Developing an *Evidence Review Cycle* Model for Canadian Dietary Guidance

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ABSTRACT

Formulating dietary guidance involves navigating a large volume of substantive, conflicting evidence. Canada's guidance is determined after periodic evidence reviews. Health Canada identified the need for a more formal and systematic process to gather, assess, and analyze evidence. This led to the development of the *Evidence Review Cycle* model for Canada's dietary guidance. The *Evidence Review Cycle* consists of 5 steps that form a dynamic, iterative process to promote evidence-based, transparent, and proactive decision making. Resulting actions may include enhancing the implementation of guidance, revising guidance, or developing new guidance. Here, the development of this model is described, including considerations for implementation.

Key Words: dietary guidance, Canada's Food Guide, evidence review, nutrition education (*J Nutr Educ Behav.* 2016;48:77-83.)

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INTRODUCTION

The influence of nutrition on population health is well-established. Individual food choices intersect with multiple determinants of health within the physical, social, and economic environment, which may increase or decrease risk for nutrition-related chronic diseases. The Global Burden of Diseases, Injuries, and Risk Factors Study 2010¹ indicated that 6 of the top 15 risk factors that account for the most disease burden in Canada were related to nutrition. Cancer, heart disease, and diabetes ranked in the top 10 causes of death in Canada in 2011, at 30%, 21%, and 3%, respectively.² Furthermore, an estimated 26% of Canadian adults were obese and an additional 34% were classified as overweight in 2011.³ The high risk for obesity associated comorbidities

translates into an enormous health care cost, with a 2006 estimate of \$3.9 billion in direct health care costs and \$3.2 in indirect costs.⁴

Dietary guidance informs nutrition and health education, policies, and programs; supports consistency in healthy eating messages; and provides a standard for the assessment of dietary intakes of Canadians.⁵ The Government of Canada has formally recognized the importance of food intake in health since 1942, with the release of the *Official Food Rules*, which acknowledged wartime food rationing while endeavoring to prevent nutritional deficiencies and improve the health of Canadians.^{6,7} The latest iteration was *Eating Well with Canada's Food Guide* (2007), which targets the healthy, general population aged ≥ 2 years. Canada's nutrition policies and programs for

the health and safety of Canadians are formulated, in part, using the Dietary Reference Intakes (DRIs) developed by Canadian and American scientists through a process overseen by the Institute of Medicine.⁸

The development of Canadian guidance was previously documented for the 1992 and 2007 Canada's Food Guides.⁹ Briefly, the evidence review has historically coincided with the identification of a potential need to revise guidance (eg, evolving science, revisions to nutrition standards, or changes to the food supply), and thus has occurred periodically. Globally, many countries have dietary guidance in place and most engage in periodic evidence reviews rather than a standardized process.¹⁰ This differs from the US, which has a legislated process to review and update dietary guidelines for Americans every 5 years.¹¹

Canada's dietary guidance development process is generally aligned with the World Health Organization (WHO) *Preparation and Use of Food-Based Dietary Guidelines*,¹⁰ because the process has consistently involved stakeholder consultation and considered how Canadian dietary guidance is used, the nutritional intake and status of the population, the environment within which Canadians make food choices, as well as the

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literature on associations between food and chronic disease prevention. Formulating dietary guidance on a national level has become increasingly complex, given the growing volume of substantive, conflicting evidence that aims to clarify the role of nutrition in the health of the population, understand the food environment, and describe food intake and nutritional status.

The growing volume of evidence and public interest in nutrition policy stimulated Health Canada to establish a mechanism for more regular and proactive review of the evidence underpinning dietary guidance. The *Evidence Review Cycle* (ERC) model was developed to formalize the evidence review process; ensure dietary guidance remains scientifically sound, relevant and useful; and identify facilitators and barriers to healthy eating behaviors.

DISCUSSION

Development of the ERC Model

The ERC model was developed in 2012 by Health Canada to frame the

evidence review process for dietary guidance. The first step in building the ERC model was to adapt Gillespie's¹² conceptual framework for developing a dietary guidance system (Figure 1). Consideration was given to other models, including the Food and Agriculture Organization of the United Nations/WHO *Preparation and Use of Food-Based Dietary Guidelines*¹³; however, the broader system approach related to dietary guidance—and the interrelated factors that affect this system—made the Gillespie Framework more relevant. Furthermore, adapting this framework promoted consistency because it was used to inform the previous Canada's Food Guides.¹⁴

Basis of the ERC Model

Gillespie's¹² Framework positions dietary guidance as central to nutrition education; thus, development is linked to implementing a dietary guidance system. The adapted framework advances this work in several ways to capture the complexity of food and health research and enhance the rigor needed for evidence review. The Gillespie Framework was refined

to include 5 factors as direct influences on developing dietary guidance: nutrition standards, food supply, population status, the role of specific foods and dietary patterns, and the policy environment. Nutrition standards, a modification of the Gillespie Framework specification of nutrition needs, were included to better reflect the use of DRIs in assessing and planning diets. These standards reflect the current state of scientific knowledge on nutrient requirements; furthermore, the DRIs are the nutrient basis of the current Canada's Food Guide (2007) dietary pattern. Gillespie's terminology of food constraints was modified to the food supply and to reflect broader considerations such as food fortification, the nutrient composition of food, and food availability.¹⁵ Like Gillespie's Framework, the ERC model cites population status—consumption patterns, nutritional status, and health status—as a direct influence on dietary guidance. National surveillance data inform the development of dietary guidance by revealing trends in sociodemographic characteristics; food consumption patterns; nutritional and weight status; and health status of the population, such as disease pattern change and chronic disease prevalence.

The role of specific foods and dietary patterns in improving health and reducing the risk of chronic disease was added to the adapted framework to reflect the important scientific associations between food and health status.¹⁴ The policy environment was another addition, because the timing of food and nutrition policies as well as associated resources have a direct influence when linked to public health priorities that affect the food environment and the communication of dietary guidance. For example, if nutrition regulations change (eg, fortification policies), this is assessed against the current dietary pattern to ensure that the guidance still meets the needs of Canadians. The policy environment also has an indirect influence, because nutrition-related policies across government departments are also considered (eg, agricultural and environmental policies determine food availability, which in turn affects the content and application of dietary guidance).

Figure 1. Framework for developing and implementing a dietary guidance system. (Reprinted from Gillespie A. A conceptual framework for developing a dietary guidance system. *J Nutr Educ*. 1985;17:139–142. Copyright [1985], with permission from Elsevier.)

The process of implementing dietary guidance in Gillespie's¹² Framework captured a number of interrelated factors, including the direct influence of intermediary (ie, health professionals, public health practitioners, health educators, and communicators who deliver dietary guidance to Canadians) and consumer inputs on stakeholder awareness and understanding of dietary guidance. Stakeholders are broadly defined as individuals, groups, or organizations that may be directly affected by or interested in a proposed policy.¹⁶ Consumer inputs represent predispositions such as the skills, beliefs, attitudes, and habits that shape the audience's approach and response to messaging.¹² These predispositions are linked to cultural, psychological, and lifestyle factors that impact food

choices¹⁷ and may influence the audience's level of awareness and knowledge of and attitude toward dietary guidance tools.¹⁴ Intermediaries influence the ways in which dietary guidance is communicated and integrated into nutrition policies and programs. For example, intermediaries choose the communication channel and formulate organizational policies, the source of information and evidence-base used, the content of messages, and the implementation strategies.¹⁸ Intermediary and consumer inputs indirectly influence each other, as well as dietary guidance messaging, including awareness, knowledge, and attitudes related to existing healthy eating guidance tools.¹⁴

Gillespie's¹² Framework was also enhanced to include the information

environment, which reflects the evolving context in which dietary guidance is developed and implemented. External sources of diet and nutrition information (eg, messages from mass media, communicating with peers) may complement or contradict national dietary guidance. Thus, the information environment can influence the key outcomes, which in the adapted framework included acceptance, confidence, knowledge, and integration/use. Assessing these outcomes aids in determining the usefulness of dietary guidance.

Building on the Adapted Framework

The adapted framework (Figure 2) became the foundation for the

Figure 2. Adapted framework for developing dietary guidance.

development of the ERC model, as 3 key input areas that frame the scope of the evidence review were identified: scientific basis, Canadian context, and use of guidance (Figure 3). The first input, the scientific basis, captures how Canada's guidance is based on scientific information on diet and health and the current nutrient standards. The second input, the Canadian context, takes into account the environment in which food choices are made, or the current patterns of consumption and behaviors associated with food choices. The third input, use of dietary guidance, assesses awareness of existing guidance as well as acceptance, integration, and use, which includes determining facilitators and barriers to using dietary guidance for the general population, as well as subgroups. These key areas are consistent with evidence used during development of the 2007 Canada's Food Guide (ie, science, environmental context, and use and understanding of guidance).

Health Canada sought input on the adapted framework from key informants, including representatives from academia, health professional organizations, and federal, provincial, and international governments who had experience developing or implementing the 2007 Canada's Food Guide or other food-based dietary

guidance. There was strong support for the comprehensive scope of influencing factors that were captured in the adapted framework. It was suggested that the evidence review process encompass Canada's dietary guidance across the lifespan rather than be specific to Canada's Food Guide. Some informants recommended reporting the outcome of review activities every 3–5 years. It was recommended that the decision-making process be simple and clear. Furthermore, mechanisms were needed to consider the appropriate timing and level of engagement of stakeholders.

The adapted framework, along with input from the key informants, was used to alter the proposed evidence review process. For example, it was determined that a cycle would better illustrate the iterative process of evidence review. Thus, the framework was further adapted to incorporate elements of the Health Canada Decision-Making Framework for Identifying, Assessing, and Managing Risk, a concise, cyclical method for making health-related decisions that outlines a series of interconnected steps that broadly include issue identification, risk assessment, risk management, and stakeholder engagement.¹⁹ A risk management framework is appropriate in the context of dietary guidance evidence review; risk assessment is used to formulate nutrition

standards and guidelines, because the potential harm of inadequate and excessive intakes is considered.^{20,21}

The ERC Model

The ERC model (Figure 4, Table) includes the following steps as part of an iterative cycle. Evidence from the 3 key areas appear as red spheres within each stage of the model to emphasize how these components are considered at each step of the ERC.

The first step in the model is to gather data using defined inclusion and exclusion criteria, and identify relevant findings for each key input area. Data sources include peer-reviewed literature, scientific reports, national surveillance data, and evaluation studies. Various approaches can be used to gather and assess data (eg, literature searches, key informant interviews). In the second step, Assess, findings are gathered for each key input area. The data gathered are assessed and findings are identified that may have implications for dietary guidance, or how dietary guidance is used and understood. Further analysis of findings may be required before the next step in the cycle (eg, food pattern modeling).

The third step is the part of the process where the spheres for the key input areas begin to overlap.

Figure 3. Key input areas from the adapted framework to inform decisions about dietary guidance categorized into 3 key areas.

Figure 4. Health Canada's *Evidence Review Cycle* for dietary guidance.

Table. Overview of *Evidence Review Cycle* for Dietary Guidance

Step	Description
Gather	<ul style="list-style-type: none"> Gather data for each evidence input
Assess	<ul style="list-style-type: none"> Assess data from each evidence input and identify relevant findings Gather more data through further analyses, as needed
Synthesize	<ul style="list-style-type: none"> Synthesize overall relevant findings from each input area
Identify actions	<ul style="list-style-type: none"> Identify areas of focus and issues of concern Identify potential options for action Consider roles, perspectives, and priorities
Act	<ul style="list-style-type: none"> Implement actions Communication process and results

Here, the relevant findings from the assessment step are synthesized to identify relationships among the key input areas. The Synthesize step leads to the fourth step, in which results of the collective analysis of key findings are reviewed and potential areas of focus or issues of concern are identified (eg, subgroups that are not meeting recommended intakes, are at high risk of nutrition-related chronic disease, and do not report understanding of specific elements of dietary guidance). Furthermore, potential options for action are identified, which involves assessing approaches that could be initiated or strengthened to address areas of focus or issues of concern. The outputs are dietary guidance relevant actions, and thus can include dietary guidelines, educational tools to strengthen dietary guidance messages, recommendations for future surveillance activities, and knowledge translation activities. Each approach is assessed in relation to roles, public health priorities, and stakeholder perspectives. This leads

to identification of the most feasible and relevant actions.

In the final step of the process, Act, the process and results of the evidence review are broadly communicated to stakeholders and actions are implemented. Evaluation is in the center of the cycle because this will allow for the cycle and components of the process to be strengthened. Furthermore, stakeholder input is sought at various steps in the cycle to ensure adequate opportunities for public involvement. Strategies for effectively involving stakeholders will be based on *The Health Canada Policy Toolkit for Public Involvement in Decision Making*.²² For example, scientific experts may be asked to assess the methodology used to gather food and health data, whereas the insights of educators and communicators may be used to gather evidence related to the use of current guidance.

IMPLICATIONS FOR RESEARCH AND PRACTICE

Here, the development of the ERC model for Canada's dietary guidance is described. Although Health Canada has always reviewed the evidence base, development of the ERC model supports a more rigorous, formalized process that involves systematically gathered evidence and a framework to support decision making. Countries planning to undertake evidence review for national dietary guidance can consider adapting this model to support their work.

The ERC process could lead to various outcomes (eg, it may confirm areas where current guidance aligns with the evidence; thus, no changes are needed). This review cycle may also lead to actions that can support the implementation of current guidance, such as enhanced communication of dietary guidance. Furthermore, if the scientific basis, the Canadian context, or the use of dietary guidance has changed considerably, and knowledge gaps are identified, this may provide evidence that current guidance should be revised or new guidance developed. If revisions occur, this is undertaken with an understanding that time

must be allowed for implementation, population uptake, and evaluation.

Decision-making frameworks are regularly used to formulate policies. The ERC model combines elements from a cyclical decision-making framework for risk assessment and the adapted framework. These processes are compatible, because there are multiple similarities between frameworks for risk assessment and the development of nutrition standards. For example, when comparing steps of a risk analysis framework for nutrition standards and the WHO framework for developing food-based dietary guidelines,¹³ it was demonstrated that intake assessment and nutrient-related risk characterization were equivalent to various components of the WHO framework, including evaluating nutrient and food intake in the population, identifying deficiency or excess in subgroups, and evaluating dietary intake compared with established food–nutrient disease relationships.²⁰ Thus, integrating these frameworks was appropriate as well as critical in formulating the iterative process illustrated in the final ERC model.

More than 100 countries have food-based dietary guidelines, which are reviewed in different ways depending on the country's context.¹⁰ For example, the US has a formal process to review the evidence supporting the Dietary Guidelines for Americans, which involves expert committees, comprehensive literature reviews, and public meetings, and which is mandated to occur every 5 years.¹¹ Countries undertaking evidence review for dietary guidance must plan for resource allocation—financial and human—because this is a major consideration in implementing the ERC model. Leveraging existing resources and international collaboration will be important strategies to ensure the ERC is sustainable.

The ERC model allows for flexibility so that emerging issues can be reviewed (eg, the release of reports on food and health or national-level data; emerging literature on relevant topics such as the influence of dietary patterns on health, nutrition-related factors and mental health, and the health of the growing older adult population; changes to nutrition standards or the food supply; and new

nutrition promotion tools). It is anticipated that the data gathering and assessment steps would occur on a regular basis, and evidence synthesis, dissemination, and identification of actions could be undertaken every 5 years. The actions identified may or may not indicate the need for revisions to dietary guidance.

Key strengths of the ERC development process were the use of an established decision-making framework and the adaptation of a model previously applied to dietary guidance work. Key informant input was sought and incorporated to develop the conceptual model and process. The ERC model can be strengthened in various ways. The process could be improved by explicitly including various lenses to be applied throughout the cycle (eg, the social determinants of health and health equity). Furthermore, the ERC model is intended to facilitate decision making related to dietary guidance, which requires planning and resources to identify and target specific research needs.

The newly formulated, iterative ERC model can be applied to conceptualize a review of the evidence that underpins dietary guidance. Formalizing the evidence review process will inform actions and stimulate regular reporting to ensure that current and future guidance remains scientifically sound, relevant, and useful.

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CONFLICT OF INTEREST

The authors have not stated any conflicts of interest.