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Food environments: Where people meet the food system

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Can dietary guidelines support the transformation of food systems to foster human and planetary health?

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ABSTRACT

There is substantial evidence of the need for efforts to drastically shift the food system to enable eating patterns consistent with human and planetary health. This will have implications for food production, processing, distribution and consumption. Eating patterns low in fruit, vegetables, whole grains, nuts and seeds and omega-3 fatty acids are contributing to morbidity and mortality around the world. This highlights the need for interventions to increase accessibility to foods that are currently under-consumed relative to recommendations. However, some of those foods are not produced in sufficient quantity, while others are being consumed at an environmentally unsustainable rate. Consequently, food-based dietary guidelines, traditionally aimed at providing evidence-based recommendations for healthy eating, appear to be evolving towards a holistic approach that embraces the complexity of eating patterns, the roles they play in society and the factors that influence them, as well as environmental sustainability considerations. The recent update to Canada's Food Guide has taken such an approach, providing an opportunity to consider the extent to which such food-based dietary guidelines can support strategies to transform the food system.

INTRODUCTION

Dietary risk factors, such as inadequate intake of fruit, vegetables, nuts and seeds, whole grains and omega-3 fatty acids and excessive intake of sodium, have been shown to be responsible for more deaths than any other risk factor (Afshin et al., 2019). At the same time, there is a growing body of literature documenting the non-trivial contribution

of eating patterns to climate change, biodiversity loss, water scarcity and deforestation (Friel et al., 2014; Willett et al., 2019). As we learn more about how influences in the outer rings of the social-ecological model (including foods and beverages offered in a range of settings) shape our eating patterns (Hawkes et al., 2013; Swinburn et al., 2013), the growing body of evidence has spurred efforts to transform the food system and the food environments within (Swinburn et al., 2013; Afshin et al., 2019; Willett et al., 2019).

In this context, it is relevant to consider food-based dietary guidelines (FBDGs) and the role they may play in influencing the food system. FBDGs are considered important in promoting healthy eating patterns among populations and placing nutrition concerns on national and regional agendas (WHO and FAO, 1998). We draw on Canada's recently updated FBDGs (Health Canada, 2019a; 2019b) in considering whether such guidelines may support food-system transformation to enable healthy and sustainable eating patterns, defined as "diets with low environmental impacts which contribute to food and nutrition security and to healthy life for present and future generations" (FAO, 2010).

FBDGs: A SHIFT TOWARDS HOLISM AND RELEVANCE TO THE FOOD SYSTEM

Traditionally, FBDGs have been based predominantly on evidence on eating patterns and human health, outlining patterns of food consumption likely to meet nutrient needs and reduce risk of chronic disease (WHO and FAO, 1998). The focus on optimizing human health is consistent with a

reductionist approach that has been criticized for its “lack of attention and importance given to the broader impacts of food and nutrition systems” (Ridgway et al., 2019). Recently, there have been indications of a shift to more holistic FBDGs that embrace the complexity of eating patterns, the roles they play in society (including cultural and social, as well as their potential impacts on the environment) and the factors that influence them (such as the characteristics of food environments, including retail outlets and restaurants) (Ministry of Health of Brazil, 2015; Ridgway et al., 2019). Perhaps the most prominent example of a holistic approach are the Dietary Guidelines for the Brazilian Population, which focus on the ways in which foods are prepared and consumed (Ministry of Health of Brazil, 2015; Monteiro et al., 2015). Brazil’s guidelines are unique among FBDGs in integrating physical, mental and emotional health considerations, as well as the cultural, socioeconomic, environmental, biological and behavioural dimensions of food and nutrition.

To the extent they are implemented and adopted, FBDGs can ensure that food- and nutrition-related policies are grounded in evidence (WHO and FAO, 1998). For example, FBDGs can influence policies related to foods and beverages offered in locations such as retail settings and schools. Indeed, international frameworks related to the food system have identified the value of dietary guidelines in supporting effective policy implementation (Swinburn et al., 2013). Given the changes needed to eating patterns to “optimise human, and protect planetary, health” (Forouhi and Unwin, 2019), multiple reinforcing policy strategies are critical. As they consider a range of factors influencing eating patterns and the impacts of those patterns beyond human health, FBDGs that take a holistic approach could potentially support such a suite of strategies.

FBDGs IN CANADA

In Canada, FBDGs have been in place since at least 1942, when the country introduced its Official Food Rules (Health Canada, 2007), which emphasized meeting nutrient requirements in the context of wartime rationing and were aligned with national agricultural policies of the time (Ostry, 2006). The 1944 Food Rules appear to mark the first dietary guidance in Canada accompanied by a graphical representation (Health Canada, 2007). Several food guides have been published since, with a gradual shift away from the prevention of nutrient deficiencies to the reduction of chronic disease through a focus on recommended food groups, such as fruits and vegetables, as well as dietary components to be consumed

in limited amounts, such as fats and sugars. As evidence regarding eating patterns and chronic disease accumulated, FBDGs became more nuanced, incorporating details on the number of servings to consume daily from each food group, as well as messages regarding dietary components to limit (Bush and Kirkpatrick, 2003). Messages on energy balance and moderation first appeared in 1982, with recommendations to limit fat, sugar, salt and alcohol. Such messaging persisted into the 2007 Guide (Katamay et al., 2007), which specified the number of servings of each food group to consume each day based on energy needs, emphasized choosing lean options and those prepared with little fat, sugar and salt, and highlighted “other foods” to be consumed in moderation because they are high in dietary components that should be limited. There was also a version of the 2007 Food Guide that included foods traditionally consumed by indigenous peoples, acknowledging the cultural relevance of particular foods (Health Canada, 2007).

The 2019 Food Guide, intended for Canadians aged two years and older, is a departure from prior Canadian FBDGs in that it moves away from prescriptive advice in relation to food groups and servings towards an explicit recognition that, “Healthy eating is about more than the foods you eat. It is also about where, when, why and how you eat.” (Health Canada, 2019b). The consumer-targeted graphical representation, consisting of a plate, presents the key message: “Eat a variety of healthy foods each day” (Health Canada, 2019b).¹ The use of a plate as opposed to other graphical representations is consistent with international trends towards a focus on proportionality (Martínez et al., 2015). Fruits and vegetables make up half of the plate, with whole grains and proteins each making up a quarter and water emphasized as the drink of choice. The 2019 edition also includes foods relevant to populations including indigenous peoples. Healthy Eating Recommendations to support the key messages note to be mindful of eating habits, cook more often, enjoy food, and eat meals with others (Box 1). Recommendations to choose protein foods that come from plants more often, as well as to limit highly processed foods and foods high in sodium, sugars and saturated fats are also presented separately from the main graphic. The use of food labelling and awareness of food marketing are encouraged. The guide does not make specific reference to environmentally sustainable eating practices, but the recommended pattern of eating bears similarity to the EAT-Lancet Commission’s “planetary health diet” (The EAT-Lancet Commission, 2019; Willett et al., 2019).

¹ <https://food-guide.canada.ca/en/>

Box 1. KEY MESSAGES ACCOMPANYING CANADA'S FOOD GUIDE²**Make it a habit to eat a variety of healthy foods each day****Eat plenty of vegetables and fruits, whole grain foods and protein foods. Choose protein foods that come from plants more often**

- Choose foods with healthy fats instead of saturated fat

Limit highly processed foods. If you choose these foods, eat them less often and in small amounts

- Prepare meals and snacks using ingredients that have little to no added sodium, sugars or saturated fat
- Choose healthier menu options when eating out

Make water your drink of choice

- Replace sugary drinks with water

Use food labels**Be aware that food marketing can influence your choices****Healthy eating is more than the foods you eat. It is also about where, when, why and how you eat****Be mindful of your eating habits**

- Take time to eat
- Notice when you are hungry and when you are full

Cook more often

- Plan what you eat
- Involve others in planning and preparing meals

Enjoy your food

- Culture and food traditions can be a part of healthy eating

Eat meals with others

Source: Health Canada (2019b).

Accompanying the consumer-focused resources are Canada's Dietary Guidelines for Health Professionals and Policy Makers (Health Canada, 2019a).³ The Guidelines outline the rationale behind the key messages presented by the Food Guide and stress the influence of the food environment in terms of foods available in varied settings, such as homes, retail outlets and restaurants, as well as the impacts of nutrition information and food marketing, including through social media. There is an emphasis on food skills and food literacy as critical elements enabling Canadians to navigate food environments and enjoy healthy eating.

Constraints on time and the availability and accessibility of resources, as well as social, cultural and gender norms are also mentioned (Health Canada, 2019a). The guidelines note unique considerations for indigenous populations, including the limited availability of foods acquired in traditional ways. They also acknowledge the impact of food production, processing, distribution and consumption on the environment, with a focus on conserving soil, water

and air by choosing eating patterns higher in plant-based and lower in animal-based foods, as well as reducing food waste (Health Canada, 2019a).

Canada's Food Guide and Dietary Guidelines were informed by an evidence review that examined convincing findings on food and health (Health Canada, 2018). Dietary guidelines from other countries were considered and Health Canada undertook extensive consultation with experts from a variety of fields, including members of provincial and territorial organizations, health professional organizations and indigenous organizations. Online consultations were open to members of the public, the food industry, non-governmental organizations and experts in nutrition. A comprehensive transparency process was implemented, restricting direct dialogue between members of the food industry and governmental officials and requiring public disclosure of the content of meetings between government and other stakeholders (beyond experts) (Health Canada, 2018). The evidence review identified areas for which additional information is needed, such as environmentally sustainable eating patterns and the dietary intakes of populations such as First Nations, Inuit and Métis (Health Canada, 2018).

² <https://food-guide.canada.ca/en/food-guide-snapshot/>.

³ <https://food-guide.canada.ca/static/assets/pdf/CDG-EN-2018.pdf>.

THE IMPLICATIONS OF CANADA'S FOOD GUIDE AND DIETARY GUIDELINES FOR CANADA'S FOOD SYSTEM

Canada's Food Guide communicates the government's official messages on recommended eating patterns. With its greater consideration of the determinants of food choice, the updated guidance may support a shift towards healthy and sustainable eating patterns. However, given the current food system and the food environments within it, as well as social determinants, following Canada's Food Guide is challenging, particularly for sub-populations, such as those affected by food insecurity (Kirkpatrick and Tarasuk, 2008) and/or those living in rural and remote regions, including indigenous peoples (Health Canada, 2019a). Indeed, prior surveillance efforts have shown that the alignment of eating patterns with dietary guidance is suboptimal (Garriguet, 2007). To some extent, the Dietary Guidelines provide the beginnings of a roadmap for action to foster the implementation of the key recommendations outlined by Canada's Food Guide. A stated objective of the Guidelines is to support improvements in the Canadian food environment and it is noted that they serve as "a resource for developing nutrition policies, programs, and educational resources for members of the Canadian population two years of age and older" (Health Canada, 2019a). As noted, there is a focus on food skills (including the use of food labelling), as well as food marketing and misinformation.

These emphases align with the federal government's broader Healthy Eating Strategy, which is aimed at "making the healthy choice the easy choice" (Health Canada, 2016). The Healthy Eating Strategy incorporates a variety of policy and regulatory approaches to support healthier food environments, including the elimination of trans fats in the food supply, guidelines for sodium reformulation in packaged and restaurant foods, restrictions on marketing foods with minimal nutritional value to children, and changes to food labelling. There is also support for greater accessibility to healthier foods in northern communities, where food environments are a major barrier to healthy eating due to the lack of availability and high prices of healthy, safe and culturally relevant foods. More recently, the Government announced A Food Policy for Canada, a multi-sectoral approach with four pillars related to health, economic growth, food security and the environment (Government of Canada, 2019). Concrete actions have not yet been clearly delineated, but Canada's Food Guide and Dietary Guidelines could serve as the foundation for identifying priorities for action. Overall, the introduction

of these strategies appears to reflect a move towards a joined-up systems approach to food in Canada, with the promise of creating and implementing synergistic policies to create meaningful food-system change.

There are many considerations at play in orchestrating food-system change, including agricultural, ecological, environmental, political and social (Ridgway et al., 2019), with challenges in terms of aligning priorities and overcoming the siloed approach that has historically predominated (MacRae, 2011; Herforth et al., 2014). Comprehensive policies are needed across multiple sectors, as implementing the key recommendations within the updated FBDGs has broad implications for the food that is produced, offered and consumed.

Changes are needed to the foods and beverages offered or sold in a range of settings, including retail outlets, workplaces, schools and recreation facilities, in addition to their promotion and pricing (Swinburn et al., 2013).

Specifically, there needs to be a continued focus on reducing the prominence of foods consumed at levels that have deleterious effects on human and planetary health (with eating patterns high in these foods referred to by Willett et al. (2019) as "lose-lose diets"), including animal proteins and packaged processed foods (Friel et al., 2014). Canada's Dietary Guidelines specifically state that foods and beverages offered in publicly funded institutions should align with the Guidelines (with a focus on limiting highly processed foods and beverages) (Health Canada, 2019a), which may prove a useful, though challenging, launchpad for all levels of government to implement the updated FBDs.

Changing what is offered in institutions, as well as in homes and retail outlets, depends on larger-scale efforts to improve the alignment of the overall food supply with the FBDGs. Relevant initiatives in Canada typically focus on particular dietary components of concern, such as sodium and trans fats (Health Canada, 2016) and may be considered reductionist in nature from that perspective. There remains much to be done to shift the overall balance of the foods and beverages offered across the food stream to better align with recommendations. For example, at a global level, fruit and vegetable production levels are not sufficient to support increases in consumption to recommended levels (K.C. et al., 2018). In Canada, a significant portion of fruit and vegetables is imported and the shortfall will need to be met with increased yields, possibly by shifting from other crops (K.C. et al., 2018), through genetic engineering or other technological solutions, such as greenhouses. However, these solutions may carry

their own environmental impacts, such as the energy used for heating and refrigeration (Mercier et al., 2017; University of Michigan Center for Sustainable Systems, 2018).

Furthermore, considerations related to crop destruction by severe weather and other sources of waste at points along the food stream cannot be overlooked. Moreover, expanding the distribution and, thus, the accessibility of particular foods may have negative consequences for the environment (Friel et al., 2014). For example, resources accompanying Canada's Food Guide list fish and shellfish among the nutritious foods that should form the foundation of healthy eating, but there are environmental considerations related to overfishing and the contamination of wild fish, as well as to aquaculture (Willett et al., 2019). Within rural and remote communities, concerns associated with inequitable access to healthy foods are relevant, with implications for transportation, which also raises environmental issues. There are, thus, multiple priorities to be balanced to maximize both human and planetary health.

At the consumption level, dietary decision-making is a complex process involving taste and preferences, convenience, social and cultural factors, and socioeconomic considerations (Angus Reid Institute, 2019). Within this context, population uptake of the updated Canada's Food Guide remains to be seen. Although there were relatively high levels of self-reported awareness and use of the prior version, consumer awareness of key messages, such as the food groups and recommendations for consumption within those groups, was low (Vanderlee et al., 2015). The simplified messaging of the updated FBDGs may make it possible for consumers to better take up the key recommendations. However, to implement them, they must have the skills and self-efficacy to navigate food environments (including those that do not foster healthy and sustainable eating) to select, purchase and prepare healthy foods, and, critically, the financial and other resources to do so (Thomas et al., 2019).

Increasing food skills and food literacy may be supported by policies and programmes within a range of settings, including schools and health-care facilities. For example, some school programmes are beginning to address gardening, food preparation and composting (Stephens et al., 2016) to expand children's exposure to the food system. Such programming must be implemented within the context of broader policies to address the social determinants of health, as more than 1 in 10 households within Canada are affected by food insecurity (Tarasuk et al., 2014).

For indigenous communities, steps towards greater food sovereignty and security must encompass policies to

support equity and access to healthy foods, addressing traditional foods as well as local capacity-building (Lemke and Delormier, 2017).

As noted in Canada's Dietary Guidelines, "supporting healthy eating is a shared responsibility" (Health Canada, 2019a). Indeed, creating a food system that supports human and planetary health will require a holistic perspective that marries considerations from multiple sectors (Ridgway et al., 2019). A systems lens that considers trade-offs among priorities may be useful for balancing considerations (Herforth et al., 2014; Ridgway et al., 2019), but it has been noted that such approaches "are not yet receiving sufficient political support or attention in the face of organized and concentrated opposition" (Ridgway et al., 2019). With its broader focus compared to prior FBDGs, as well as the process used in its development, Canada's Food Guide may herald the beginning of a systems approach to food and nutrition in Canada. A question to be addressed is how to effectively engage the range of relevant stakeholders, including the food industry. In light of the barriers to incorporating planetary health into FBDGs observed in other countries (Ridgway et al., 2019), Canada's approach to developing its Food Guide, including broad consultation with limits on direct industry involvement (Health Canada, 2018) may inform efforts to develop and implement relevant policies elsewhere.

CONCLUSION

There are indications of an evolution of FBDGs away from a reductionist focus on foods to eat to promote nutritional health towards the integration of a range of considerations relevant to the food system, including those related to the food environments that influence our choices, as well as planetary health. Canada's Food Guide and Dietary Guidelines emphasize an overall pattern of healthy eating that resembles those recommended for environmental sustainability, incorporate food literacy and social aspects of eating, and highlight the need for food environments to align with the guidance. It remains to be seen to what extent Canada's Food Guide and the earlier Dietary Guidelines for the Brazilian Population, which took a similar tack, will be implemented. However, the shift towards embracing the complexity of eating patterns and the food system may hold promise in terms of supporting the identification and implementation of policies that have the potential to transform the food system to enable healthy and sustainable eating patterns. A concerted effort will be needed to ensure that policies are cohesive and go beyond a reductionist focus on specific dietary components to address multiple facets of the food system.

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A world free from hunger and all forms of malnutrition is attainable in this generation



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