambiguous and not well understood is a range of processing for both health and less healthy foods. There are concerns that companies may use the term 'plant-based' or 'high-in' protein to portray highly processed foods as healthy.	Consumer education and awareness about selecting and preparing nutrient-rich protein foods that contain little sodium, saturated fat, and added sugars. Clear regulatory framework to assess protein quality and quantity in foods and provide health claims.
Guideline 3: Food skills are needed to support healthy eating		
Food skills are needed to navigate the complex food environment and support healthy eating	Concerns that consumers will opt for highly processed protein foods because they lack the knowledge and skills to select and prepare minimally processed nutrient-rich protein foods	Ensure food literacy is taught to all children and youth across Canada so that the new generation is equipped to navigate our current complex food environment. Develop a fair and transparent regulatory framework that protects consumers against misleading advertising and health claims.
Cooking and food preparation using nutritious foods should be promoted as a practical way to support healthy eating.	Consumers may lack the knowledge, skills, time and motivation to cook and prepare nutritious protein foods. In particular, there is little knowledge about how to prepare nutritious protein-rich plant-based meals.	Good quality resources need to be easily accessible and widely available that provide instructions about preparing simple protein rich meals, including plant-based protein sources.
Food labels should be promoted as a tool to help Canadians make informed food choices	Protein quality is not reflected on food labels and protein content of a food may be misinterpreted as quality. Health claims based on protein content may be misleading.	Develop an updated framework that portrays protein content accurately, takes into account protein quality, and allows for transparent health claims