# Food literacy and healthy diets of Canadian parents: Associations and evaluation of the Eat Well Campaign

**Thèse**

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# Résumé

Une mauvaise alimentation est un facteur de risque important contribuant au fardeau des maladies chroniques. La littéracie alimentaire contribue à l'adoption de saines habitudes alimentaires et aide les consommateurs à développer de la résilience envers les effets négatifs de l'environnement alimentaire malsain qui offre une grande variété d'aliments à petits prix, souvent riches en énergie et de pauvre qualité nutritionnelle. Un besoin de réaliser de la recherche au Canada sur les déterminants de la littéracie alimentaire et leur association à la qualité de l'alimentation a déjà été identifié. La campagne « Bien manger » est une initiative portant sur la saine alimentation développée par Santé Canada pour sensibiliser les parents canadiens à la saine alimentation et augmenter leurs connaissances ainsi que leur participation à la planification des repas familiaux – une composante de la littéracie alimentaire. Les partenariats multisectoriels avec les détaillants alimentaires, les médias et les organisations de santé ont facilité la diffusion de la campagne et ont contribué à l'accroissement de sa portée et de son efficacité auprès des parents canadiens. La planification de repas n'est pas une composante de la littéracie alimentaire qui a été bien documentée dans la littérature, et jamais aucune intervention populationnelle sur ce sujet n'a fait objet d'une évaluation. De telles évaluations sont nécessaires pour fournir de la rétroaction aux parties prenantes concernant des pistes d'améliorations d'initiatives en santé et pour identifier des stratégies optimales visant à soutenir les progrès en santé publique. L'objectif principal de cette thèse est de mener des évaluations de processus et d'impacts de la campagne « Bien manger », explorer les associations entre la littéracie alimentaire et la qualité de l'alimentation des parents canadiens et de transférer les connaissances auprès des décideurs et des parties prenantes.

Pour réaliser les objectifs, un échantillon composé de partenaires multisectoriels de Santé Canada a été interrogé et une enquête a été réalisée auprès de parents canadiens. Dans un premier temps, une évaluation qualitative du processus d'implantation a été effectuée avec 21 partenaires pour déterminer quels facteurs ont influencé leur décision d'adopter la campagne « Bien manger » et pour identifier les

facteurs facilitants et les obstacles reliés à l'implantation de la campagne. Dans un deuxième temps, une évaluation quantitative a été effectuée auprès de 964 parents canadiens pour caractériser la portée de la campagne et déterminer les effets sur les attitudes reliés à la planification des repas familiaux. Dans un troisième temps, des associations entre la littéracie alimentaire, le statut d'emploi et la qualité de l'alimentation ont été examinés au sein de 767 parents.

L'évaluation de processus a mis au jour de nombreux éléments clés à prendre en considération lors de futures collaborations. Notamment, indépendamment de la mission de chaque organisation, celles partageant des valeurs compatibles ont de bonnes chances d'être de bons partenaires. En revanche, la planification collaborative et la communication sont nécessaires pour maintenir l'engagement de l'organisation et pour soutenir l'implantation des activités. L'évaluation d'impact a dévoilé que le rappel de la campagne était plus important chez les francophones, les personnes sans éducation universitaire et les personnes à faibles revenus. Les taux de rappels ont largement varié à travers le pays, avec les taux les moins élevés à Vancouver, Winnipeg et Toronto et les taux les plus élevés à Québec et dans les régions rurales du Québec. De plus, le rappel de la campagne était associé à des attitudes plus favorables envers la planification de repas. Finalement, les analyses exploratoires ont dévoilé que le statut d'emploi n'est pas associé à la littéracie alimentaire, que le temps était un obstacle important à la préparation de repas, et que les dimensions de connaissances en nutrition et conceptualisation d'aliments étaient associées à une meilleure qualité alimentaire.

En conclusion, les futures initiatives de santé publique en matière de nutrition peuvent être renforcées par l'implication de partenaires avec des valeurs semblables dès l'étape de planification de l'intervention. Les initiatives futures devraient être élaborées en ciblant les dimensions de littéracie alimentaire qui ont la plus grande chance d'influencer des facteurs nutritionnels positives telles que les dimensions de connaissances alimentaires ou conceptualisation alimentaire, et prendre en

considération des stratégies permettant aux parents de surmonter les obstacles reliés au manque de temps.

# Abstract

Poor diet is a major risk factor for non-communicable chronic diseases such as obesity, cardiovascular disease and certain cancers. Food literacy supports healthy eating practices and can help individuals build resilience to food environments that provide consumers with a large variety of energy-dense nutrient poor foods in abundance at low-costs. A need for further research in Canada on the determinants of food literacy and their relationship to diet quality has previously been identified. The Eat Well Campaign (Food Skills) (EWC) is a healthy eating initiative developed by Health Canada to increase parents' awareness, knowledge of and engagement in meal planning – a component of food literacy. Cross-sector partnerships with the retail food industry, media and health organizations facilitated the diffusion of the EWC and were pivotal to extend its reach and effectiveness. Meal planning is not well described in the literature and no population-wide communication interventions targeting meal planning have been evaluated to date. Evaluations are essential to provide feedback to stakeholders on improving health initiatives, identify optimal strategies to support advances in public health and ensure government accountability. The main objective of this thesis was to conduct process and impact evaluations of the EWC, explore associations between food literacy and diet quality of Canadian parents and put this information into context for decision makers and stakeholders.

To achieve these objectives, a purposeful sample of Health Canada's cross-sector partners were interviewed and a cross-section of Canadian parents were surveyed. First, a qualitative process evaluation was conducted with 21 cross-sector partners to determine which factors influenced their decision to adopt the EWC and identify facilitators and barriers that they experienced during the EWC implementation. Second, a quantitative impact evaluation was conducted with 964 parents from across Canada to characterise the reach (i.e., awareness) of the EWC and determine whether the campaign's awareness influenced meal planning attitudes, behaviors and self-efficacy. Third, associations between different food literacy dimensions, employment status and diet quality were investigated in a subsample of 767 parents.

The process evaluation revealed several key considerations for future collaborations with partners from multiple sectors. Of note, regardless of mission, organizations with similar values are likely to make stronger partnerships; however, advanced collaborative planning and consistent communication are necessary to maintain organizational engagement and activity implementation. The impact evaluation revealed that the highest rates of campaign awareness were among French-speakers, parents without university education and those from low-income households. Awareness varied greatly across the country with the lowest rates in Vancouver, Winnipeg and Toronto, and the highest rates in Quebec City and rural Quebec. Additionally, campaign awareness was associated with more positive attitudes towards meal planning. Finally, exploratory analyses of different food literacy dimensions revealed that employment status was not associated with food literacy, time was a major limitation for home-based meal preparation and nutrition knowledge and food conceptualisation are significantly associated with diet quality.

In conclusion, future public health nutrition initiatives can be strengthened by involving partners with similar values during the intervention planning stage. Future interventions should target dimensions of food literacy that are most likely to influence dietary outcomes such as nutrition knowledge or food conceptualisation and need to consider strategies to overcome time barriers to healthy eating.

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# List of abbreviations

BMI, Body mass index

CCHS, Canadian Community Health Survey

CFG, Canada's Food Guide

CI, Confidence interval

CIHR, Canadian Institutes of Health Research

COREQ, Consolidated criteria for reporting qualitative research

DALYs, Disability-adjusted life years

DONE, Determinants Of Diet and Eating

DRD, Diet-related diseases

EWC, Eat Well Campaign: Food Skills

FFQ, Food frequency questionnaire

FPC, Food Preparation Checklist

HC, Health Canada

HEAEI, Healthy Eating Awareness and Education Initiatives

HEI, Healthy Eating Index

INAF, Institute of Nutrition and Functional Foods

NCCD, Non-communicable chronic diseases

NGO, Non-governmental organisation

OR, Odds ratio

SD, Standard deviation

SRWG, Sodium Reduction Working Group

SSB, Sugar-sweetened beverages

UPF, Ultra-processed foods

WHO, World Health Organization

# Dedication

*To my grandmother, Elizabeth Fernandez, and aunt, Francesca Bruneau, strong women who believed in education.*

*Follow your passion. Stay true to yourself. Never follow someone else's path unless you're in the woods and you're lost and you see a path. By all means, you should follow that* – Ellen DeGeneres

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First, I would like to thank my PhD supervisor, Dr. Véronique Provencher, for taking a risk by accepting an outsider into her team. She trusted me to take ownership of the Skills Study and had confidence that I would develop it in an appropriate direction. I appreciate the independence she gave me to pursue interests beyond the Skills Study and my PhD, allowing me the freedom to develop skills as a researcher by engaging in countless external leadership activities, part-time work, collaborations and training. Whether it was a manuscript, a conference abstract, a travel award, a summer school or one of the dozens of scholarship applications, she supported all my endeavours.

Second, a special thanks to my co-supervisor, Dr. Sophie Desroches, who was a like a primary supervisor, embracing me into her lab and treating me like one of her very own students. She always provided valuable constructive feedback that helped me refine and fine-tune all my manuscripts and abstracts. She has never declined to review any of my work, no matter how short notice. I will always be grateful for her support in applying to the CIHR Fellowship for the first time and revising every single line of my application – it made a difference and was integral to my success.

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Also, I would like to thank my collaborators. Dr. Marie Marquis always had good advice to push my qualitative work forward and critical questions to improve our manuscripts.

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# Foreword

The work presented in this thesis was conducted by the candidate under the supervision of Dr. Véronique Provencher and Dr. Sophie Desroches. The candidate led all data analysis, interpretation, authorship of publications, dissemination of results at conferences and knowledge transfer activities, under the supervision of the principal investigator and co-investigators. This thesis reports the results from the Skills Study, a three-part research project that included: 1) a process evaluation of Health Canada's (HC) Eat Well Campaign: Food Skills (EWC), 2) an impact evaluation of the EWC and 3) exploratory analyses describing the food literacy of Canadian parents. Parts 1 and 2 are part of a unique project that allowed for the independent evaluation of a "real-world" food literacy intervention developed and disseminated to Canadians by the Federal government. It reports on the 'reach', 'effectiveness', 'adoption' and 'implementation' of the EWC, dimensions of the RE-AIM evaluation framework, and has resulted in the preparation of three original manuscripts. Part 3 builds on Part 2 through two formative studies that help to better understand the associations between different components of food literacy and dietary intakes of Canadian parents. Furthermore, Part 3 helps better understand time-related barriers of home-based food preparation faced by Canadian parents. Part 3 has resulted in the preparation of two original manuscripts.

The Skills Study was funded by the Canadian Institutes of Health Research (CIHR) led by principal investigator Dr. Véronique Provencher and co-investigators Dr. Sophie Desroches and Dr. Marie Marquis. Additionally, the work presented in this thesis was made possible with the assistance of several individuals. Namely, our collaborator and co-author, Dr. Alexandre Lebel, project coordinator, Mylène Turcotte, qualitative research assistant, Joëlle Dufour, and statistical analysis support by Pierre Gagnon. Finally, research assistants (Geneviève Ouellette-St-Hilaire, Myriam Landry and Diedre Pyke) supported participant recruitment. Five of seven of the chapters from this thesis are manuscripts that have been accepted for publication or are currently under revision at peer-reviewed journals.

**Chapter 2:** Fernandez MA, Desroches S, Turcotte M, Marquis M, Dufour J, Provencher V. Factors influencing the adoption of a healthy eating campaign by federal cross-sector partners: a qualitative study. BMC Public Health. 2016;20(16):904.

The candidate developed data analysis methodology, analyzed the data and wrote, reviewed and edited the manuscript. This manuscript is a qualitative study about the adoption of the EWC and was the first part of the process evaluation of the campaign that was conducted with HC's partners. This study reports on the key factors that influenced different kinds of partners from the retail food industry, the media and health organizations to partner with HC to promote food literacy to Canadian parents. From this study, key recommendations are provided for public health organizations that wish to engage in partnerships to promote nutrition initiatives to the public.

**Chapter 3:** Fernandez MA, Desroches S, Marquis M, Turcotte M, Provencher V. Facilitators and barriers experienced by federal cross-sector partners during the implementation of a healthy eating campaign. Public Health Nutr. 2017;30(13):2318-28.

The candidate developed the data analysis methodology, analysed the data and wrote, reviewed and edited the manuscript. This manuscript is a qualitative study about the implementation of the EWC and was the second part the process evaluation of the campaign that was conducted with HC's partners. This study reports on the main factors that helped or hindered the implementation of the EWC by HC's partners. Results from this study informed the development of recommendations for public health organizations (including HC) to strengthen collaborations when working with different kinds of partners (in kind and paid) as well as from different sectors (retail food, media and health).

**Chapter 4**: Fernandez MA, Desroches S, Marquis M, Lebel A, Turcotte M, Provencher V. Promoting meal planning through mass media: Awareness of a nutrition campaign among Canadian parents. Public Health Nutr. Submitted on December 10, 2018.

The candidate contributed to the study design, collected and analyzed the data and wrote, reviewed and edited the manuscript. This manuscript is a quantitative study

about the impacts of the EWC on Canadian parents and reports on the reach and effectiveness dimensions of the campaign. Due to the cross-sectional nature of this study, it focuses on the reach (i.e., awareness) of the campaign rather than effectiveness. Through a thorough investigation of the awareness of the EWC among Canadian parents, this chapter reports on the diverse and segmented nature of the target audience and provides insights to better reach Canadians in future initiatives.

**Chapter 5**: Fernandez MA, Desroches S, Marquis M, Lebel A, Turcotte M, Provencher V. Which food literacy items are associated with diet quality? Br Food J. Submitted on November 2, 2018.

The candidate designed the study, collected and analyzed the data and wrote, reviewed and edited the manuscript. This manuscript is a quantitative study that uses the same database as Chapter 4 to explore the associations between the food skills of Canadian parents and their diet quality. This is a unique study that identifies specific components of food literacy that are important targets of future research and interventions aimed at improving dietary intakes. Additionally, this chapter reports on gender differences in food literacy among parents responsible for household food preparation.

**Chapter 6**: Fernandez MA, Desroches S, Marquis M, Turcotte M, Provencher V. Full-time employment, diet quality and food skills of Canadian parents Can J Diet Pract Res. Accepted for publication on September 5, 2018.

The candidate designed the study, collected and analyzed the data and wrote, reviewed and edited the manuscript. This manuscript is a quantitative study that uses the same database as Chapter 4 to explore the associations between the employment status of Canadian parents and their food skills and diet quality. This study draws attention to time as an important barrier to home-based food preparation, which is a greater barrier for employed parents. Findings suggest that clinicians and public health practitioners need to consider time-scarcity when providing counseling to patients/clients or when developing future healthy eating interventions.

In addition to the five peer-reviewed publications contained in this thesis, there are lay-publications and science outreach activities that were conducted and have been included as appendices. An invited publication entitled “Selecting cross-sector partners to work with the federal government on promoting healthy eating” was prepared and published in February 2016 by the Global Fruit and Veg Newsletter, an international publication for food and nutrition professionals (Appendix 1). Finally, an end of project knowledge translation lay language summary of the EWC evaluation was prepared for HC in September 2018. This document was intended to be an overview of results from the Skills Study evaluation and is presented in the form of a PowerPoint slide deck. It was prepared following feedback from HC at an in-person knowledge translation and exchange meeting with the Office of Nutrition Policy and Promotion that took place in Ottawa on June 18, 2018 (Appendix 2).

Results from this thesis highlight the complex nature of food literacy, the challenges of using mass media to promote nutrition and the best ways to integrate cross-sector partners into health promotion. Furthermore, it will identify and discuss knowledge gaps and much needed future research in food literacy and nutrition promotion.

# Chapter 1 - Introduction

## General introduction

Food and diet-related factors have a major influence on population health and can lead to reduced disability-adjusted life years (DALYs) and premature death (1). Poor diet has surpassed tobacco use as the leading risk factor for cardiovascular disease and mortality in Canada and other developed nations (2). Furthermore, diet-related aspects dominate lifestyle risk factors for cancer and obesity prevention worldwide (3). Of the four major risk factors for noncommunicable chronic diseases (NCCD), diet is believed to make a larger contribution to the disease burden than physical activity, smoking and alcohol combined (4). In addition to lost lives and lower quality of life, these NCCD pose a growing economic burden on society with exorbitant health costs, particularly in nations with public health care systems (5). In Canada, alone, inadequate vegetable and fruit intake have been attributed to economic losses of 3.3 billion dollars annually through direct and indirect health care expenses (6). Unhealthy eating in general (i.e., not meeting intakes of protective foods and exceeding intakes of harmful foods) represents an economic burden of 13.8 billion dollars in Canada, which is similar to the burden associated with smoking and greater than physical inactivity (7).

Although there is no standard definition or consensus of what constitutes a healthy diet, it can be characterised by common features; rich in plant-based foods and minimally processed foods (8). Individual foods that are commonly known to be healthful have been identified through epidemiological studies to be protective against common NCCD (e.g., obesity, type 2 diabetes, osteoporosis, cardiovascular disease) and include nuts and seeds, whole-grain cereals, legumes, fruits and vegetables (9). While specific recommendations vary from country to country, optimal intake of these food items are generally consistent with global food-based dietary guidelines and healthy dietary patterns like the Mediterranean diet (9, 10). Despite long-standing dietary guidance provided by national and international health agencies through food-based dietary guidelines, their impact on human health has been minimal (11). In contrast, poor diet, associated with greater risk of NCCD, can be characterized by high intakes of red

meats, processed meats, refined grains and sugar (12). These diets provide inadequate intakes of vegetables, fruits and whole grains and are high in processed foods that are energy-dense and nutrient-poor (12). The obesity epidemic, in part, has been attributed to an international food supply that is rooted in inexpensive refined grains, vegetable oils and added sugars providing energy-dense nutrient-poor foods in abundance (13). These foods are not only readily available and economical, but they also taste good, appealing to the senses of consumers (13). Home-based food preparation (i.e., food literacy) is thought to be associated with 'nutrition resilience' or the ability to make healthy dietary decisions (13). However, finding effective ways to prompt the public to choose nutrient-dense foods that provide less of a sensory appeal and little apparent immediate health benefits, over easy to consume highly palatable processed foods is a major public health challenge.

Dietary choices are complex and based on a multitude of factors that include personal preferences, social norms, sociodemographic factors (e.g., education and income), nutrition knowledge, cooking skills as well as health status (14, 15). Additionally, health behavior change involves various spheres of influence including environmental factors and individual motivations and abilities (15). To modify and sustain improvements in dietary behaviors, a combination of individual and societal changes needs to be made. All types of stakeholders need to be included when addressing the complex global problems related to diet and nutrition (16). This includes the food industry (16).

In a scientific statement made by the American Heart Association, a number of population-based approaches to improve lifestyle habits (reduce smoking, improve diet or increase physical activity) were evaluated (17). Among these approaches, media and education campaigns, as part of a multi-component strategy, are considered as an effective strategy to increase knowledge and consumption of healthy foods (17). Evidence, primarily from quasi-experimental studies, supports the use of focused mass media campaigns as a policy lever to help modify dietary risk factors, particularly fruits and vegetables and sodium; however, further investigation is needed to evaluate campaign intensity and penetration as well as other dietary risk factors or practices (18).

Unhealthy diets, driven by obesogenic food environments and food systems, are the leading cause for poor health due to NCCD globally. Both qualitative and quantitative evidence are needed to improve public health outcomes (19). Identifying appropriate targets for public health nutrition initiatives as well as evaluating current and past interventions will contribute to building an evidence base that will lead to more effective population-level policies and programs that combat poor diet.

The Eat Well Campaign: Food Skills (EWC) developed by Health Canada (HC) is a unique initiative, implemented in 2013, which focused on using mass media communication to promote an uncommon topic — meal planning and family inclusion in meal preparation. The topic of this campaign diverged from traditional campaigns providing nutritional education on consuming healthy foods (i.e., increasing fruit and vegetable intakes) to focus on food literacy. It was seen as a means to support healthy eating and healthy weights within the family environment by addressing time barriers. To my knowledge, the work presented in this thesis is the first evaluation of a national mass media campaign on meal planning — a component of food literacy. Parts 1 and 2 of this thesis (Chapters 2–4) will address the impacts of a "real-world" public health initiative through third-party process and impact evaluations of the EWC. Through knowledge transfer and exchange activities presented in appendices 1 and 2, findings are intended to inform decision makers such as HC about improving future population nutrition initiatives. To complement findings from the evaluation study and further provide learnings for future initiatives, Part 3 of this thesis (Chapters 5 and 6) presents two observational studies that identify knowledge gaps and practical topics to target in new food literacy interventions.

## Determinants of nutrition-related practices

While the fact that diet and nutrition are major determinants of NCCDs worldwide is well known, the rationale and unique contextual factors that drive individuals to make risky decisions about their nutritional health, i.e., poor dietary practices, are not fully understood (15). The determinants and drivers of dietary practices (food choice and

eating behavior) and nutrition are complex and involve individual, interpersonal, environmental and policy levels of influence and action (20, 21). Common determinants of nutrition and food choice that impact population health include physiological, food preferences, perceptions of healthy eating, psychological factors, physical environments, and the economic environment (21), nutrition communication, social context, socioeconomic status and demographic characteristics (22), personal motivation, support (social and environmental), self-efficacy, knowledge and skills (15). While there is abundant literature on the individual determinants of healthy eating, there are still significant knowledge gaps about larger collective determinants, particularly relating to food environments and policies. The majority of studies conducted apply weak designs (e.g., lack of control or comparison groups) that assess associations between risk factors and dietary outcomes rather than behavioral mechanisms, limiting conclusions. Furthermore, many studies do not use validated tools to assess behaviors or measure dietary outcomes (23, 24). Despite these limitations, there is evidence that supports several areas of action that have potential to be successful in nutrition behavioral interventions: 1) social support and modelling, particularly among youth, 2) parental modeling of eating behaviors and parenting practices that support healthy eating habits among children, 3) availability and accessibility of healthy foods, particularly in schools and workplaces, 4) improving diet quality among low socioeconomic households (15). Nevertheless, a greater understanding of the motivations and abilities for dietary behavior change is essential, and stronger knowledge about opportunities for change is also needed (15). In particular, understanding the complex interactions about how environmental and policy-level factors support individual food choice and healthy eating would be valuable (21).

To be effective, dietary interventions need to be rooted in behavior change theories that take into consideration individual motivations as well environmental change strategies to promote action and opportunities for change (25). The Determinants of Nutrition and Eating (DONE) Framework is currently attempting to map out the complex factors that affect dietary outcomes by quantifying their contribution to population-level impacts and estimate their potential to be modified (20). This is one method to achieve a functional

framework for dietary behavioral interventions that is rooted in sound theory and based on evidence from studies with strong designs (25). Intended as a dynamic flexible tool to prioritize research questions and intervention development, it lists general categories related to the determinants of eating practices and their outcomes (20) (Figure 1.1).

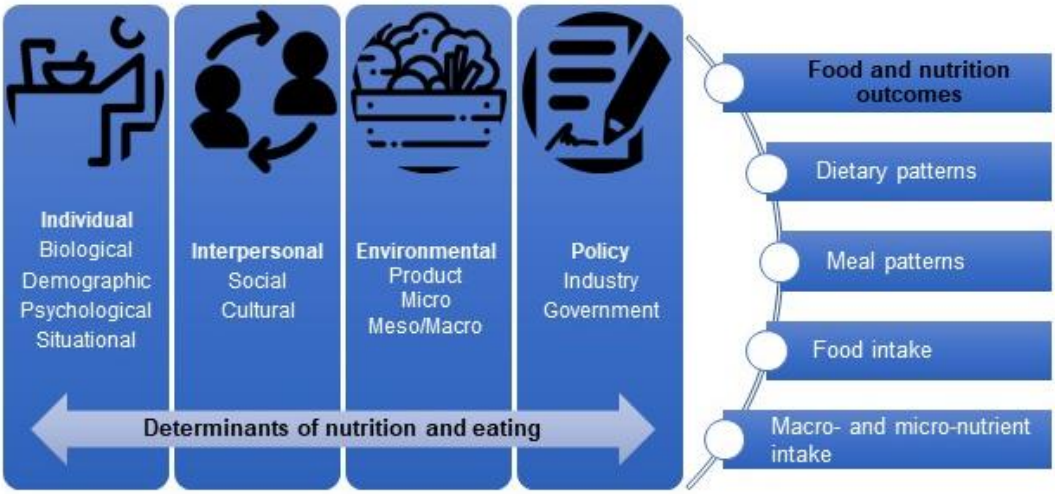


**Figure 1.1** The determinants and outcomes of nutrition and eating adapted from the DONE Framework (20). Icons made by Freepik from www.flaticon.com

By identifying points of leverage that are most likely to be modifiable, researchers and public health practitioners have points of entry into changing dietary practices of the public (24). The challenge, however, as mentioned above, is that there are few 'dynamic' research designs (e.g., repeated measures over a long period of time or assessment of interactions between behavioral variables) that are able to adequately assess nutritional behaviors and directly link their impacts to dietary outcomes (24). In light of the current quality of dietary evidence, nutrition priorities are influenced by a combination of evidence and expert opinion.

Among nutrition determinants, the DONE framework (26) has identified several attributes of food literacy (27). While the factors with the greatest potential for action (i.e., opportunities for modification) and impacts are thought to be environmental, individual and interpersonal-level factors are investigated more frequently (28). The DONE Framework has ranked 305 separate determinants of nutrition and eating according to

priorities for research identified by experts from over a hundred institutions (26). While environmental level determinants dominate the top research priorities that have been identified, interpersonal level determinants that focus on parental influences on eating behaviors are prominent (parental modeling, recommendations, nutrition knowledge, food habits, cooking and portion size habits) (Table 1) (26). Furthermore, parental factors were not just ranked as top research priorities, but also highly appraised for their potential to be modifiable and have population-level effects (26). Interventions to address the determinants of healthy eating need to focus on the most important factors with the greatest likelihood of being changed (15). Parental or family environments represent a potentially important cluster of nutrition determinants to target. Research on the familial influences of healthy eating in children and youth has also been identified as a research priority in Canada (29).

**Table 1.1** Top 35 research priorities on determinants of nutrition and eating out of 305 individual, interpersonal, environmental and policy level determinants identified by experts in the DONE framework (26).

| Rank | Determinant | Level | Category |
|---|---|---|---|
| 1 | Food accessibility | Environmental | Environment food availability and accessibility |
| 2 | Sensory appeal | Environmental | Intrinsic product attributes |
| 3 | Neighbourhood healthy food availability | Environmental | Environment food availability and accessibility |
| 4 | Food availability | Environmental | Home food availability and accessibility |
| 5 | Product package size | Environmental | Extrinsic product attributes |
| 6 | Health consciousness | Individual | Health cognitions |
| 7 | Portion size | Environmental | Portion size |
| 8 | Price | Environmental | Extrinsic product attributes |
| 9 | Presence of food cues | Environmental | Exposure to food promotion |
| **10** | **Parental modeling** | **Interpersonal** | **Parental behaviors** |
| 11 | Nutrition self-efficacy | Individual | Food knowledge, skills and abilities |
| 12 | Dietary knowledge | Individual | Food knowledge, skills and abilities |
| **13** | **Parental recommendations** | **Interpersonal** | **Social support** |
| **14** | **Parental nutrition knowledge** | **Interpersonal** | **Parental resources and risk factors** |

| | | | |
|---|---|---|---|
| 15 | Food preferences | Individual | Sensory perceptions |
| 16 | Nutritional composition | Environmental | Intrinsic product attributes |
| 17 | Product taste | Environmental | Intrinsic product attributes |
| 18 | Social relationships | Interpersonal | Social influence |
| 19 | Food knowledge | Individual | Food knowledge, skills and abilities |
| 20 | Package size | Environmental | Extrinsic product attributes |
| **21** | **Parental food habits** | **Interpersonal** | **Parental behaviors** |
| 22 | Enhanced eating environment | Environment | Eating environment |
| 23 | Portion size regulations | Policy | Industry regulations |
| 24 | Health concerns | Individual | Health cognitions |
| 25 | Level of education | Individual | Personal socio-economic status |
| 26 | Perceived barrier of food price | Individual | Food beliefs |
| 27 | Cultural food habits | Interpersonal | Cultural behaviors |
| 28 | Weight loss intention | Individual | Weight control and behaviors |
| **29** | **Parental food processing (cooking)** | **Interpersonal** | **Parental behaviors** |
| 30 | Healthy eating motivation | Individual | Health cognitions |
| 31 | Food advertising | Environmental | Exposure to food promotion |
| 32 | Neighbourhood supermarket density | Environmental | Food outlet density |
| 33 | Exposure to food adverts | Environmental | Exposure to food promotion |
| **34** | **Parental portion size habits** | **Interpersonal** | **Parental feeding styles** |
| 35 | Self-regulation skills | Interpersonal | Self-regulation |

In addition to parental influences, in the above table, a number of individual level determinants of nutrition implicate knowledge, skills and self-efficacy around food and nutrition, which are important intrinsic concepts of food literacy (27). Interpersonal, environmental and policy level determinants fit into the extrinsic attributes of food literacy (27). While these extrinsic attributes are not well described or defined in the food literacy literature, they have been extensively discussed in the context of the food environment (30, 31). The extrinsic attributes from the table above describe various dimensions of healthy food environments (physical, economic, social and communication), which have the potential to be both modifiable and have population impacts on improving nutrition (30). This thesis will focus on intrinsic attributes of food

literacy and include social (e.g., the family environment and social aspects of eating) and communication (e.g., nutrition promotion) aspects of the food environment. However, to highlight the importance of food literacy and put it into context of the EWC, the physical food environment (e.g., food accessibility, availability and composition) will be discussed in the following section.

## Physical food environment: Food accessibility, availability and composition

Society, government and industry are constantly interacting with individual factors and the food environment to shape dietary choices (31). Today, the public is surrounded by an 'obesogenic' food environment that offers a wide variety of easily accessible highly processed convenience foods at very affordable prices that take minimal time and effort to acquire (32). Over the last several decades, the mass production of food has resulted in significant reductions in the time-cost to prepare and acquire foods as well as a reduction in the actual prices of foods. This has led to the possibility of consuming a larger variety of processes foods, more frequently and in greater quantities with no difficulty (33). The food environment inundates the public with constant messages through traditional (TV, radio and billboards) and, more recently, new media (web ads, video-game ads, and mobile app ads) to purchase and consume these foods, rather than take time to plan and prepare meals from mostly fresh or minimally processed ingredients.

The 'obesogenic' environment first coined by Swinburn et al. (34) is extremely dynamic and continues to evolve at a rapid pace. For example, non-traditional food retailers such as pharmacies, gas marts, dollar stores and corner stores provide additional convenient locations for food provisioning; however, the quality of food offered in these establishments is much lower than the traditional large surface grocery stores outlets. One study in Minneapolis found that 29% of consumers shopped at a non-traditional food retailer at least once daily (35). Purchases from these types of outlets were associated with lower healthy eating index (HEI) scores among shoppers (36) and

greater neighbourhood access to these establishments was associated with greater risk for child overweight and obesity in the US (37). Additionally, the growth of the online-to-offline (O2O) food market means that consumers can now order food at the click of a button or touch of a screen, wait a very short time and eat without leaving the comfort of their home and without spending any time on food preparation or cleanup (38). While the impact of these new virtual access points to the food environment has yet to be evaluated in terms of their effect on diet quality and the health of consumers, they contribute to increased timely access and availability to convenience foods (Figure 1.2).

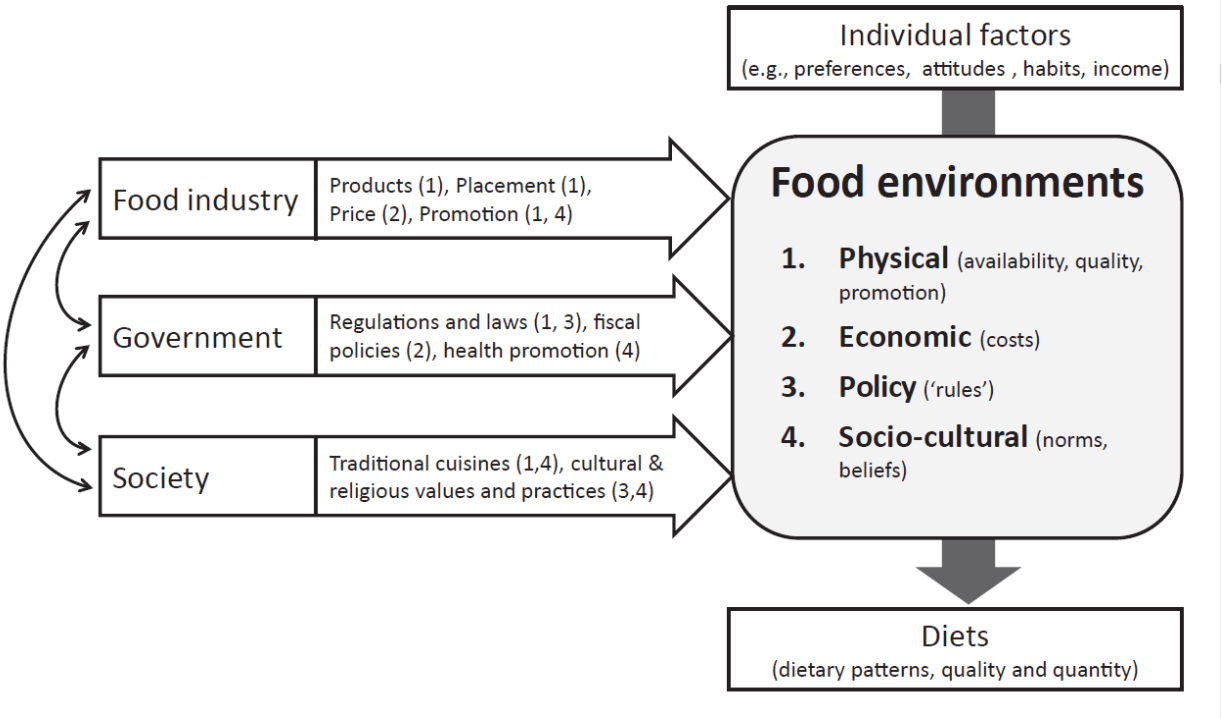


**Figure 1.2** Food environments and their four main components; the major influences of the food industry, governments and society on food environments (and their interactions); and the interaction between individual factors and food environments to shape diets. Swinburn et al. (31)

Processed foods are high in energy, sodium, saturated fats, trans-fatty acids and added sugars (39-41). Dietary sodium, primarily from these foods, is a major risk factor for diet-related cardiometabolic DALYs and death (42, 43). Among US adults, sodium intake was related to 65,508 or 9.5% of all cardiometabolic deaths in 2012. High processed meat

and sugar-sweetened beverage (SSB) consumption accounted for another 8.2% and 7.4% of deaths, respectively (43). A comprehensive study that examined the effects of dietary factors and their optimal intakes on leading cardiometabolic diseases found that overall, minimally processed foods (e.g., fruits, vegetables, beans/legumes, nuts/seeds) were protective whereas processed foods (e.g., processed meats and SSBs) were harmful (10). High consumption of processed foods is a hallmark of the 'Western' diet, an unhealthy dietary pattern known to be associated with NCCD (10). In addition to providing high-energy nutrient-poor foods, they contain food additives, to improve sensory texture and taste or replace calories (e.g., emulsifiers, non-caloric sweeteners), that are potentially damaging to the gut microbiota and host metabolism — increasing susceptibility to the development of cardiometabolic diseases (e.g., obesity, hypertension, diabetes, metabolic syndrome, cardiovascular disease) (44). Dietary advice is consistent in recommending limited consumption of highly processed foods in favor of whole foods or less processed foods that are high in nutrient density to maintain health and prevent NCCDs (8, 13, 14, 44, 45).

Ultra-processed foods (UPF) are a category of processed food products that are ready to eat, ready to heat or made with no or little preparation that are consumed as snacks or as replacements for home-cooked meals (e.g., frozen dinners). UPF are convenience foods defined as "industrial formulations with five or more and usually many ingredients" that are highly desirable to the public (46). These foods are formulated to have a very long shelf life, are highly palatable and potentially habit-forming and are available in large portions that are incessantly marketed to consumers, particularly youth (45-48). They are conceptualized to be 'prepared' at home, by fast-food establishments or other food service establishments to save time, and can be eaten anywhere including while driving or watching television (46). The term UPF is relatively novel, coined by Monteiro et al. (46) less than 10 years ago, and has been criticized for its broad categorisation and demonization of processed foods (49). Nevertheless, this new cluster of foods has been repeatedly associated with poor health outcomes and poor dietary quality in various populations around the world (39, 50-57). Though eating processed foods on occasion is not problematic, the extent to which they are consumed, the proportion of the modern

diet that they represent and their displacement of nutrient-dense foods diet pose a concern for public health (45). This is a particularly alarming situation given the dominance of UPF within the food supply, both in developed and middle-income countries (58). For example, 83% of packaged supermarket foods in New Zealand were classified as UPF, and these foods are significantly associated with worse nutrient profiles than minimally processed foods (59). Furthermore, the consumption of other types of minimally processed foods has decreased over the last several decades in favor of greater consumption of UPF (60). Between 1953 and 2011, purchasing of unprocessed and minimally processed foods have declined from 53% of household food budgets to 41%, whereas purchasing of ready-to-eat and UPF increased from 37% of household food budgets to 54% over the same time period, essentially replacing less processed foods purchased by Canadian households (61).

The appearance of convenience or UPF (high in saturated fat, refined carbohydrates and sodium) is thought to coincide with the nutrition transition, industrial/technological revolution and globalization (45, 62). This transition has resulted in a food supply that is saturated with inexpensive processed foods with little or no nutritional value. This comes at a time when many populations are experiencing a reduction in food preparation knowledge and skills and households are spending less time on home-based food preparation (63). The contribution of processed foods to dietary intakes appears to increase with the wealth of a nation. Processed foods are a concern in middle-income countries like Brazil, where it contributes to roughly 20% of caloric intake (46), who have gone to great lengths to minimize the impact of these foods by basing the development of their food guidelines around levels of food processing (64). However, in higher-income countries such as Canada and the US, the contribution of UPF to dietary intakes is greater (39, 56). In the US, UPF account for 58% and 89% of energy and added sugars consumed, respectively (39). The situation is similar in Canada where there is high consumption of ready-to-eat and ready-to-heat meals (65) and UPF accounts for 48% of calories consumed (56). Intakes of UPF in Canada were consistently high among different socioeconomic groups, including children and adolescents (56). Furthermore, these foods were associated with significantly higher

intakes of carbohydrates, free sugars, total fat, saturated fat and energy and lower intakes of important nutrients such as protein, fiber, calcium and vitamins (56). The dominance of UPF and their association to poor diet is cause for public health action given their association to NCCD.

Moubarac et al. (56) have concluded that diets composed of unprocessed or minimally processed and fresh foods are nutritionally superior to diets containing high proportions of UPF, and therefore recommended reducing the intake of UPF and increasing intakes of home-made meals (56). The challenge, however, is motivating the public to increase home-based food preparation with minimally processed foods in lieu of using UPF or other convenience foods. In practice, reducing the consumption of UPF in Canada would require a dramatic shift in dietary habits from reliance to time-saving convenience foods to cooking meals at home with basic ingredients (65). Furthermore, the feasibility of reducing the use of these convenience foods needs to be realistically considered against feelings of time-scarcity (66). Do consumers possess the culinary skills, facilities, knowledge and time to prepare meals from minimally processed foods (49)? While the advice given by well-meaning nutrition experts (in favor of minimizing processed foods intakes) appears simple, changing dietary behaviors is inherently challenging, particularly within our obesogenic food environment. Food processing offers consumers convenience that saves them effort and time working in the kitchen (67), an attribute that would be difficult to replace.

Food, particularly convenience foods have never been more accessible, which is seen as a major challenge to acquire and practice food and cooking skills, as well as transferring food preparation skills to children and adolescents. Food literacy is key for the public to understand how to navigate obesogenic food environments and develop lasting healthy eating practices (27). Promoting food literacy, particularly among youth, is crucial to safeguard them from the detrimental effects of the food environment (68).

## Food literacy and its components

Food literacy as a concept has evolved over the last decades from being limited to the simple skills involved in preparing foods and referred to as 'cooking skills' (69) to including a wider set of knowledge and skills with 'food skills' (70, 71). Now it is commonly being recognized as a 'framework', encompassing a complex set of extrinsic and intrinsic factors that provide a scaffolding to support healthy dietary decisions and navigate the food system (27, 68, 72, 73). The evolution in terminology used to define and describe food literacy is captured in Table 1.2. Since the term food literacy was first reported in the literature by Kolasa et al. (74) in 2001, there has been a great deal of work done to build a definition and identify different attributes or critical components. In recent years, since 2015, four separate systematic scoping reviews have indexed food literacy definitions and attributes (27, 72, 75, 76). Cullen et al. (72) identified 22 different studies from peer-reviewed literature that described a definition of food literacy, whereas Truman et al. (75) examined grey literature in addition to peer-reviewed papers and identified 38 novel definitions. Both reviews set out to develop comprehensive definitions of food literacy. The most recent systematic review by Krause et al. (76) identified 13 novel definitions of food literacy and seven conceptual models. Additionally, a fourth scoping review by Azevedo-Perry et al. (27) set out to capture the specific characteristics associated with food literacy interventions with the goal of developing a tool to measure food literacy. Table 1.2 highlights the diversity of components and variation in potential interpretation of selected food literacy definitions.

**Table 1.2. Key food literacy definitions and components**

| | |
|---|---|
| **Short, 2003a (69), Short 2003b (77) and Short, 2006 (78)** | **Cooking skills** described as the types of skills involved in today's cooking are mechanical, technical, perceptual, conceptual, organizational and academic. "Rather than our technical skills, it is our approach to cooking that influences what and how we cook," i.e. "the attitudes and beliefs about cooking that we share with others, our personal identifications as people who cook and our confidence in cooking and the degree to which we find it an effort, arising in part from our tacit, unseen skills and academic knowledge." |
| **Vanderkooy, 2010 (70)** | **Food skills** defined as a complex, interrelated, person-centred set of skills necessary to provide and prepare safe, nutritious, culturally acceptable meals for all members of one's household.<br><br>Food skills include:<br>Knowledge about food, nutrition, label reading, food safety and ingredient substitution; |

| | |
|---|---|
| | Planning by organizing meals, food preparation on a budget, teaching food skills to children;<br>Conceptualizing food by creatively using leftovers and adjusting recipes;<br>Mechanical techniques such as preparing meals, chopping/mixing, cooking, following recipes;<br>Food perception by using senses, texture and taste when foods are cooked. |
| **Ontario Ministry of Health Promotion, 2010 (79)** | **Food skills** defined in a way that considers the needs of the local community and the health unit capacity to provide interventions and training programs to develop those food skills. At a minimum, a definition of food skills should include: food selection (e.g., menu planning and food shopping), healthy food preparation (e.g., chopping, pureeing, cooking, safe food handling and serving), food storage (e.g., safe storage techniques) (69). A more ambitious definition of food skills may include the elements from Vanderkooy, 2010 (70). |
| **Desjardins et al. 2013 (80)** | **Food skills** defined as necessary to provide regular, healthy meals for one's household and/or one's self comprise a combination of techniques (ability to use cooking implements and appliances, handle food ingredients); knowledge (nutrition for good health, interpreting food labels, following/understanding instructions, ingredients and recipes; food safety; awareness of food origins and characteristics, and growing food if possible); and planning ability (organizing meals; food budgeting, shopping and storage).<br><br>**Food literacy** defined as a set of skills and attributes that help people sustain the daily preparation of healthy, tasty, affordable***** meals for themselves and their families. Food literacy builds resilience, because it includes food skills (techniques, knowledge and planning ability), the confidence to improvise and problem solve, and the ability to access and share information. Food literacy is made possible through external support with healthy food access and living conditions, broad learning opportunities, and positive sociocultural environments. |
| **Slater, 2013 (81)** | **Food literacy aspects include:**<br><br>Functional food literacy: basic communication of credible, evidence-based food and nutrition information, involving accessing, understanding and evaluating information<br><br>Interactive food literacy: development of personal skills regarding food and nutrition issues, involving decision-making, goal setting and practices to enhance nutritional health and well-being.<br><br>Critical food literacy: respecting different cultural, family and religious beliefs in respect to food and nutrition (including nutritional health), understanding the wider context of food production and nutritional health, and advocating for personal, family and community changes that enhance nutritional health. |
| **Vidgen and Gallegos, 2014 (73)** | **Food literacy** is defined as the scaffolding that empowers individuals, households, communities or nations to protect diet quality through change and strengthen dietary resilience over time. It is composed of a collection of interrelated knowledge, skills and behaviours required to plan, manage, select, prepare and eat food to meet needs and determine intake. |
| **Cullen et al. 2015 (72)** | **Food literacy** is defined as the ability of an individual to understand food in a way that they develop a positive relationship with it, including food skills and practices across the lifespan in order to navigate, engage, and participate within a complex food system. It's the ability to make decisions to support the achievement of personal health and a sustainable food system considering environmental, social, economic, cultural, and political |

| | |
|---|---|
| | components. It includes community food security and food skills. |
| **Truman et al. 2017a (75)** | **Food literacy (1)** is defined as involving broad sets of skills and knowledge about food origins and systems; individual and collective food experiences; food identification; physical, emotional and mental effects of food; as well as basic abilities related to food.<br><br>**Food literacy (2)** is defined as a foundation of knowledge, understanding and awareness that allows people to perform actions related to food and think critically about their relationship to the broader food system. |
| **Truman et al. 2017b (82)** | **Food literacy themes** include skills and behaviors, food/health choices, culture, knowledge, emotions, and food systems. |
| **Azevedo-Perry et al. 2017 (27)** | **Food literacy aspects (attributes):**<br>Food and Nutrition Knowledge includes facts and information acquired through experience or education related to food and nutrition (food knowledge, nutrition knowledge, food language and nutrition language).<br><br>Food Skills include techniques of food purchasing, preparation, handling, storage (food techniques, food skills across the lifespan).<br><br>Self-Efficacy and confidence examine the construct related to health behaviours; the efficacy/capacity of performance in settings or situations, including overcoming obstacles to participate in an exercise (nutrition literacy, nutrition self-efficacy, food self-efficacy, cooking self-efficacy, food attitude).<br><br>Ecologic (beyond self) includes meso- and macrosystems that interact with food decisions/practices (socio-cultural influences and eating practices, food and other systems, infrastructure and population-level determinants).<br><br>Food decisions include applying knowledge, information, skills to make healthy food choices (dietary behavior). |
| **Slater et al. 2018 (68)** | **Food literacy framework competencies** include functional (confidence and empowerment with food), relational (joy and meaning through food) and systems (equity and sustainability for food systems). |
| **Krause et al. 2018 (76)** | **Food literacy core abilities and skills** include “reading, understanding, and judging the quality of information; gathering and exchanging knowledge related to food and nutrition themes; practical skills like shopping and preparing food; and critically reflecting on factors that influence personal choices about food, and understanding the impact of those choices on society.” |

Given the breadth of food literacy definitions and different frameworks, there are currently no tools that can measure food literacy in its entirety. However, this should not be an objective. Different validated tools can be employed to measure specific components within frameworks such as cooking skills and nutrition knowledge (83-85). Work needs to be done to better define constructs and identify the components that have the greatest influence on dietary practices, and can be modified. Though there is no standard definition (75), different groups are currently working towards building a common working definition that can be used as a basis for assessing and monitoring

aspects of food literacy in different populations (86-88). While the actual term 'food literacy' varies between authors and organisations, sometimes left to the interpretation of readers, there are several commonalities and core components that are consistent: food- and nutrition-related knowledge, skills and self-efficacy that are influenced directly or indirectly by social contexts and the food system. New concepts and terms such as 'food agency' (89, 90) and 'food sovereignty' (91, 92) are also emerging and being adopted within the context of food literacy, which adds to its complexity and the diversity of the topic. With this in mind, it is conceivable that food literacy encompasses all aspects of food and nutrition-related practices from acquisition of skills to manipulation of foods to eating events and interactions with the food environment. Food literacy, in its global sense, is crucial to not only navigating, but also building resilience to an 'obesogenic' food environment that encourages consumption of unhealthy foods.

Some of the most commonly studied aspects of food literacy are cooking skills or home-based cooking (23, 93-95), family meals (96, 97) and nutrition knowledge (98). While various components of food skills have been favorably associated with better dietary outcomes, overall, the evidence remains inconclusive primarily due to studies that lack validated measurements, weak study designs, no control groups and small sample sizes (23, 99). Nevertheless, there is support, both among policy makers (79, 100, 101) and academics (27, 68, 72), that food literacy (skills, knowledge and self-efficacy) interventions are crucial to healthy eating and countering the obesity epidemic, particularly among children and adolescents. Aspects of food literacy have been integrated into Brazil's most recent food guidelines with increased attention on cooking and sharing meals (64). The most recent version of the Spanish food guide 'New Pyramid of Sustainable Eating' has also included cooking techniques and social aspects of eating at the base of the pyramid and specifies other important considerations (e.g., sharing meals, sustainable food system, nutrition labeling) (102). Food literacy and skills are a strategic direction of the Ontario Food and Nutrition Strategy (103). Aspects of food literacy, namely knowledge and skills, have been written into Canada's guiding principles and recommendations to navigate complex food environments and support healthy eating for the proposed revised Canadian Food Guide (CFG) (104). The newest

generation of food literacy frameworks support a more holistic sense of health, rather than just focusing on food and nutrition, they also recognize the importance of well-being, social dimensions of health and the food system and its sustainability (68). This holistic approach recognizes that the food system has evolved in such a manner that a greater number of more complex skills are now needed for food preparation. Key food literacy topics will be discussed below.

**Deskilling, culinary skills transition and the new age of food media**

We live in a society that provides enough conveniences that we do not need to acquire cooking skills to survive (105); however, cooking skills is a strong predictor for ready-made meal consumption (106). The practice of cooking and home-based food preparation from 'scratch' or mainly basic ingredient has declined in the last half of the last century and has persisted into the 21st century (107). Convenience foods are a norm and the consumption of meals eaten outside the home and processed foods have been favored over home food preparation (108). Reasons for this decline include the 'culinary transition' and 'deskilling' (109).

The phenomenon known as "deskilling" has a negative connotation. It is viewed as the replacement of home-based food preparation by manufacturing and a loss of food preparation skills and confidence among young people (110, 111). As parents cook less from basic ingredients, children are less exposed to food preparation in the home (112). Mothers are still the primary source for food skill acquisition and less cooking has been attributed to women entering the workforce, which has influenced household eating and food preparation practices (113-115). Shifts in the labor market have coincided with changes in traditional household roles over the last several decades with women spending more time outside the home and making significant contributions to household income, yet still being responsible for the majority of household chores such as food provisioning (33, 108, 113, 115). Therefore, processed foods have become a trade-off between convenience and minimizing cognitive effort and time (116), particularly with two working parents. Processed foods serve a practical role in household food provisioning by facilitating the lives of busy working adults (116-119). However, by providing

convenient alternatives, the use of processed foods (prepared, ready-to-heat, frozen and microwavable) exacerbates the problem of "deskilling" resulting in further decreases in from 'scratch' cooking (69). Additionally, home economics is not offered or is not mandatory in school curricula, therefore, youth are also rarely exposed to food preparation or nutrition education at school (81, 120). Home and school environments previously represented the primary sources of food skill acquisition for children and adolescents, and are thought to be major contributors to the deskilling of the population. 'Deskilling' also refers to the removal of cooking from the home and its replacement by corporate industries, which has a profound effect on agri-food systems, food sovereignty and health (110).

On the other hand, the diminished practice of from 'scratch' cooking can also be viewed as a more positive "culinary transition" or as a natural process of evolution in food literacy and food manufacturing. Under this theory, technology has liberated the public (mainly women) from spending hours in the kitchen by offering time-saving appliances and a wide variety of affordable convenience products including minimally processed foods (e.g. pre-cut and pre-washed vegetables) that, combined, can make healthy meal preparation quick and easy (109). However, despite technological advances and time-savers, along with the 'culinary transition' has come the need for a greater knowledge base and more complex skills than were needed by previous generations (68, 93). Today, in addition to traditional cooking kills, consumers need food and nutrition knowledge and self-efficacy to select, combine and prepare foods along with time management, planning and organization skills in order to prepare meals and snacks several times a day, every day of the year for each member of the household according to their preferences and schedules (69).

A recent study documenting trends in cooking over a 13-year period in the US (2003 to 2016) noted an increase in cooking since the early years of the 21$^{st}$ century, particularly among men (121). More men in Canada are also participating in household food preparation, both as a domestic chore and as a hobby (108, 122, 123). New cooking trends point towards the beginning of a new era of food transformation that is propelled

by the media and may disproportionately influence men (121). Over the last 10 years, there has been an increased interest in food and cooking shows in the media, but also a dramatic shift to digital food media (124). Health professionals and researchers now receive direct and indirect support from celebrities and public figures (e.g., chef Jamie Oliver and journalist Michael Pollan) to promote a 'return' to cooking and whole foods as a means to improve health and prevent obesity (125, 126). However, while the new age of food media can provide sound food and nutrition advice and powerful food systems advocacy tools at one's fingertips, it is also inundated by contradictory and potentially dangerous images about dieting and body image (e.g., food porn and pro-anorexia) (127, 128). The public grants pseudoscience about food, nutrition, diet and health instant credibility purely based on celebrity status and media following of influencers (129). Food media is playing a central role in governing food production, policies and practices (128), and is highly visible to vulnerable children and adolescents, making the push to improve food literacy all the more urgent and necessary.

**Food preparation and cooking**

Home food preparation and cooking involves a broad range of activities. For the purpose of this thesis, cooking refers to all activities as outlined by Taillie (121):

> "the sum of reported time spent in all activities that were categorized as food and drink preparation (e.g., baking, cooking, broiling, boiling; packing lunches; heating up food), food presentation (setting the table, filling salt and pepper shakers, serving the meal), kitchen and food clean-up (e.g., clearing the table, washing dishes, storing leftovers), and other food preparation activities not otherwise specified." (p.2)

Other cooking activities can include meal planning, writing a grocery list, budgeting for food, and grocery shopping. Home-based cooking can be time consuming and fits poorly with busy lifestyles, whereby individuals experience a high degree of time scarcity, particularly parents (118, 130). Overall, people are spending less time on food preparation over the last few decades. Time women spend cooking has declined by half

alongside smaller increases in the time men contribute to household food preparation (107, 113). Consumers generally have positive perceptions about enjoying a home-cooked meal and consider it the optimal or ideal meal (131-134). It is also believed that home cooking helps to achieve a healthy diet, improve eating practices, gain control over one's food supply and provide a time for connectedness, and consumers really do attribute a high level of value to home-based food preparation (135, 136). Many studies have also reported that the vast majority of adults and adolescents possess relatively high levels of basic mechanical cooking skills. In New Zealand, 80% of youth from a national sample of 8,500 students reported being able to cook a meal from basic ingredients fairly easily or very easily (137). A study based on findings from the Canadian Community Health Survey (CCHS) on food skills reported that 75% of adults (14 years or older) cooked foods from mostly whole or basic ingredients and 63% could prepare most dishes especially with a recipe to follow (138). Among a small sample of American parents, respondents reported high levels of confidence in making home-prepared meals, but low levels of enjoying to cook or desire to cook (139). Cooking frequency may also vary significantly according to educational attainment, household income, race and country of birth (140). However, despite the positive attitudes towards home-prepared meals, possessing mechanical skills, and well-meaning intentions that people have towards home-cooked meals, there are consequential barriers that prevent households from cooking regularly that cannot be ignored or dismissed (131). Time scarcity is undoubtedly the most reported primary barrier to home food preparation and healthy eating and a legitimate reason that parents opt for processed meals (66, 67, 107, 132, 141-144). Other barriers include fatigue, lack of motivation, perceived costs, family preferences (for processed foods), low cooking and meal-planning self-efficacy, children's activities, atypical schedules and picky eating (67, 130, 139, 144, 145). Innovative ways to increase opportunities to participate in home-based meals are needed by finding ways to overcome time management, picky eating, and low motivations towards cooking (131, 139, 146).

Traditionally, cooking has been studied in a very narrow context, limited to simple mechanical skills, rather than a more complex set of sensorial, cognitive and

organization skills that are needed for food provisioning and preparation (147). Home cooking is about more than just the ability to cook, it takes food agency, the capacity to set food-related goals and the empowerment to act on them by cooking (90). However, only recently are researchers becoming equipped to start capturing and measuring this complexity with new tools. For example, the Cooking and Food Provisioning Action Scale is based on a food agency framework for understanding cooking behaviors that are influenced by interactions between social structures and individual skills (148). A paradigm shift from the narrow view of cooking as a mechanical process to a broader concept of food agency has been called for (90). This new paradigm will help bridge the gap between the public having positive attitudes towards home cooking and their actual engagement in meal preparation activities, while factoring in the realities of families and their day-to-day food provisioning challenges (90). A feasibility study assessing the acceptability of a food literacy intervention sought to reduce barriers for family food preparation by providing resources (including meal plans, recipes and ingredients) to prepare five meals a week. The intervention was successful in that most meals were prepared (86%) and almost all prepared meals were eaten together (149). While the intervention addressed major challenges to food preparation, it would not be flexible enough to adapt to family food preferences and would not be sustainable or cost-effective at a population level. Furthermore, an intervention that provides all resources and instructions is limited to the narrow benefits of cooking and does not address critical food literacy that would be needed to sustain healthy eating or transfer skills to youth (68). The latest food literacy framework developed by Slater et al. (68) outlines 16 broad competencies and over 50 specific competencies to support sustainable food literacy programs and interventions (Figure 1.3). While cooking abilities (including food preparation, safety and hygiene) are crucial aspects of food literacy, they must be supported by other dimensions such as critical nutrition knowledge.

*Cooking and associations with health*

Whether complex sets of cooking skills or simple mechanical skills are examined, studies suggest favorable associations with dietary and/or health indicators in children and adolescents (94, 150) and adults (23, 95, 151). The impact of the conclusions of these

studies is, however, often criticized. Weak study designs that use cross-sectional samples, unvalidated tools, inconsistent adjustments for potential confounders, short or no follow-up and lack of pre-post test comparison or control/comparison groups limit the

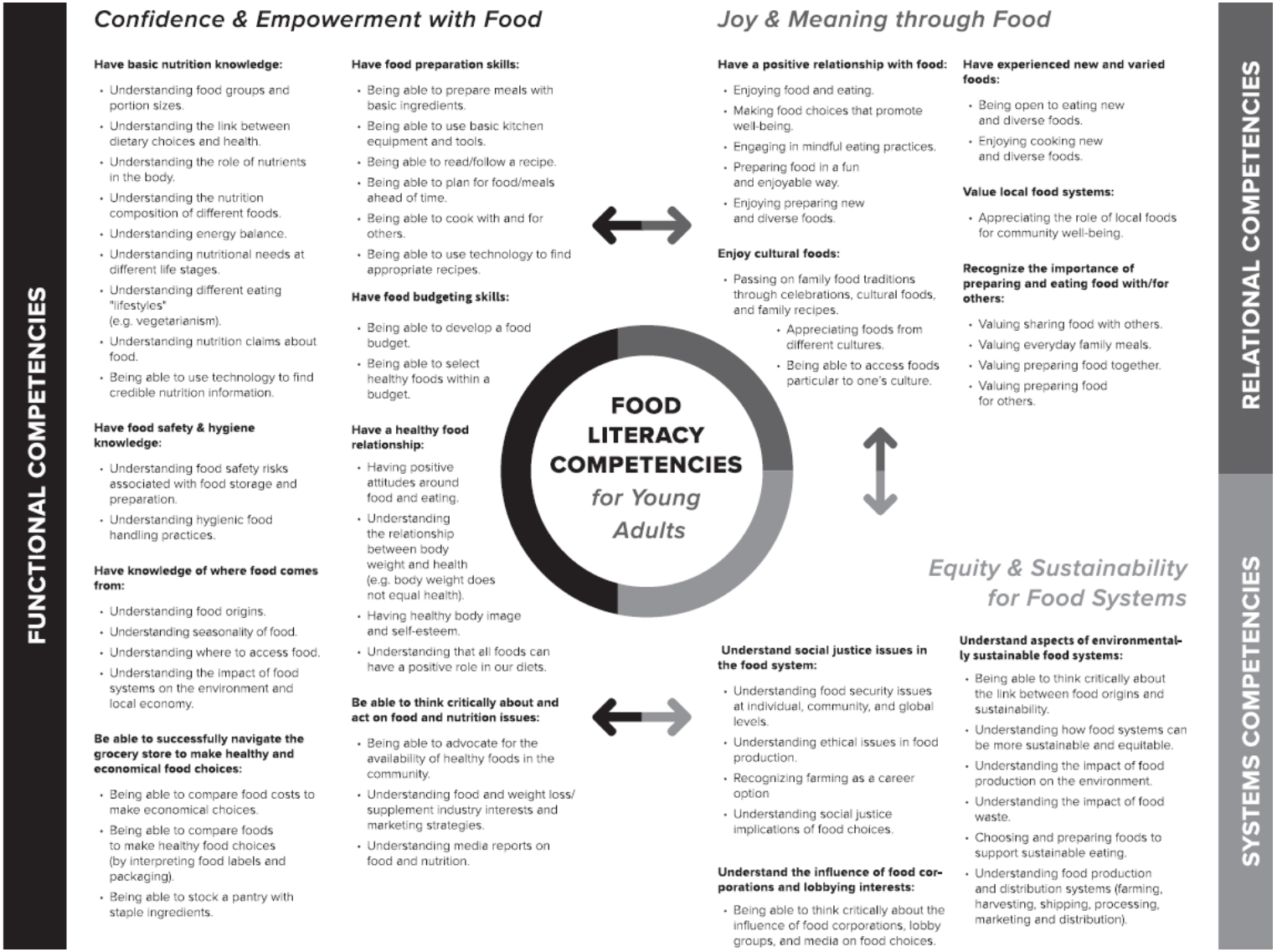


Figure 1.3 Food literacy competencies for young adults. Slater et al. (68). Reprinted with permission from John Wiley and Sons.

validity and application of the conclusions that can be drawn from such studies (23, 95, 99). Validated tools are often not available or not appropriate for certain studies. Nevertheless, the quality of studies can be improved by using longitudinal and repeated-measure designs and considering socio-cultural, physical and environmental dimensions of eating (15, 24). Despite limitations in this field reported by several authors, all studies investigating aspects of cooking, contribute to the knowledge base of understanding home-based food preparation and its influence on health indicators. Positive outcomes associated with home food preparation could be explained by the fact that knowledge of cooking is related to a better understanding of food ingredients (152, 153). Home food preparation implies cooking skills and taking control over food intake by being able to choose which foods to eat and how to prepare them (152). In addition, better food skills encourage a broader variety of food items, increase intentions to buy more fresh produce and the use of foods from all food groups (154). Furthermore, cooking skills encourage healthy eating by enabling individuals to prepare foods and facilitating a better selection of ready-prepared and ready-to-eat meals (155). Selected examples are outlined from different populations in the following paragraph.

### Cooking frequency

The frequency of home-prepared dinners was negatively associated with fast food and SSB intakes and positively associated with vegetable intakes among children (6–13 years) in the US (156). In a large cross-sectional study with 3,398 grade five students in Alberta, Canada, high frequency of helping to prepare foods at home was associated with greater liking for fruits and vegetables, higher self-efficacy for making healthier food choices and greater intakes of fruits and vegetables (157). Among adolescents (13–17 years) in New Zealand, students with the highest rated cooking abilities and who cooked more frequently had greater odds of meeting fruit and vegetable recommendations and having family meals, compared to those who could not or did not cook. Cooking abilities, however, were positively associated with body mass index (BMI), indicating conflicting and complex relationships between cooking and nutrition indicators (137). Nevertheless, the benefits of cooking extended beyond nutrition indicators as cooking abilities were also associated with better mental health (lower

depressive symptoms scores and higher well-being scores) and stronger family connections (137). In another cross-sectional study, among American teens in the Project EAT (Eating Among Teens), frequency of food preparation was associated with lower intakes of fat, and higher intakes of fruits and vegetables, fiber and vitamins (folate and vitamins A). Additionally, frequency of food preparation was also associated with lower soft-drink intakes among female adolescents and fried foods among male adolescents (158). Food preparation in this population was tracked from adolescence (15–18 years) into emerging adulthood (19–23 years) and then onto the mid-to-late 20s (24–28 years). While food preparation from emerging adulthood tracked into the mid-late 20s was associated with better dietary intakes, it did not track from adolescence, indicating potential unknown mediators in this transitional period (159). In a second longitudinal study with the same cohort, adequacy of cooking skills in young adulthood (18–23 years) were examined against nutrition-related health outcomes 10 years later (30–35 years). Self-reported cooking skills in young adulthood were a predictor for greater fruit and vegetable later in life (160). Additionally, parents who reported greater cooking skills in young adulthood also reported having regular family meals, eating fast food less and fewer barriers to food preparation. Taken together, these results indicate that cooking practices in young adulthood predict practices later in life and positive family food environments (160). Among Irish adults (20–60 years), cooking skills were a strong predictor for saturated fat and fibre intake, but not the Eating Choices Index (4-item measure that aims to discriminated between and unhealthy eating behaviors), again indicating a complex relationship between cooking and nutrition indicators (161). In Switzerland, a simple seven-item cooking skills scale that included self-reported perceptions about general cooking skills and the ability to prepare six items (a hot meal without a recipe, gratin, soup, sauce, cake and bread) was used to assess the association between cooking skills and dietary behaviors. Cooking skills was negatively associated with convenience food, meat and sugar intake and positively associated with fruit and vegetable intake, even after controlling for health consciousness (162). Taken together, cooking is generally linked with better dietary intakes, but associations are not always clear and mechanical cooking skills do not provide a complete picture of all skills and activities needed to follow a healthy diet on a regular basis.

### Meal planning

Aside from mechanical cooking skills, dimensions that are important to the larger definition of cooking such as having adequate supplies and meal planning are being investigated more frequently. A food preparation checklist (FPC) score was developed to assess the availability of supplies needed to cook in American households. The FPC score was not associated with BMI of children or caregivers (156). Meal planning is often cited as a strategy to overcome time scarcity as a barrier to home food preparation in qualitative and descriptive studies (132, 133, 135, 144). Parents with lower scores on the meal-planning ability scale were more likely to report using processed foods as a result of not having time to prepare other foods (67). Only a few studies have examined direct quantitative associations between meal planning and dietary intakes. In one study, meal planning, defined as planning ahead the foods that will be eaten in the next days, was examined in a national cohort of 40,554 French adults. It was found that people who planned meals were more likely to have greater adherence to French nutritional guidelines and food variety scores (163). In another study with low-income minority families in the US, it was found that parental meal planning, defined as planning in the morning what will be eaten at dinner, was positively associated with children's intake of fruits, but not vegetables at dinner (164). Forward planning and organization of food and meals (e.g., making a grocery list, planning meals, packing meals) were food-related behaviors that were associated with healthier intakes of fruits and vegetables among Australian women (165). While the evidence supporting the importance of meal planning as a determinant of healthy diet intakes may not be abundant or very strong, it may interrelate with other cooking practices that should be investigated. For example, among US parents, maternal dinner planning was a significant correlate of family meals, which was negatively influenced by time pressure and positively influenced by the maternal importance of dinner (166).

### Gender differences

A systematic review identifying the determinants of home cooking illustrated the interrelation of various facilitators and barriers (Figure 1.4). Factors that were supported

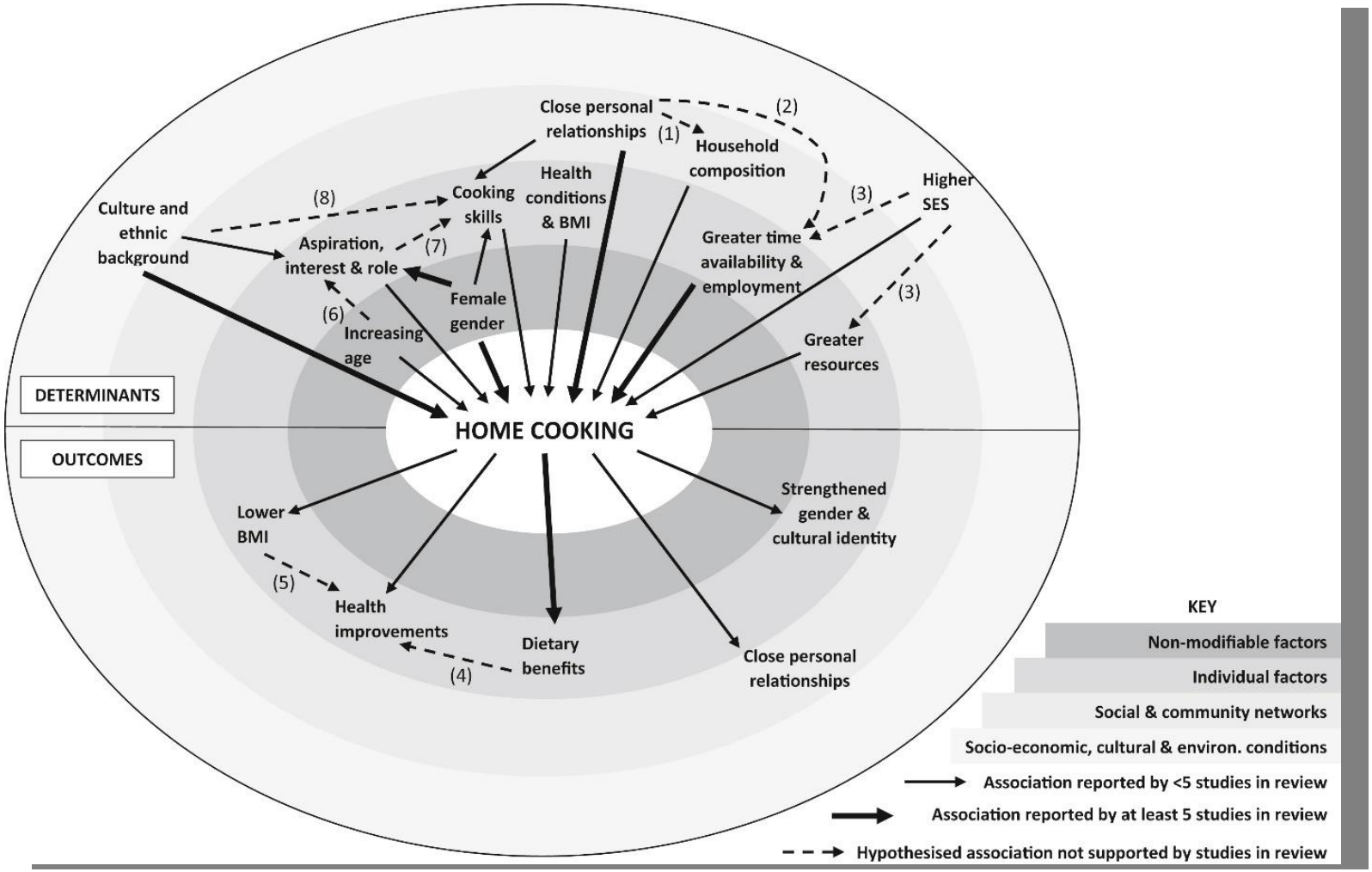


**Figure 1.4** Conceptual model of the 38 studies included in this review of observational studies of the determinants and outcomes of home cooking. Mills et al. (93) available at: https://doi.org/10.1016/j.appet.2016.12.022. Reprinted under the creative commons licence found at: https://creativecommons.org/licenses/by/4.0/

by at least five studies included the female gender, cultural and ethnic background, close personal relationships and greater time availability and employment (93). While men are currently taking on greater shares of domestic tasks, they still spend less time on household chores than women, even in households where both spouses are employed full-time (33, 167). Women and girls are more likely to engage in household cooking in the UK (152), Portugal (168), Switzerland (162), Spain (89) and the USA (169-171). In Canada, a national study on food skills found that women had greater proficiency of cooking skills than men (138).

While a majority of individuals consider planning and preparing meals at home as positive ways to improve diet quality and eating behaviors (135), home food preparation is still primarily viewed as a household chore and remains a female role (172). Food preparation is, perhaps inappropriately, considered to be a leisure activity for men or is a household task that warrants praise. On the contrary, for women, it is an expected duty (122, 123, 173). Calls to reconnect with food through home-cooking, often involving labor intensive activities, are primarily directed towards women (173). Though cooking may remain a gendered activity, considering the particular role of men in household food preparation should not be neglected as it could have an impact on nutrition and health outcomes of families (170, 174). Men's roles in the kitchen are important and play a part in modeling healthy eating practices to children and youth, particularly in the context of changing family structures where fathers are more involved than ever in meal preparation and feeding children (175). Additionally, support from household members including children and fathers who contribute to cooking tasks, can help reduce working women's feelings of time scarcity, assist with work-life balance and remove some of the burden of food provisioning as well as improve cooking self-efficacy among youth (118, 173, 176).

### Social aspects of eating and the family environment

Among the determinants of food choice, the interpersonal sphere (social and cultural) plays an important and central role in influencing diet-related practices and behavior

change (20, 177). Parental encouragement and modeling are more important indicators of fruit and vegetable consumption than availability (15). Social modeling, using others as a reference point, guides what is eaten and how much people eat (178). Additionally, social influences impact perceptions about judgements about what people eat may modify eating behaviors to create a particular image (179). Promoting family meals or taking time to share meals with friends and family acts as a leverage point to influence dietary behaviors through social factors that determine behavioral intention such as social norms (i.e., beliefs about correctness, appropriateness, desirability and morality of intentions and behaviors) and prescribed agreements (timing and place of behaviors, e.g., family dinners) (180). There is substantial evidence that supports the effects of social modeling on food intake, particularly when individuals desire to be affiliated with the model or perceive themselves as similar to models (178). Additionally, social norms are potent influencers of dietary intake, because they provide social judgements (validation or determent) (181). Social capital, both at home and among peers at school, can act to endorse positive eating practices or instill damaging eating habits among youth (182). Social influences transcend several spheres of influence as they interact with distal societal factors (e.g., public support for policy) as well as more proximal cultural factors (e.g., family food traditions and practices) (177). Social capital, both at home and among peers at school, can act to endorse positive eating practices or instill damaging eating habits among youth (182). The broader social context is important in influencing dietary practices; however, for youth, parents are thought to be the primary influencer for healthy eating, making the family social context an extremely important point of leverage for interventions involving food literacy (183).

*Family environment*

As part of social capital within the home environment, the DONE Framework recognizes the importance of modeling, recommendations, nutrition knowledge, food habits and cooking of parents as important modifiable determinants of nutrition with the potential to have a major impact on dietary intakes of the public (26) (Table 1.1). Dietary practices are shaped at a very young age through parental modeling and controls, which persist over time (184). Parental influences remain among the most prominent determinants of children's eating practices (185). Evidence suggests that the home food environment

during adolescence has the power to set up youth with healthy dietary practices that will continue later in life (186). Even for young adults, the home environment is a major factor that is related to one's cooking abilities and nutrition knowledge (160). Positive effects of family meals and positive parental dietary practices on nutrition indicators may reflect a more healthful and supportive child food environment within these households (187).

Increased attention has been given to family eating behaviors, such as family meals, with particular interest given to details about the family member who prepares the meal, the location food is purchased and where meals are consumed (152). Since family meals tly take place at home, food preparation is viewed as a facilitator for family meals. Results from a meta-analysis, confirming a significant protective effect on the nutritional health of children and adolescents of eating family meals three or more times a week, demonstrated the importance of families consuming meals together several times a week (97). More frequent shared family meals were associated with healthier dietary and eating patterns among young adults (i.e. higher intakes of fruits and vegetables, milk products and some key nutrients) (188). Moreover, it has been suggested that families have an opportunity to influence attitudes and behaviors related to food and eating through parenting style, behavior modeling and shared environment (189). For example, parental intake of fruit and vegetables has been identified as a predictor for dietary intakes of their children during adulthood (190). Positive parenting practices (making fruits and vegetables available, making fruits and vegetables accessible, modeling of fruit and vegetable intake and encouragement of fruit and vegetable consumption) were associated with greater intakes of fruits and vegetables among adolescents compared to families that did not practice positive healthful parenting practices. The combination of healthful practices with frequent family meals was associated with the highest intakes of fruits and vegetables among adolescents implying a synergistic effect (190) and reinforcing the importance of parental factors and home food environments as determinants of healthy eating.

Similar to adolescents, home food preparation is expected to have the same level of influence on children’s intake and food preferences. Parental practices such as

modeling and food availability are the strongest correlates of both healthy and unhealthy food consumption among children (191). A study showed that when children were involved in preparing and cooking foods at home with their parents, they were more likely to prefer fruits and vegetables and had a higher level of self-efficacy for selecting and eating healthy foods (157). Social and family dimensions related to the experience of home food preparation are important. For example, parent-child food preparation is related to a more positive feeling of care and love (172). Individuals are also more likely to enjoy cooking when they are assisted by their family and/or friends (172). Family/shared meal frequency in early adolescence contributes to healthy eating practices five years later (192) and is a predictor for shared meals in young adulthood (188). Young adults report that they enjoy and value eating meals with others, but time is cited as a barrier to sharing a sit down meal (134). Eating dinner with others was associated with better dietary intakes and eating on the go was associated with less healthful food choices. Social interaction is an important part of food literacy and a determinant of healthy eating. Encouraging eating meals with others and family meals can contribute to improved dietary intakes. Healthy eating interventions, however, need to take into account barriers to these types of activities, namely, time (134). For example, when families do not have time for family meals, health practitioners need to acknowledge and promote other favorable eating practices that mitigate poor dietary intakes such as fruit and vegetable availability, in addition to strategies to overcome time scarcity (190). Solutions may include strategies to improve family functioning, i.e., the structural/organization roles and interpersonal interactions between family members, which include communication, problem solving, adaptability, and behavior control among family members (193). Finding alternative solutions to overcome barriers to family meals and other healthful home-based eating practices is particularly important in households with lower socioeconomic status or non-traditional families with single parents that report fewer shared meals and are likely to have more challenges involved in engaging in these types of positive parenting practices (194-198). Single- and dual-headed households may have different barriers to family meals. For example, single-headed households perceive costs as a major barrier whereas dual-headed households

identify lack of ideas (146, 199). Supporting parents' use of positive parenting practices is particularly important in the context of food insecure households (200).

While there is strong evidence and consistent support for the positive impacts of family meals on nutritional outcomes such as healthy dietary intakes, it is less consistent for overweight and obesity (201). The quality of food consumed during family meals may have a moderating effect on its association with weight status (144). In one study, fast food purchases for family meals were positively associated with weight status and negatively associated with vegetable intake among parents, indicating the nutritional quality of shared meals matters as much as the social act of eating with others (202). Alternately, the mealtime atmosphere can influence the healthfulness of food served. The presence of TV (even just as background noise) during family meals has been associated with lower HEI scores and lower ratings of group enjoyment, indicating that taking the time to provide a pleasant atmosphere and the caliber of connection with others is also relevant to the quality of family meals (203). Low healthfulness of food served at family meals has been linked to low educational attainment, high work-life-stress, low-family functioning, low cooking enjoyment and low value attributed to family meals (204). Nevertheless, it is also relevant to look beyond the potential nutritional benefits of family meals to other holistic health implications such as better socialization, less frequent engagement in risky behaviors, better mental health, academics and general literacy (198, 205). Newer studies are beginning to pay attention to other important health outcomes such as depression and well-being in relation to shared meals. Frequency of family meals in a national cohort of New Zealand adolescents was associated with fewer depressive symptoms and emotional difficulties and better well-being, with stronger associations seen in girls (206).

Overall, these findings stress the importance of the family food environment in supporting healthy food choices among children and adolescents. Food literacy provides many opportunities to develop intervention strategies that support healthy eating by focusing on home food preparation through positive parenting practices, cooking and family meals.

## Health communication and mass media

The World Health Organization (WHO) has called for population-wide health promotion strategies to address rising rates of NCCD such as obesity by improving diet and physical activity (207). Given the obesogenic environment and the wide availability, accessibility and affordability of processed foods, it believed that behavior change interventions based on education alone will have little population impact on obesity prevention (208). It is therefore, the belief that comprehensive strategies that target communities, environmental supports, policy action as well as individual attitudes and behaviors are needed (21). This vision of interconnected factors that influence health promotion and disease prevention fits within various social ecological models of health and is extremely relevant for developing food literacy interventions to improve dietary outcomes (18, 177, 209). Additionally, to halt the rise of obesity and diabetes, the implementation and evaluation of population-based interventions that use multisectoral partnerships are called for. These interventions include strategies such as marketing policies (restriction to food advertising), fiscal policies (increase affordability of health foods), developing healthy eating environments and health education/social marketing campaigns to impact dietary behaviors (210). As the central theme of the thesis is a healthy eating campaign, environmental, fiscal and marketing interventions will not be discussed, and mass media campaigns will be further developed in the section below.

Mass media health campaigns are structured interventions that are used to communicate healthy lifestyle-related messages to a vast public audience with the purpose of informing, persuading or motivating populations to change health behaviors (211). While the focus of these campaigns is centred on the individual, the purpose is to shape public behavior change (212). Mass media can be a powerful tool that is generally used by public health agencies to change health attitudes and behaviors (213). There is evidence, albeit low quality, from the Cochrane Database of Systematic Reviews that supports efforts for the use of mass media in increasing smoking cessation rates in adults (214) and preventing smoking uptake in youth (215). Mass media has also been widely used and evaluated in the context of physical activity promotion (216). The WHO recommends to use of mass media as a ‘best buy’ strategy (i.e., cost-effective, high-

impact and feasible) for tobacco prevention and physical activity promotion (210). In nutrition, evidence is less established for mass media to be considered as a best buy; however, these campaigns create consumer awareness about healthy diets and are believed to be both impactful and cost-effective, when combined with multi-component strategies (210). Mass media campaigns can be used to promote specific healthier foods, advertise against specific less healthy foods and as educational campaigns (217).

As a health communication strategy, mass media is seen as a policy intervention to support prevention measures for NCCD prevention and is largely understood to be an effective way to promote healthy eating (17, 18). Although, few dietary practices to date that have been promoted via mass media, past large-scale public health campaigns have targeted some common dietary practices such as increasing fruit and vegetable intake and limiting sodium and SSB intakes (217). Additionally, although not necessarily formally evaluated, small-scale social marketing campaigns that use mass media, mainly sponsored by the food industry, have been used to promote family meals (146). There is evidence of effectiveness of using mass media in dietary interventions, particularly to promote fruit and vegetables. Again, while there are limitations to these campaigns and evaluations, they are considered as an effective strategy to improve dietary practices of the public (18). Nutrition campaigns that adopt Andreasen's social marketing benchmark criteria (218) are particularly effective in improving dietary practices through achieving behavioral change (219). Andreasen (218) postulated that effective social marketing campaigns should include a combination of the following benchmark criteria; behaviour change, consumer research, segmentation and targeting, marketing mix, exchange and competition. When social marketing is applied using the full breadth of criteria, there is a tangible possibility of changing eating behaviours (219). While there is consensus about the potential for health communication campaigns to significantly influence behaviors of entire populations, the major limitation of this type of intervention is that generally the effect size of most campaigns is modest (212). It is reasonable to anticipate that five percent of a population will change dietary-related behaviors following a nutrition campaign, which seems like an inconsequential proportion, but, given the population reach of these interventions, even small changes in

population behaviors may represent a large number of individuals (220). Social marketing can be viewed as an approach to mass media campaign strategy development and a tangible instrument for behaviour change by teaching the public how to make positive behaviours simple and easy (221, 222). The social marketing strategy assists with intervention planning by setting clear individual and organizational goals, creating audience and stakeholder segmentation, using behavioural modeling that is based on theory and concrete evidence. It can also help identify stakeholders and partners who can participate in intervention delivery (222). The traditional marketing mix makes use of the 4 Ps (price, product, promotion and place), which are often criticized for its limitations regarding its applicability in social marketing initiatives with a wide range of stakeholders (222). Andreasen's benchmark criteria also consider additional facultative Ps such as partnership allowing for a more appropriate integration of the marketing mix into social marketing and addressing concerns regarding the "missing social mix element" (i.e., stakeholders) (222).

Unfortunately, little is known about the effectiveness or even appropriateness of using mass media for different dietary practices, beyond promoting fruit and vegetable consumption (18, 217). There is still a lot to learn about how communication resources can be used to target and influence a wide range of factors within social ecological models of health (212). Extrapolating from effective campaigns, though, it is clear that campaign awareness, predicted by campaign dose (frequency, intensity and persistence) is a key factor for effectiveness. First, campaigns may raise awareness and then provide a call for action (i.e., behavior change) (216). Effective health campaigns use formative research, have a theoretical foundation, have a targeted message and disseminate messages in channels with broad reach (223). Furthermore, impacts of a campaign can be enhanced through strategic partnerships, dissemination through multiple jurisdictions (local, state/provincial and federal), and use diverse channels in traditional (TV, radio, print media) and new media (internet, social media, mobile technology) (216). According to the World Health Organization (WHO), health campaigns that include government, food industry, media and community collaboration may lead to sustainable changes in health, when they are of long duration (208).

Additionally, successful campaigns have demonstrated slow and staged approaches (one behavior at a time), support from legislative action/regulation (e.g., food marketing restrictions), education, strong advocacy within society for change, and shared responsibility/collaboration between the public, private sector and government (208). Finally, mass media campaigns are not intended to act as stand-alone initiatives, but rather as a tool to facilitate message transmission within a broader health change strategy that provides resources, supports and infrastructure for behavior change (216).

## Eat Well Campaign: Background

Obesity has reached epidemic proportions in many countries across the globe, including in Canada. The rates of child obesity are of particular concern with approximately 31% of Canadian children being classified as overweight or obese (224) and a sharp increase in prevalence between 1978/79 and 2004 from 15% to 26% for children aged 2 to 17 years (225). Following a statement by the Ministers of Health in 2010, declaring that child obesity prevention was a federal priority (226), several documents were prepared outlining strategies for future action. The first document, entitled *Curbing childhood obesity: A federal, provincial, and territorial framework for action to promote healthy weights,* called for the creation of supportive environments, early action in childhood and improved access to nutritious foods (225). These key areas of action created the basis for the recommendations outlined in *Actions Taken and Future Directions: Curbing childhood obesity: A federal, provincial, and territorial framework for action to promote healthy weights (*227*)*. The recommendations called for the use of multiple sectors to create supportive environments where children would have the opportunity to make healthy decisions as well as develop the knowledge and self-efficacy to make these decisions.

### Healthy Eating Awareness and Education Initiatives (HEAEI)

In response to *Actions Taken and Future Directions: Curbing childhood obesity: A federal, provincial, and territorial framework for action to promote healthy weights,* HC established activities to support policy priorities in the Framework. One of these

activities included a set of initiatives called the Healthy Eating Awareness and Education Initiatives (HEAEI). The HEAEI was presented in three phases; nutrition labelling in 2011, sodium reduction in 2012 and food skills in 2013 (228). Based on recommendations that came from The Sodium Reduction Working Group (SRWG), a social marketing approach was taken for the dissemination of key messages for each phase (229). The ultimate goal of HEAEI was to influence positive changes in dietary behaviours. The foundation of the HEAEI was the CFG and guiding principles for messaging included; consistency in addressing nutritional issues and healthy eating, a national approach and clear messages related to using the CFG as a tool to select the appropriate foods at home, at the grocery store or while eating out (227). All federally supported nutrition initiatives are aligned with the CFG to ultimately help Canadians meet their nutritional needs and minimize their risks of developing NCCDs (230, 231). While most (80%) of Canadians are aware of the CFG, there is a gap between awareness and healthy eating knowledge and behaviors (232).

Given that Canadians find it challenging to navigate through the food environment to make healthy decisions (230), the HEAEI was designed to support activities from the Framework directly related to helping Canadians make healthier dietary decisions. The second and third phases of HEAEI, supporting recommendations from the Framework, were named the Eat Well Campaign. The second part of the Eat Well Campaign or phase three of HEAEI, launched in 2013, focused on healthy eating and food skill messaging to address knowledge, abilities and awareness gaps of Canadian parents. This was seen as crucial messaging given that the level of knowledge, abilities and awareness of parents and caregivers regarding healthy eating is a factor that can influence pediatric obesity (230).

**The Eat Well Campaign: Food Skills**

The primary objective of the Food Skills phase of the HEAEI was to increase the awareness, understanding and application of food skills among Canadian parents with the ultimate goal of contributing to the HEAEI's long-term objective of supporting healthy weights in children. Focusing on food skills was seen as a non-stigmatic approach to

support healthy body weights. The intention to promote healthy weights via food skills without focusing or mentioning weight during EWC activities was deliberate and was in line with a specific recommendation from the Framework regarding "Education and Training" (227). Based on findings in Canada that mothers are primarily responsible for family meal planning and preparation activities and children develop their food skills from modeling their parents (115), the target population selected for this phase of the EWC was parents with young children with a focus on mothers (230). The campaign was designed using a social ecological approach (Figure 1.5) to address the need for multi-sector involvement in child obesity prevention (227). Key messages were based on Pat Vanderkooy's definition of food skills developed by the Region of Waterloo Public Health (70) (Table 1.2) and adapted by HC. The EWC focused on messages that promoted meal planning activities while involving the family in meal preparation (e.g., planning is key to healthy eating). Both meal planning and involving family members in meal preparation are strategies to help manage time constraints associated with home-based food preparation and therefore facilitate healthy eating. Key messages were delivered alongside additional messages about healthy eating (e.g., compare the % daily value on the Nutrition Facts Table, carry a bottle of water when it's too hot).

Behavior change cannot be accomplished by focusing on knowledge alone; interventions should include critical thinking skills and autonomy. Perceptions, attitudes and beliefs also play a central role in food-related behaviors (233). The development of effective approaches that lead to changes in health behaviours requires combining of efforts at various levels of influence: individual, interpersonal, institutional, community and public policy (234). The use of an integrative framework, the social ecological model, by HC was a relevant approach to develop the EWC. This strategy was anticipated to ensure that the intervention did not focus solely on individuals' capacity for behavior change, but that also the dietary practices of Canadian parents could be supported and reinforced through several dimensions of influence (Figure 1.5). Social marketing was recommended by the SRWG in 2010 as a strategy for public health nutrition campaigns in Canada to support behavior change (229).

It is challenging for organizations to undertake initiatives with progressively restrictive budgets (235). Public health initiatives in Canada face the added challenge of covering an immense territory with a scattered population who may face diverging realities related to their locality. It is increasingly understood that public-private partnerships are becoming a norm through necessity (236). Leveraging resources and expertise between organizations are becoming commonplace. The Canadian Institutes of Health Research have been promoting partnerships between the governmental agencies and the private sector as part of the Government of Canada's science and technology strategy (237). In the case of the EWC, HC engaged in multiple partnerships to leverage their resources with those of their collaborators to increase the reach of the campaign and thereby potential for effectiveness. The EWC created three types of partnerships; paid, cost-sharing and in-kind. Seven media and communication companies were engaged in paid partnerships, non-governmental organizations (NGO) were engaged in cost-sharing partnerships and two major Canadian food retail associations (comprising over 80% of the Canadian retail food market) committed to in-kind relationships. In addition, HC's own regional offices as well as Provincial and Territorial Government public health offices committed to in-kind partnerships.

While public-private partnerships have been used by many departments within the Government of Canada, the use of the retail food industry in public-private partnership was an innovative approach employed by HC. In the past, HC exercised caution when partnering with the Food Industry for nutrition promotion initiatives. HC started building partnerships with the private sector during the first two phases of the HEAEI. Partnerships were expanded to include retail associations so messaging could be delivered to Canadians at the point of purchase (i.e., the grocery store) potentially influencing those purchases. The development of retail food partnerships and building relationships with other partners were viewed as essential to the success of the EWC. The extensive number of partners used to implement the EWC is the key element differentiating it from public health nutrition initiatives done in the past.

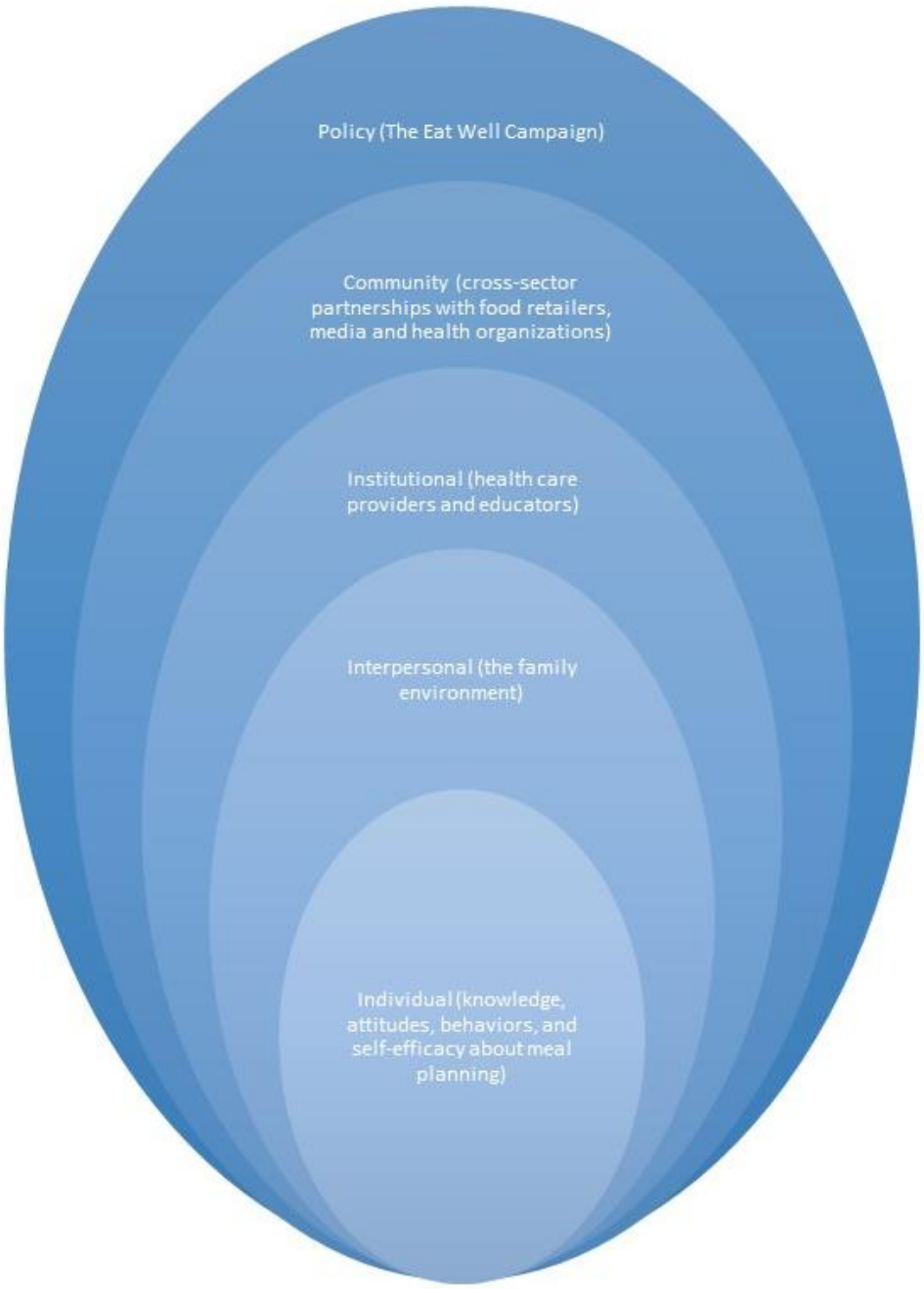


**Figure 1.5** The social ecological model adapted to the Health Canada's Eat Well Campaign (Food Skills)

## The Skills Study

### Rationale

While the aim of public health interventions such as mass media campaigns is to improve health attitudes and behaviors, without rigorous evaluations, the impact of these interventions remains unclear (238). Government-driven initiatives face additional pressures to be impactful in order to secure future funding for continued public health activities. Evaluations are necessary to validate whether interventions are responsible for any observed effects, identify which populations benefited from the intervention, identify which circumstances contributed to the effects, monitor adverse or unintended consequences and identify mechanisms of action (239). Additionally, evaluations serve a practical purpose by providing evidence necessary for decision-making (240). They allow stakeholders, particularly developers, to receive feedback on strategies to improve initiatives as well as identify the most advantageous ways to apply limited resources (241). Furthermore, for relevant interventions to be incorporated into larger public policies and programs, evaluations are needed to provide justification with strong evidence (239).

Public health initiatives having numerous stakeholders, including the funding agency, partners and the public, have a responsibility to be accountable in terms of public health spending. Public health evaluations need to respond to government (i.e., political) needs as much as contributing to the advancement of science. Therefore, evaluation objectives should be flexible and responsive to contextual circumstances and the information needs of public health stakeholders and decision makers (242). Ideal evaluations would be third party, undertake robust scientific methods (243) and measure multiple dimensions of program quality (244). Various dimensions can be measured through both outcome and process evaluations. While an outcome or impact evaluation provides an indication of an initiative's influence on health parameters, the process evaluation provides a cue into how these outcomes are achieved (245). Evaluations are essential to provide feedback to stakeholders on improving health initiatives, identify optimal strategies to support advances in public health and ensure government accountability (246). An evaluation the EWC will be useful for decision makers, such as

HC by provide avenues for improving future interventions and recommendations for stronger partnerships.

While food literacy components such as planning meals were incorporated into the EWC, little is known about its most valuable components. It is strongly believed that food literacy is a type of scaffolding that supports healthy eating (27, 68, 73). A need for further research in Canada on determinants of food literacy and their relationship to diet quality has been identified (111). Exploring different food literacy dimensions in relation to diet quality and employment status is a first step to identifying potential components that can be the basis of impactful interventions that fit into the lives of important target populations such as parents.

**Objective**

Conduct process and impact evaluations of the EWC, explore associations between food literacy, diet quality and employment status of Canadian parents and put information into context for decision makers and stakeholders

**Research questions and hypotheses**

*Part 1. Process evaluation of the EWC among Health Canada's cross-sector partners (research questions)*

Chapter 2 — Adoption of the EWC:

What factors influenced cross-sector partners' decision to adopt the EWC?

Chapter 3 — Implementation of the EWC:

What facilitators and barriers did cross-sector partners experience while implementing the EWC?

*Part 2. Impact evaluation of the EWC among Canadian parents (hypotheses)*

Chapter 4 — Reach and perceived effectiveness of the EWC

a) The EWC will reach the majority of Canadian parents
b) The EWC will reach equivalent numbers of Canadian parents from different sociodemographic groups

c) The EWC frequency and intensity will be associated with greater odds of reporting more positive beliefs about the campaign and its key messages.
d) The EWC awareness will be associated with greater odds of believing meal planning is important for healthy eating, of planning family meals and of feeling competent in meal planning.

*Part 3. Associations between food literacy, diet quality and employment status (hypotheses)*

Chapter 5—Diet quality and food literacy

Greater food literacy will be associated with better diet quality among Canadian parents.

The prevalence of food literacy items will be different between mothers and fathers

Chapter 6 — Employment status, diet quality and food literacy

Full-time employment status will be associated with worse diet quality and less food literacy among Canadian parents.

Full-time employment status will be associated with more barriers to meal planning and meal preparation strategies.

## Methods

*RE-AIM Framework*

For the process and impact evaluations (Chapters 2–4), mixed methodology including quantitative and qualitative tools were used for data collection and analysis. The RE-AIM framework is a well-established model that guides the assessment of population-based interventions via five key dimensions; reach, effectiveness, adoption, implementation and maintenance (244). Four of the five key dimensions of RE-AIM program evaluation framework were used to guide study development (247). The reach and effectiveness of the campaign on Canadian parents and its adoption and implementation by HC's partners were examined. The final dimension of the framework (i.e. maintenance) was beyond the scope of this study and was not examined given that the evaluation topic is a campaign and not a program, the campaign was undertaken for a defined duration and the content was not repeated. In addition to the dimensions of the RE-AIM framework, the broader implication of using cross-sector partnerships in

public health nutrition was studied by outlining recommendations for future collaborative work between cross-sector partners and HC.

*Qualitative methods*

Qualitative methods were used to study the adoption (Chapter 2) and implementation (Chapter 3) of the EWC. HC's partners were invited to participate in a web questionnaire and an hour-long semi-structured telephone interview. All public-private partners (food retailers, n = 16; media, n = 7) were invited to participate. Key non-governmental organizations (n = 4), regional HC offices (n = 8) and Provincial and Territorial government public health offices (n = 7) were also invited to participate. A key informant from each partner organization, who consented to participate in the study, was sent a web questionnaire and subsequently interviewed. The web questionnaire served to collect preliminary information about the partners' participation, which could further be probed via a semi-structured telephone interview. All telephone interviews were conducted in either English or French by a single interviewer between April 2014 and January 2015. Interviews were designed to capture qualifying details on questions from the web-based survey and sought to gather information about key components related to the adoption and implementation of the EWC. In addition, these interviews captured details on facilitating factors, barriers and challenges, perceived reach, perceived effectiveness, insights into private-public partnerships and relationships with HC.

A methodological philosophy with a pragmatic approach underlies the qualitative research conducted in the Skills Study (248). A hybrid of deductive and inductive methods of thematic analysis was employed to ensure that findings were 1) founded on scientific literature and 2) grounded in the data (249). For the adoption dimension, to understand the reasons that influenced partners to participate in the EWC, the *Diffusion of innovations* decision process model was used (250). For the implementation dimension, facilitators and barriers were identified inductively and results were reported according to the consolidated criteria for reporting qualitative research (COREQ) (251).

*Quantitative methods*

A rich database of variables that included sociodemographic characteristics of Canadian parents, awareness and perceptions about the EWC, food literacy items and dietary data was used to prepare Chapters 4–6. This data was collected from a representative sample of parents from across Canada recruited by a private firm. Using a random digit dialing system, recruiters systematically contacted 93,888 Canadian telephone numbers, between April and mid-July 2014, to determine their interest and eligibility using predetermined inclusion criteria. To participate in the study, participants needed to:

1) be a biological or adoptive parent of a child between the ages of 2–12 years old;
2) be an adult at least 18 years old;
3) live with their child or children at least half of the time;
4) plan at least half of the meals;
5) be a Canadian citizen;
6) understand English or French;
7) have internet access;
8) and have an e-mail address.

Those who agreed to participate were sent personalized emails with links to a web-based survey and details about informed consent. The research team executed a maximum of two follow-up reminders (by e-mail and or by telephone between), encouraging participants to complete at least three of the four questionnaires included in the survey between April and August 2014. Recruitment ended when at least 1,100 participants had completed the primary study questions (questionnaire 2). Participants were able to withdraw from the study at any time. Incentives were provided to participants; one entry into a draw to win one of five iPads for every questionnaire completed. The web-based survey contained four questionnaires, which took an estimated time of 75 minutes to complete:

1) Questionnaire 1 was a standard 13-item questionnaire used by the Institute of Nutrition and Functional Foods (INAF) to capture demographic information from research study participants.
2) Questionnaire 2 was a 14 to 26-item questionnaire that was designed by the research team to assess Canadian parents' awareness of the campaign, the exposure rate and the impact of the campaign in terms of changing beliefs regarding family involvement in meal planning, increasing knowledge and frequency of planning to make healthier food choices and, cooking family meals more frequently.
3) Questionnaire 3 is a 100-item questionnaire developed by the research team based in part on a two-part national survey on food literacy from the CCHS (252, 253) commissioned by HC prior to the launch of the campaign. In addition to questions from the CCHS, a literature review was conducted to collect information on general food literacy topics with a focus on meal planning and preparation, from which additional questions were formulated.
4) Questionnaire 4 was optional and collected food consumption data through a validated web-based food frequency questionnaire (FFQ) (254). This data was used to compute a HEI score adapted to the CFG (255).

The database of responses of parents from the survey was analysed using quantitative and semi-qualitative methods.

# Chapter 2 — Adoption of the Eat Well Campaign: Food Skills


## Résumé

La campagne « Bien manger » a été développée par Santé Canada et elle a été diffusée avec l'aide de partenaires multisectoriels. Le but de cette étude était de décrire les facteurs menant à l'adoption de la campagne tels qu'identifiés par les partenaires multisectoriels. Une analyse thématique a été réalisée à l'aide des transcriptions d'entrevues téléphoniques avec 18 partenaires. Les thèmes saillants influençant l'adoption de la campagne étaient : une concordance élevée entre la campagne et les valeurs des organisations, une volonté d'avoir une association avec Santé Canada, une faible complexité perçue des activités. Les normes sociales sont citées comme ayant eue un rôle important dans la décision de détaillants alimentaires et de petits organismes. Une bonne compréhension des facteurs encourageant les partenaires à collaborer avec le gouvernement aidera à identifier les meilleurs partenaires qui contribueraient à faire avancer les objectifs de promotion de la saine alimentation.


The manuscript presented in this chapter is entitled: **Factors influencing the adoption of a healthy eating campaign by federal cross-sector partners: a qualitative study**


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**Factors influencing the adoption of a healthy eating campaign by federal cross-sector partners: a qualitative study**

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## Abstract

**Background:** The *Eat Well Campaign* (EWC) was a social marketing campaign developed by Health Canada (HC) and disseminated to the public with the help of cross-sector partners. The purpose of this study was to describe factors that influenced cross-sector partners' decision to adopt the EWC.

**Methods:** Thematic content analysis, based primarily on an *a priori* codebook of constructs from Roger's *diffusion of innovations decision process model*, was conducted on hour-long semi-structured telephone interviews with HC's cross-sector partners (n = 18).

**Results:** Dominant themes influencing cross-sector partners' decision to adopt the EWC were: high compatibility with the organization's values; being associated with HC; and low perceived complexity of activities. Several adopters indicated that social norms (e.g., knowing that other organizations in their network were involved in the collaboration) played a strong role in their decision to participate, particularly for food retailers and small organizations. The opportunity itself to work in partnership with HC and other organizations was seen as a prominent relative advantage by many organizations. Adopters were characterized as having high social participation and positive attitudes towards health, new ideas and HC. The lack of exposure to the mass media channels used to diffuse the campaign and reserved attitudes towards HC were prominent obstacles identified by a minority of health organizations, which challenged the decision to adopt the EWC. Most other barriers were considered as minor challenges and did not appear to impede the adoption process.

**Conclusions:** Understanding factors that influence cross-sector adoption of nutrition initiatives can help decision makers target the most appropriate partners to advance public health objectives. Government health agencies are likely to find strong partners in organizations that share the same values as the initiative, have positive attitudes towards health, are extremely implicated in social causes and value the notion of partnership.

## Background

In 2008, nearly 63% of deaths worldwide were attributed to noncommunicable diseases and the global burden from cardiovascular disease, diabetes, cancer and respiratory disease is expected to increase over the coming years (207). A large proportion of these diseases are preventable with lifestyle changes including a healthy diet, yet there has been very little success in diminishing rates of diet-related chronic diseases (207, 256). Complex societal health concerns such as obesity are influenced by a wide range of environmental and individual factors that demand collaborations between government, industry and civil society (207, 257). Major health agencies in the US and Canada have recognized that leveraging the resources and the power of stakeholders (including influencers in private and public sectors) through partnerships is essential to shift the paradigm of poor eating patterns (258, 259). Complex problems require multi-faceted solutions and to reverse the increasing burden of noncommunicable diseases multisectoral efforts are necessary (210, 256).

There are evident financial incentives for governmental public health agencies to engage in partnerships. During fiscal restraint, leveraging resources and expertise through partnerships becomes an attractive mechanism for governments to address complex issues such as obesity and chronic disease prevention (260). Multisector or cross-sector partnership benefits for governments include greater reach through access to new networks, sharing resources and technology, increasing potential for innovation, leveraging resources and expertise and greater consistency in health messages through a concerted effort (256, 261). The motivations for private-sector partners to get involved in public health initiatives include: corporate and social responsibilities, demonstrate positive public goodwill, appear more attractive to future employees, build goodwill among current staff and create additional business and profits (262). Despite the budding potential for win-win cross-sector partnerships, there are demonstrable (237) and potential (262) conflicts of interest that need to be considered and managed carefully as not to undermine public health goals.

Little is known about cross-sector partners' motivations for adopting healthy eating initiatives. The RE-AIM evaluation framework (reach, effectiveness, adoption, implementation and maintenance) examines adoption in terms of the number or percentage of sites that participate in a program and is often a quantitative dimension indicative of representativeness (263-265). A purely quantitative examination of adoption, however, falls short by not describing the factors leading to adoption. Given that understanding how the adoption of an intervention can vary significantly between modalities and this can impact the intervention itself (266), it is particularly important to garner a strong understanding of the adoption processes between partners from different sectors through qualitative examination. Understanding the factors influencing adoption is expected to help inform decision makers about the most effective partners with the greatest potential for impacting public health goals and minimizing conflicts of interest. Qualitative adoption data can be used to identify and target future adopters with the best systems-organization fit. This information has potential to be extremely valuable for developing strategies for purposive targeting of partners and enhancing adoption rates (267, 268).

Child overweight and obesity was declared a public health priority in 2010 by Federal, Provincial and Territorial Ministers of Health in Canada (225). In response to this declaration, three phases of a healthy eating and education awareness initiative were designed by HC. The *Eat Well Campaign: Food Skills* (EWC) was the third initiative; it leveraged the resources and expertise of cross-sector partners to diffuse a fully integrated social marketing campaign. Partners adopting the EWC included collaborators from the retail food industry, advertising, the media, Federal, Provincial and Territorial governments and non-governmental organizations (NGO). The purpose of this study was to describe, among cross-sector partners, the factors influencing the decision to adopt the EWC.

## Methods

### Study design

Adoption of the EWC by HC's cross-sector partners was investigated as part of a process and impact evaluation of the EWC. Qualitative data collection and analysis was conducted to describe the factors that influenced cross-sector partners' decision to adopt the EWC. Constructs and keywords from Rogers' *Innovation-decision process* model that lead to knowledge generation about an innovation and persuade an organization to make the decision to adopt an innovation (i.e. the EWC) (250) were used as a basis for describing the adoption process of the EWC. The main constructs examined were prior conditions, characteristics of the adopter and characteristics of the innovation (250) (Table 2.1).

### Data collection

With HC assistance 37 of the 53 partners involved in the EWC collaboration were purposefully selected and invited to participate in the study (Figure 2.1). Purposeful selection was based on role, partner-type and timing of involvement in the EWC. HC provided contact information for the key informant at each organization invited to participate in the study, but an organization that was not actively engaged in the EWC at the time of study conception was not invited. Key informants were invited to participate in the study by e-mail, telephone or both. During the first round of interviews a purposeful sample of 24 partners were invited to take part in the study. Those who agreed to participate were provided with confidentiality agreements and gave their informed consent. An interview guide and a brief web questionnaire asking participants to describe their organizations' involvement in the EWC were provided. An hour-long semi-structured interview based, in part, on Roger's *Diffusion of innovations* theory (250) was administered over the phone by a bilingual interviewer (M.T.). To complete suspected data gaps identified during the first round of interviews, 13 additional participants were purposefully selected from the food retailer and the health organization groups. Additional interviews did not provide new or different information.

Given that the objective of this study was to describe factors influencing the decision to adopt the EWC, participants from HC's own regional offices were excluded (n=3). Fifteen partners refused to participate, one participant dropped out and a total of 21 interviews with partners were conducted, 3 were excluded and the remaining 18 interviews were analyzed: n=8 food retailers; n=6 media; n=7 health organizations.

**Data analysis**

Interviews were digitally recorded and transcribed verbatim. Transcript quality was verified (by M.A.F. or J.D.) to ensure language accuracy and avoid misinterpretation. Transcripts were coded by three bilingual research assistants (M.T., M.A.F., J.D.). Thematic content analysis was conducted on transcripts using Saldana's (269) method of first and second cycle coding to first categorize and then interpret data. NVivo software (version 10; QSR International, Doncaster, Victoria, Australia) was used to organize data. A deductive-inductive data analysis approach was employed whereby excerpts were initially lump coded into an *a priori* codebook followed by the inductive splitting of subthemes into micro-themes. The codebook was based on the *Innovation-decision process* model (250) and interview question keywords. All three coders were involved in the first round of lump coding. Coding agreement between coders was over 80% and was verified by triple coding five interviews. Codes were split during subsequent rounds of coding and code interpretation. Code splitting was conducted separately by two coders (M.T. and M.A.F) and then validated as a group. French excerpts were translated into English by an Anglophone (M.A.F.) and verified for accuracy by a Francophone (J.D). Validation was done by verifying procedures and methods with senior researchers (S.D., M.M., V.P.) during peer debriefing sessions (248). Contextual coding was carried out throughout the data analysis process to ensure organizational context was maintained.

## Results

### Adoption of the EWC by cross-sector partners and decision-making context

HC invited a very large retail association (Retail Association 1) and an independent food retail association (Retail Association 2) to participate in the EWC. Both retail associations agreed; all 8 food retail members from Retail Association 1 and 8 members from Retail Association 2 adopted the EWC. Recruitment of Retail Association 2 members into the EWC was done through a third party and non-adopters remained anonymous to HC. All paid collaborators (media partners) that were invited adopted the EWC. Among health organizations, all 13 Canadian Provinces and Territories adopted the EWC as well as Federal health organizations who were already involved in working groups (the Federal/Provincial/Territorial Group on Nutrition and the Healthy Eating and Education Awareness Initiatives Task Force) that were mandated to support the EWC. In addition, the 2 non-governmental health organizations who were invited to collaborate adopted the EWC. Several respondents reported that the decision itself to adopt the EWC campaign was made relatively easily, without hesitation.

> I think we kinda assumed that we had to do it, like it wasn't an option to not do it is the way I saw it, because, well it's a retailer campaign and we're a big retailer so we wouldn't really not do it, I guess. —*Food retailer*

Other contextual factors surrounding the decision to participate involved: collaborative discussions with HC; a way to demonstrate corporate citizenship; financial influences (both investments made by in-kind partners and income received by paid-partners); opportunities to support HC and support good messages.

### Description of the participating organizations and their roles

Table 2.2 provides a description of the characteristics of the 18 organizations who participated in the study as reported by key informants. Adopters of the EWC consisted of three types of partnerships; paid, in-kind (volunteer) and cost-sharing. However, some paid and in-kind contractors also saw themselves as cost-sharing collaborators.

> Well I think that because Health Canada was funding the development of the artwork and they helped fund a lot of base costs and then we also paid for

> production and materials and distribution and, you know, added support and staff and that type of thing. So, it was a jointly funded program. —*Food retailer*

One paid contractor perceived themselves as true partners with HC in the EWC, because of their perception of cost-sharing. There was a semblance of pride linked to the idea of being a partner and not just contractor.

> We weren't just diffusers; we were real partners in this cause. —*Media*

Other specific roles that were identified by some partners included: diffusers of information, producers of material, information sharing with HC, intermediaries with other organizations or the public, spokespeople and message translators.

> Our role was to translate the message from Health Canada into a more accessible form for average people and families at home to give them recipes, to inspire them and to really get them on the right path to making better food choices for their families. —*Media*

**Prior conditions: previous practice**

All partners interviewed had previous experience with healthy eating, healthy lifestyle or community campaigns. The majority of partners had no direct experience working with HC although this did not appear deter their decision to participate, whereas having had previous experience working directly with HC appeared to facilitate the decision to adopt the EWC.

> We had worked with them before, you know we had that already… the relationship developed, and so we didn't have to worry about worrying, you know about things like oh, how will they react or whatever, like we knew what to expect from them. —*Media*

**Prior conditions: innovativeness**

A slight majority of participants across partner types did not perceive the EWC as innovative mainly because the theme and messages were not novel. It was seen as just another education campaign and not different or exciting.

> I felt that they were messages that I've seen a million times before delivered through other campaigns by other organizations. I didn't think it was unique to Health Canada, you know. —*Food retailer*

Despite the lack of perceived innovation by most partners, the campaign was considered relevant to the public. Some partners considered the approach HC used to make federal health messages accessible to the public as innovative. The quality of the graphics and materials, the use of many diffusion channels, the use of point of purchase messaging and the combination of traditional and social media were also viewed as innovative aspects of the EWC by a few partners. In addition, the cross-sector partnership itself was considered as an innovative way for HC to diffuse a healthy eating initiative by a food retailer and members of health organizations.

> Oh! Yeah, I think that, again it's the collaboration that was unique about this—multiple retailers all at once communicating a message. —*Food retailer*

**Prior condition: norms of the social system**

Many respondents spoke about social norms influencing their decision to adopt the EWC. All respondents who spoke about social norms were food retailers or worked for a small organization. The primary influence for major retailers was their professional network, Retail Association 2. For these respondents, there was a sense of wanting to be part of the group and a minor sense of peer pressure to follow in line with their peers/competitors.

> Well, it was a campaign that brought together the majority of retailers, you know. So, we knew that our competitors would probably be participating and we didn't want be left out. —*Food retailer*

Respondents from small organizations spoke about how the public expected them to be involved in this type of initiative. One in-kind respondent mentioned that while their social network was important, they would have participated regardless of other organizations, because it was "the right thing to do".

**Prior conditions: perceived need or problem**

The majority of organizations spoke about the EWC meeting needs and problems of their clients rather than their own organization. This information was captured under "relative advantages" for organizations. No organizational problems were mentioned during interviews. The EWC, however, addressed a few organizational needs; a food

retailer mentioned the need to educate their clients about healthy eating; a health organization spoke of the need to raise awareness about healthy eating within their region; and a food retailer mentioned the need to be involved in activities that support their position as a leader in healthy eating.

> "The important part is for us to raise awareness about healthy eating. […] food is very much a part of our culture, and historically some of our choices are not what we would consider healthy." — *Health organization*

**Characteristics of adopters: communication behavior**

Interconnectedness played a major role in the adoption process of the partners. The majority of participants were recruited through established networks; Retail Association 1, Retail Association 2 and the Federal/Provincial/Territorial Group on Nutrition. It was through these usual social networks that participating organizations came to know of the campaign. In addition to these professional networks, interconnectedness within large organizations (between departments) as well as between organizations and the government were identified. A notable communication barrier that emerged was the lack of exposure to mass media by a partner from a health organization that was not located in Central Canada. This limited their exposure to the EWC and was seen as an obstacle that seriously challenged its adoption. The notion of high social participation organically emerged from most food retailers and media respondents who described having notable experiences working with charities, in other social causes, fundraising, etc.

> It would take me like hours to tell you about all the things that we do in community to teach kids how to eat healthy. You know from getting out, going to schools and having kids coming to our schools and hiring dietitians to talk to kids — *Food retailer*

**Characteristics of the adopter: personality variables**

The organizational personality traits identified were favorable attitudes, empathy and a strong level of rationality. Rationality emerged as an organizational personality variable related to the decision to adopt the EWC by half the respondents.

> A core essence of what we're about is helping Canadians […], and so a program that helps support our overall arching objective of helping people to

> understand that direct relationship between the food they eat and how they feel and how they live is a benefit. —*Food retailer*

Favorable attitudes towards health, new ideas and HC were seen as organizational personality traits that influenced the adoption of the EWC by all partners except two health organizations. These two partners held reserved attitudes towards HC, which appeared to be obstacles challenging their adoption of the EWC. A high level of empathy was demonstrated towards the EWC target population by a small number of partners in the food retail group and towards HC by a media partner.

> We felt also that Health Canada had a very strong message but they also didn't really have, you know, a huge budget to accomplish this. So, if this was not Health Canada, for us it probably wouldn't have been worth our while, but we wanted to make the effort because we think that it's a good message […] So, we really made an effort to, you know, meet all the requirements they had. —*Media*

**Characteristics of the innovation: compatibility**

One health organization and one food retailer spoke of the lack of compatibility between the EWC and their organizations, whereas among the remaining partners there appeared to be a very strong sense of fit with the EWC. Partners spoke of sharing similar values, mission or vision with the EWC and/or HC. Half of the food retailers and some media partners described their organizations as having very different missions, but sharing the same values as the EWC and HC. A media partner and a health organization spoke of sharing the same mission as HC but having extremely different visions. Sharing the same values appeared to be more important than having the same (public health-oriented) mission or vision on how to address health and nutrition.

> Because we are a media company […] our mandate is to entertain and not really to educate the public on healthy lifestyles. It's a cause that we consider important, that we think is noble like I mentioned before, but this doesn't mean that it's a cause that our organization supports systematically. —*Media*

The fit between the organizations' practices, target population and the EWC was also important. Some media partners spoke of a strong fit between their brand and clients with the activities and target population of the EWC. Partners from all groups described having the same audience or clientele as the EWC.

> Just tips for families ‘cause that’s really our demographic right, it’s families that are on the run and on the go and… So the campaigns really seemed to fit with the timing. —*Food retailer*

An emergent element from a small number of food retailers and media partners was staff fit between organizations’ employees and the EWC. Poor staff fit was identified as a challenge for one food retailer, but did not impede organizational adoption, whereas compatibility between employees’ personal values, beliefs and work ethic with elements of the EWC facilitated adoption.

> So, it’s a lot of work goes into, you know. I’m the type… I don’t just wanna take a poster and stick it up on a wall. —*Food retailer*

**Characteristics on the innovation: complexity**

Overall, most partners did not perceive that adoption implicated much complexity. A handful of respondents across partner groups perceived no complexity whatsoever, because of past individual experiences, simple messaging and dissemination. Across partner groups, minor reasons for the EWC being considered as a little or somewhat complex included: problems related to planning and task management, political issues, limited financial resources, strict control of information by HC, lack of relevance to population groups, lack of clear objectives, lack of familiarity with marketing, difficult messaging to transmit and difficulties integrating activities within the organization.

> I initially I found it hard to sort of understand what they were trying to accomplish. And maybe it was because, you know, you’ve got the big forum and the big conference call and that and that’s where I found that it was hard to understand at the very beginning as to what exactly what they were doing and maybe I wasn’t in the ground level to really understand and that’s what my perception was. —*Food retailer*

**Characteristics of the innovation: relative advantages**

Having emerged entirely organically, the most salient relative advantage of the EWC for partners was the impression that it could enhance their image and credibility. This relative advantage was identified by all members of the food retailer group as well as a few members from other partner groups.

> Well I think it’s partnering with a credible organization, so we are trying… like our goal is to demonstrate to our customers that we are committed to health

> and wellness. And, by partnering with a credible organization like Health Canada, it's… you know, positive for us. —*Food retailer*

In addition, being associated with HC was a prominent relative advantage for all partner groups. The partnership aspect of the EWC was also a prominent relative advantage across partner groups for in-kind, paid and cost-sharing collaborators.

> Yeah, I think a coordinated effort is certainly preferred as opposed to… you know we may not have gotten involved as an individual company in the Eat Well Campaign specifically, just because we have lot of other things going on as well in the same areas as far as communicating health messages. So, that was an important part of it. —*Food retailer*

A common relative advantage for all food retailers and some other partners was the EWC's ability to respond to the nutritional needs and problems of their clients/audience as well as provide them with relevant information. Economic advantages were identified by paid and cost-sharing collaborators as well as a very small number of in-kind partners. The opportunity to increase the reach or visibility of their organization and its products through the EWC was identified by all types of partners. Obtaining new health content and materials was a relative advantage for a very small number of organizations across partner groups. The nature of the campaign itself (positive messaging and health promotion) emerged as an interesting relative advantage, particularly for media partners.

> It is healthy lifestyles, after all. It's a great cause. It's understood that yes, there is revenue coming in, there is an advertising investment associated with this, but we always prefer to work on projects like this one, in partnership, when it's a good cause. —*Media*

For some food retailers, the EWC supported their organizational values. A food retailer also mentioned benefits for the organizations' staff around healthy eating awareness.

> Whenever we do a program like this, we don't just offer it to the customers. We also send it out to all of our employees as well — *Food retailer*

The majority of respondents across partner groups did not perceive any disadvantages of adopting the EWC. A media partner described challenges around communicating the actual messaging. Minor disadvantages identified by half of the food retailers were related to the financial costs of participating (investments in publicity and human resources).

> Right, because often times vendors will pay money to be in your flyer. So, you know, if you take away products that you're gonna make money on to put in an Eat Well Campaign, that you don't know if you're gonna make any money on, then, you know, that would be one of the challenges. —*Retailer*

## Discussion

### Overall perceptions

Partners had a very positive attitude towards the adoption of the EWC and the partnership with HC. Many facilitating factors emerged from the interviews whereas very few barriers associated with adoption were mentioned, despite prompting. Few perceived barriers of the EWC by adopters might be explained by HC's targeted approach selecting partners through networks with high opinion leadership value (268). This invitation-based approach may have reduced the potential to engage in collaborations with unfavorable partners or those with low compatibility. This is also supported by the findings that there were extremely high perceptions of fit and favorable attitudes towards health, new ideas and HC. Furthermore, the feel-good nature of the campaign may have attracted fully engaged partners that had little to no reservations for adopting a healthy eating initiative as evidence by the easy decision-making by most organizations. Uncovering barriers to adoption is particularly important in non-adoption settings (244). Given that this study focused on factors related to the decision to adopt the EWC and not differential adoption, it is understandable that few prominent barriers emerged among actual adopters. Nevertheless, HC speculated that the lack of resources and capacity were likely factors that prevented adoption of the EWC by the majority of non-adopters from Retail Association 2 (personal communication with HC).

Recognizing in-kind and paid collaborators as cost-sharing partners in a healthy eating initiative can lead to the valorization of their expertise. This type of simple recognition could be used to strengthen their level of commitment towards and initiative through the notion of balanced contributions (258). The activity and main location of the organizations involved suggests that the EWC was diffused more in provinces in Central

Canada (i.e. Ontario and Quebec), validating one participant's perception about not having much exposure. The majority of organizations had over 250 employees suggesting a very large capacity for reach of the adopting organizations. Given that reach of the targeted population is strongly impacted by adoption (270), the participation of large Canadian organizations in the EWC indicates that reach is likely to be high across Canada, particularly Central Canada. While the adoption rate is unknown among the food retailer group, there appeared to be greater representation from Retail Association 1 whose members all adopted the EWC. Non-adopters were concentrated among Retail Association 2 members, but the exact number and details of their non-adoption remain unknown. Food retailers in Retail Association 1 are among the leading retail corporations in Canada (271), and their potential client reach is significant. For example, in 2012 four of their members represented 30%, 15.1%, 14.4% and 6.4% of the entire retail food market in Canada, respectively (272). Therefore, members from Retail Association 2 contributed to a small percentage of the potential reach of the EWC (based on their share of the Canadian food retail market) in comparison to the major food retail corporations in Retail Association 1.

**Facilitators**

The construct of prior conditions is expected to shape an individual's attitude and knowledge towards an innovation ultimately influencing their decision to adopt or reject it. Prior conditions are characterized by previous experience, perceived innovativeness, social norms and a perceived need or problem (250). Having experience with HC, skills and knowledge with healthy eating, familiarity with healthy eating initiatives or experiences with other lifestyle or community engagement programs, appeared to facilitate adoption. Experience with similar innovations or knowledge about a subject is known to facilitate adoption as seen in Olstad (273) who studied adoption in the context of implementing nutrition guidelines in recreational facilities. This may be particularly true for partners who had experience working with HC and were used to working within governmental constraints.

A few innovative characteristics of the EWC were identified; however, the only theme that emerged influencing the decision to adopt was the notion of cross-sector partnerships. The *Diffusion of innovations* implicates high levels of perceived innovation with early adoption (274). In the EWC, however, the adoption of the campaign was based on the timing of an organization's involvement making the notion of early versus late adoption irrelevant. Greenhalgh (275) also noted that the notion of early adoption was less relevant in the context of organizational adoption of an idea versus individual adoption of a product. Perceived innovativeness appeared to have a neutral influence on adoption, with the exception of partnerships. Among partners who perceived no innovation, the relevance of the campaign topic appeared to have a greater influence on their attitudes then the EWC's innovative potential. Many partners perceived an absence of innovativeness associated with the EWC indicating that its messages have already been delivered by other organizations, all the while recognizing the value of relaying important messaging again. This suggests that innovativeness was not a relevant prior condition for the EWC. Instead, strategically timing the EWC's appearance in a cluster of already-accepted campaigns may have endowed it with pre-conceived favorable attitudes by recycling the positive behaviors organizations previously developed towards other known innovations (268).

Social norms were extremely important for food retailers as well as small organizations. Innovations that are aligned with societal norms are more likely to be accepted (250, 276). Professional networks such as Retail Association 1 appeared to have a major influence on the decision to adopt the EWC campaign for major food retailers. A few organizations also indicated that their clients or audiences expected them to participate in these types of initiatives indicating the significance of social image. The importance of professional networks, social image, potential peer pressure and their influence on adoption is consistent with the adoption of an innovation or policy (268). This social reputation, particularly for small organizations, is important in defining its personality and thus perceptions about the organization (277). Social norms did not appear to be as relevant for paid contractors suggesting that in the absence of a contractual agreement,

social norms were extremely important decision-making factors for cross-sector partners. Despite social networks, an in-kind partner expressed feelings of moral obligation to participate in the EWC campaign alluding to the importance of the perceived value of the cause itself in respect to social norms. Adoption is also thought to be facilitated when an innovation is perceived to have high public support (268).

An innovation's potential to respond to a need or resolve a problem is an important prior condition influencing attitudes and knowledge about an innovation (250). In the case of the EWC, it was not perceived as being able to resolve any problems of adopters. The EWC, however, did respond to a few organizational needs of a minority of food retailers and health organizations. Perceived needs and problems were insufficient to influence adoption for the majority of cross-sector partners, which is likely driven by other attributes such as perceived risk or the innovations-systems fit (275). These findings suggest that factors beyond responding to their own needs may be more important in convincing some organizations to adopt health promotion collaborations. The lack of influence of the perceived needs attribute may also be related to the fact that respondents did not speak of the innovation as responding to their own organizational needs or problems, but rather general needs of the public. For example, nearly all respondents agreed that the EWC responded to their clients or the public's needs. This attribute seemed to be a strong relevant advantage related to their decision to participate in the EWC, particularly for food retailers.

Few organizational characteristics related to adoption of the EWC by organizations were observed. Nevertheless, favorable attitudes in general towards HC, health and new ideas can be considered as significant facilitators for adoption. Furthermore, there appeared to be extremely positive attitudes towards the adoption of the EWC among organizations where there was extremely good staff compatibility. Successful partnerships and collaborations as well as capable staff have also been identified elsewhere as facilitators for adoption (278). The favorable attitudes of respondents is similar to the finding of Olstad et al. (273) where managerial receptivity for change was a

facilitator for adoption of voluntary nutritional guidelines by recreational facilities. The ability to empathize with HC or the target population was a facilitating organizational personality variable that was identified in a small number of food retailer and media respondents and is compatible with the characteristics of adopters of innovations (250).

Interconnectedness seems to have played a major role in influencing the decision to adopt the EWC. This finding is congruent with the discourse on social network theory, whereby interconnectedness is considered as central to social networks and adoption is driven by these social relationships (279). Large organizations were well-connected to outside organizations via professional networks (e.g. Retail Association 1) and internal government relations departments. Professional networks appeared to be key trust leaders in the adopters' decision to engage in the EWC. Connections to professional networks (Retail Association 1, Retail Association 2 and the Federal/Provincial/Territorial Group on Nutrition) facilitated the decision to adopt the EWC; organizations were often made aware of the EWC via these connections. This appeared to be particularly important for in-kind collaborators. Frequent social participation by organizations indicated that it was a common communication behavior among food retailers and the media. This finding suggests that non-health organizations who engage in social participation activities may be more inclined to engage in public health initiatives. No socioeconomic characteristics of organizations emerged as themes or subthemes during interviews. There was greater representation of adopters from large organizations in the EWC indicating that they may be more visible to government or have greater organizational ease to participate in these types of initiatives. However, this may also reflect the likelihood that larger organizations (e.g. Retail Association 1 members) were targeted more than smaller ones (e.g. Retail Association 2 members) by HC.

Compatibility, relative advantages and low complexity were dominant facilitators for the adoption of the EWC and according to Tornatzky and Klein (280) they are the most important innovation characteristics associated with adoption (280). Furthermore, relative

advantages are one of the most influential factors of adoption (276). Relative advantages that emerged organically appeared to be the most persuasive; social prestige, association with HC and working in collaboration. The partnership aspect and idea of collaborating with HC and multiple partners was a prominent motivator for many organizations and can be considered as a strong facilitating factor. Social prestige is a subdimension of relative advantages that is known to influence the rate and extent of adoption (279). The relative advantage of social prestige overlaps with the innovation characteristic of social norms and the organizational characteristic of interconnectedness, and appears to relate to social network theory (278). In the case of the EWC, compatibility of the innovation with organizations' values was a prominent characteristic that appeared to be important for nearly all adopters. This innovation-systems fit has been identified as being more important than an innovation's actual characteristics (275). The strategic fit between partners and the HC was a key to facilitating adoption (268) and having the same values as the EWC was particularly important and was likely to be a strong factor influencing the decision to adopt it. Fit between organizational values, organizational practices, the target audience, the staff spearheading the campaign and the EWC were also extremely important factors facilitating adoption. There is strong evidence that both the fit between values and existing practices with an innovation are related to adoption (275, 281). Finally, the lack of perceived complexity towards the EWC speaks to a perceived ease of employing the innovation and is linked to increased probability of adopting it (276).

### Challenges

The adopters interviewed spoke of few barriers, and those that were identified were described as challenges rather than strict barriers to adoption. Notable obstacles that seriously challenged adoption were only identified among health organizations. The obstacles associated with adoption were reserved attitudes towards HC and the lack of exposure to the mass media channels used to diffuse the EWC. These obstacles were extremely important challenges given that the EWC was a social marketing campaign spearheaded by HC. Nevertheless, most other challenges mentioned by adopters were

largely seen as minor factors and did not appear to dissuade adoption. For example, the high compatibility of values between organizations likely compensated for the extremely different visions on how to approach nutrition and health that may have otherwise been a challenge. The minor presence of barriers is also likely linked to a low perception of risk versus benefits (relative advantages) (281). The utilization of professional networks and targeting of specific partners by HC may have further reduced systematic adoption barriers for many partners. Despite financial concerns mentioned by a few partners, both in-kind and paid collaborators were willing to absorb costs associated with additional services, staffing and production expenses, whereas costs are generally a major barrier to adoption (268). Other minor factors challenging adoption included political issues, strict control of information by HC, lack of relevant population groups, lack of clear objectives, difficulties integrating activities within the organization, etc. While these challenges did not appear to dissuade the adoption process, they are similar to others identified as having an impact on implementation (275).

### Study limitations and strengths

Non-adopters were unknown to HC, and for confidential reasons it was not feasible to seek them out and inquire about their rejection of the EWC. Nothing is known about the organizations that refused to participate; therefore, barriers to adoption are reported with an adopter's perspective. The lack of information from non-adopters was a major limitation in the present study, leaving a knowledge gap about factors that were associated with the decision to reject the EWC. While HC speculated that non-adoption was related to fewer resources and less capacity of small organizations, conclusions are limited without actual data. On the other hand, non-adopters were comprised solely of small independent retailers and their contribution to the entire EWC collaboration and its reach was likely extremely limited in comparison to major retail corporations, media and health organizations. The results presented are perceptions from HC's cross-sector partners that adopted the EWC and they cannot be generalized to contexts beyond governmental partnerships promoting health. The main strength of this study is the diversity of organizations providing a wide range of responses and comparisons across

partner groups. The diversity also allowed analyses to approach data saturation with a relatively small number of interviews; additional respondents from the second round of interviews did not produce different or new information. Multiple-pass coding (several rounds and two cycles) adds robustness to the qualitative data analysis methodology. In addition, coding, data interpretation, procedures and methods were corroborated by at least one other person or the entire team adding validity to the results presented. This study focused on the adoption of the EWC by HC's cross-sector partners, the primary diffusers of the campaign, but it would also be interesting to investigate the community level adoption and diffusion of the EWC by ground level intermediaries.

## Conclusion

Based on Rogers' *Innovation-decision process* model, the main facilitators that influenced the decision to adopt the EWC by cross-sector partners were closely related to compatibility between their values, practices, target audience and the campaign. Furthermore, the social prestige of being associated with HC or a social cause led by HC was an important influencing factor. Based on the findings from this study, the key recommendations for public health organizations seeking to establish cross-sector partnerships are as follows:

1. A targeted approach for partner selection is very effective to achieve high adoption rates and may help to minimize challenges associated with the adoption of a health initiative.
2. Public health organizations can find highly compatible cross-sector partners among organizations with similar values, regardless of their mission or vision.
3. Using professional networks with strong leadership value to recruit in-kind partners is efficient.
4. A public health organization's strong reputation can be used as leverage to attract desirable collaborators, particularly among organizations who value the notion of "working in partnership".

5. Efforts should be made among public health organizations to be cognizant of non-adopters in order to better understand the barriers associated with contributing to health initiatives.

## Abbreviations

EWC, Eat Well Campaign; HC, Health Canada; NGO, non-governmental organization.

## Ethics approval and consent to participate

This study was conducted according to the guidelines laid down in the Declaration of Helsinki and all procedures involving human subjects were approved by the *Comité d'éthique de la recherche avec les êtres humains de l'Université Laval* (# 2013-055) and the *Comité d'éthique de la recherche en santé de Université de Montréal* (#13-118-CERES-R) research ethics committees. Written and informed consent was obtained from all participants. As per participant consent, confidentiality was maintained by modifying or omitting gender, number, region and language identifiers in excerpts reported.

## Availability of data and material

Data contains personal and organizational identifiers and to maintain the confidentiality of the individuals and organizations who participated in the study, it cannot be shared.

## Competing interests

The authors declare that they have no competing interests.

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## Author’s contributions

M.A.F. developed data analysis methodology, analyzed the data and wrote the manuscript. M.T. was involved in developing the study design, data collection, and development of analysis methodology and data analysis. S.D. and M.M were involved in developing the study design and corroborating methods. J.D. was involved in data analysis. V.P. was involved in developing the study design, development of data analysis methodology and corroborating methods. All authors were involved in reviewing and editing the manuscript.

## Tables

**Table 2.1.** Themes based on Rogers' *Innovation-decision process model* influencing the decision to adopt the *Eat Well Campaign: Food Skills* (EWC)

| Parent themes and subthemes | Definitions |
|---|---|
| Prior conditions | All prior experience, perceptions and attitudes that can shape the organization's knowledge about the EWC and persuade them to adopt it |
| *Previous practice* | Any organizational experiences that can help create knowledge about the EWC |
| *Innovativeness* | The organization's perception of the EWC as a new idea |
| *Norms of the social system* | Perceptions of practices and behaviors that the organization is expected to conduct in relation to the EWC. These norms are set by the organizations' social network (peers, clients, public, audience, etc.) |
| *Perceived need or problem* | The recognition of the organization's internal need or problem that can be addressed by adopting the EWC |
| Characteristics of the adopter† | Any characteristic of the decision-making unit (i.e. organization) that will shape their knowledge and attitudes towards the EWC |
| *Communication behaviour* | Descriptors of the organizations' internal and external communication style, habits, exposure to media and involvement in social and public networks |
| *Personality variables* | Human personality characteristics perceived to be associated with or attributed to the organization |
| Characteristics of the innovation‡ | Characteristics of the EWC perceived by the organizations that may persuade them to adopt it |
| *Compatibility* | The perception by organizations that the EWC is consistent with their existing values, practices, experiences or needs |
| *Complexity* | The perception by organizations that the EWC is difficult to understand or implement |
| *Relative advantages* | The perception by organizations that the EWC is better than potential alternatives and can be measured in terms of benefits |

† Socioeconomic characteristics is the final characteristic of the decision-making unit, but none emerged and therefore this subtheme was not included. ‡ Triability and observability are the other two characteristics of the innovation that are commonly investigated; however, they were not relevant to the EWC and these subthemes were not included.

**Table 2.2.** Characteristics of participating organizations reported by key informants

| Characteristic | Frequency (n) | Percent (%) |
|---|---|---|
| Type of partner* | | |
| Retail food industry (retailers and retail associations) | 8 | 44 |
| Communications (media, advertising, and spokespeople) | 6 | 33 |
| Health organizations (NGO, provincial and territorial) | 4 | 22 |
| Perceived type of relationship | | |
| Paid contractor | 6 | 33 |
| Unpaid volunteer (in-kind) | 2 | 11 |
| Cost-sharing collaborator | 6 | 33 |
| Both paid-contractor and cost-sharing collaborator | 1 | 6 |
| No response | 3 | 17 |
| Head office location†* | | |
| West Coast or Prairies | 3 | 17 |
| Central Canada | 12 | 67 |
| Maritimes or Far North | 3 | 17 |
| Regional activity†* | | |
| National | 7 | 39 |
| Most Provinces and Territories | 2 | 11 |
| West Coast and Prairies | 2 | 11 |
| Central Canada | 4 | 22 |
| Maritimes or Far North | 3 | 17 |
| Active outside of Canada | | |
| Yes | 3 | 17 |
| No | 15 | 83 |
| Organizational size | | |
| Small (fewer than 50 employees) | 2 | 11 |
| Medium (between 50 and 250 employees) | 2 | 11 |
| Large (over 250 employees) | 14 | 78 |
| Congruency of organizational mission with healthy eating or healthy lifestyles | | |
| Yes | 14 | 78 |
| No | 3 | 17 |
| No answer | 1 | 6 |

† Regional definitions: West Coast, British Columbia; Prairies, Alberta, Saskatchewan and Manitoba; Central Canada, Ontario and Quebec; Maritimes, Newfoundland and Labrador, New Brunswick, Nova Scotia and Prince Edward Island; Far North, Yukon Territory, Northwest Territory and Nunavut. * Some groups were combined to maintain the confidentiality of easily identifiable participants.

## Figures

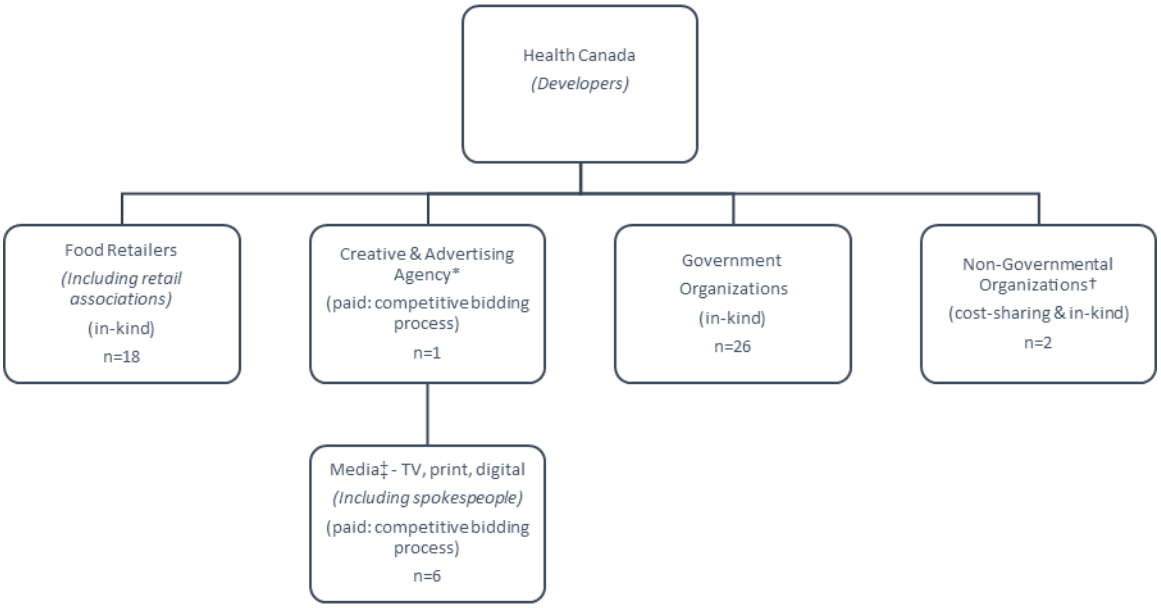


**Figure 2.1. The *Eat Well Campaign: Food Skills* collaboration.** * The creative and advertising agency was an intermediary between individual food retailers, the media and Health Canada. † For reporting purposes, Non-Governmental Organizations were combined with Government Organizations and are collectively called "health organizations". ‡ For reporting purposes, media partners were combined with the creative and advertising agency and are collectively called the "media".

# Chapter 3 — Implementation of the Eat Well Campaign: Food Skills


## Résumé

L'objectif était d'identifier les éléments facilitants et les barrières vécus par des partenaires multisectoriels pendant l'implantation de la campagne « Bien Manger » auprès de 21 partenaires de Santé Canada. Les différences entre les groupes de partenaires provenant de secteurs différents étaient examinées. Sept thèmes ont émergé : les obstacles opérationnels, les facteurs de l'intervention, les ressources, les caractéristiques des partenaires, les caractéristiques de Santé Canada, les facteurs du partenariat et les caractéristiques de la population cible. Le manque de temps était un obstacle commun pour presque tous les partenaires. Une uniformité parmi les éléments facilitants entre les partenaires a été constatée, mais les obstacles étaient divers et uniques à la réalité des partenaires de secteurs différents. La planification collaborative préalable au lancement d'une initiative aiderait à éliminer les barrières reliées au manque de temps et permettrait une meilleure intégration d'activité à l'intérieur des organisations pour faciliter l'implantation.


The manuscript presented in this chapter is entitled: **Facilitators and barriers experienced by federal cross-sector partners during the implementation of a healthy eating campaign**


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**Facilitators and barriers experienced by federal cross-sector partners during the implementation of a healthy eating campaign**

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## Abstract

**Objective:** Identify facilitators and barriers that Health Canada's (HC) cross-sector partners experienced while implementing the Eat Well Campaign: Food Skills (2013–2014) (EWC) and describe how these experiences might differ according to distinct types of partners.

**Design:** A qualitative study using hour-long semi-structured telephone interviews conducted with HC partners that were transcribed verbatim. Facilitators and barriers were identified inductively and analyzed according partner types.

**Setting:** Implementation of a national mass media health education campaign.

**Subjects:** Twenty-one of HCs cross-sector partners (food retailers, media and health organizations) engaged in the EWC.

**Results:** Facilitators and barriers were grouped into seven major themes: operational barriers, intervention factors, resources, collaborator traits, developer traits, partnership factors and target population factors. Four of these themes had dual roles as both facilitators and barriers (intervention factors, resources, collaborator traits and developer traits). Subthemes identified as both facilitators and barriers illustrate the extent to which a facilitator can easily become a barrier. Partnership factors were unique facilitators, while operational and target population factors were unique barriers. Time was a barrier that was common to almost all partners regardless of partnership type. There appeared to be a greater degree of uniformity among facilitators, whereas barriers were more diverse and unique to the realities of specific types of partners.

**Conclusions:** Collaborative planning will help public health organizations anticipate barriers unique to the realities of specific types of organizations. It will also prevent facilitators from becoming barriers. Whereas, advanced planning will help organizations manage time constraints and integrate activities, facilitating implementation.

## Introduction

In Canada, child obesity was made a public health priority by Federal, Provincial and Territorial Ministers of Health in 2010(225). The *Eat Well Campaign: Food Skills* (EWC) was an initiative that HC, a federal health agency, developed to address child obesity prevention by targeting dietary changes at the family level. The EWC was a multi-channel mass media health education campaign that used social marketing as a strategy to disseminate messages about family meal planning to Canadian parents. Dissemination of activities occurred over five activation periods (or phases) from March 2013 to March 2014 with the help of cross-sector partners (Figure 3.1). Partnerships with the food retail industry, the media and health organizations were used to extend the reach of the campaign and leverage resources and expertise to enhance outcomes (230). The nature of the partnerships included in-kind agreements with the food retail industry, paid contracts with the media, and both in-kind agreements and cost sharing contracts with health organizations.

Cross-sector partnerships in health are becoming more common and considered necessary to address complex health issues like obesity (262). Little is known about cross-sector contributions to the implementation of nutrition interventions or partnership experiences in public health. Public-private partnerships, particularly with the food industry, have the potential to influence the public's choices about healthy food behaviors and they should be strategically approached (282). It is important to study how these partners interact together to implement a nutrition initiative. The effectiveness of an intervention is closely linked to the manner in which it is implemented (283, 284), and knowledge of implementation barriers in particular can enhance the understanding of avenues for outcome improvement (263). However, few studies investigate facilitators and barriers to implementation, which could provide valuable insight into the implementation process as well as identify intervention success factors (285). The purpose of this study was to (1) identify facilitators and barriers experienced by HC's cross-sector partners during the implementation of the EWC and (2) describe similarities and differences in facilitators and barriers between cross-sector partner

groups (food retailers, media and health organizations) and partner agreements (contractual versus in-kind).

## Methods

### Partners and recruitment

As previously mentioned, the EWC was implemented over five activation periods from March 2013 to March 2014 with 53 cross-sector partners (286). The role and the level of involvement of each partner varied, with paid and cost sharing partners having defined roles as per contractual agreements and in-kind partners being involved voluntarily in various activities and phases of the campaign. The food retail industry included small and large food retailers and food retail associations. They promoted the campaign in-store, online and through grocery-store flyers. Media partners were involved in producing and promoting content for the campaign: televising vignettes, creating website content, print ads and editorials in magazines. Health organizations were primarily involved in developing and/or disseminating campaign materials through their regional networks.

The current study was part of a process evaluation to understand the implementation of the EWC among HC's cross-sector partners. Study execution and results reporting were conducted according to the 32-item Consolidated criteria for reporting qualitative research (COREQ) (251). A stratified purposeful sample (287) of 41 organizations was identified. Key informants at each organization were first identified by a manager at HC, and then contacted by a trained bilingual interviewer (MT; registered dietitian, female, 36 y) by telephone and/or email prior to their interviews to invite them into the study. The purpose of the research was disclosed to all participants, signed written consent was obtained and the interview guide was provided to all participants by email prior to the interview. Interviews were conducted until data saturation was approached.

The interviewer (MT) conducted a semi-structured hour-long telephone interview (duration ranging from 45 to 88 min; median duration 57 min) with each participant

capturing information on experiences implementing the EWC. The interview questions were based on an integrated model of program implementation (288, 289). Interviews were recorded and transcribed verbatim. Transcripts were not returned to participants, but were verified for accuracy by trained coders (MAF; registered dietitian, female, 32 y or JD; anthropologist, female, 25 y). An initial codebook of facilitators and barriers was developed inductively by lead coder (MAF) and interviewer (MT) with key words from analytic memos of interview recordings. Using thematic content analysis (290), three bilingual coders (MAF, MT, JD) challenged the codebook by triple coding six contrasting interviews intermittently during the coding process to ensure inter-coder agreement was maintained throughout. After each triple-coded interview, new themes and changes to existing parent themes were validated together before proceeding to simple coding. Parent themes were subsequently split (269) into sub-themes by the lead coder (MAF), and the interviewer (MT) corroborated the most complex sections of interview text. Sub-analyses of themes were also analyzed according to partner group (food retailer, media and health organization) and partnership agreement (contractual vs in-kind). It was not possible to validate themes with individual participants as results were reported collectively by partner type; however, findings were corroborated with HC. To maintain confidentiality of organizations, specific details of activities, identities and location were omitted from quotes. To focus on the most salient themes, only those reported by three or more respondents were analyzed.

## Results

Twenty-two organizations accepted to participate; 1 health organization withdrew from the study resulting in 21 completed interviews with 8 food retailers, 6 media and 7 health organizations. The key informants representing organizations were a mix of dietitians, public health practitioners, marketing representatives and communication experts that worked either on a regional or national level in Canada. Characteristics of the organizations that participated in the study are described in Table 3.1.

Seven major themes were identified and are listed in Table 3.2 with the number of organizations that spoke of each respective theme. Facilitating factors were identified by

all partners except for one of the health organizations. The major facilitating themes that emerged were (1) resources, (2) collaborator traits, (3) intervention factors, (4) developer traits and (5) partnership factors (Table 3.2).

Subthemes and examples are listed in Table 3.3 in decreasing order of frequency. All respondents mentioned diverse barriers related to the implementation of the EWC. The major barriers identified were grouped into six major themes: (1) operational elements, (2) intervention factors, (3) resources, (4) target population factors, (5) developer traits and (6) collaborator traits (Table 3.2). Subtheme and examples are listed in Table 3.4 in decreasing order of frequency. Intervention factors, resources, partnership factors and developer traits had dual roles as both facilitators and barriers. Major facilitating themes appeared to be homogenous and equally experienced, whereas barriers appeared to be slightly more diverse and unique to specific groups of partners.

**Operational elements**

Barriers that related to the regular functioning of the organization were clustered under the theme “operational elements”. This theme included all barriers involving time, campaign integration into organizations’ planned activities, and restrictions to mandates that prevented optimization of intended activities. There were no facilitating factors related to this theme. This theme represented the most prominent implementation challenges, and time was a salient barrier that was universally experienced by nearly all partners interviewed. The majority of food retailers and a minority of health organizations (i.e., in-kind partners) also mentioned that activity implementation was time intensive.

> Too much time for what our business is about. There’s too much time involved. —Food retailer

This barrier, however, was not an issue for contractual partnerships, presumably because paid-partners expected campaign activities to take-up a certain amount of time and resources. Although partners in all groups mentioned difficulties implementing activities under a tight timeline and long delays from HC delivering materials or

approvals resulting in changes or alterations to planned activities, this barrier was particularly challenging for the media.

> Health Canada never managed to give us the information in time—Media

The majority of food retailers and health organizations involved in in-kind agreements, experienced conflicts integrating EWC activities within existing organizational plans, which challenged the implementation of the EWC.

> The challenge would be trying to fit a campaign into a specific period of time, around specific messaging that may or may not fit with the broader communication strategy at that point in time. We may be talking about getting ready for Thanksgiving at the same time as Health Canada was talking about getting back to school. —Food retailer

Having a restrained operational mandate and limited capacity to implement activities, was perceived as a barrier for a minority of respondents across partner groups.

> Of course with a bigger piece of the pie, I think we could have done something bigger and more comprehensive. —Media

**Intervention factors**

"Intervention factors" was defined as all elements intrinsic to the EWC that created barriers or were facilitating factors for implementation. Overall, the nature of the campaign (i.e., health oriented and positive messages) was seen as a major facilitator across partner groups, and this theme appeared to be extremely prominent among the media and food retailers.

> Because it's an important topic there's so many different ways that you can target or teach people. —Media

Facilitating intervention factors that characterized the EWC were organized, overall simple to implement and it was believed that second and subsequent phases of the EWC were easier than the initial activation period.

> The first one came a little quickly, but once we got into the rhythm of it I think the other ones were fine, because at that point we already knew what to expect. —Food retailer

More than half of partners across groups had issues with the intervention strategy used by HC. For example, partners questioned the choice of channels used to diffuse the campaign (e.g., traditional versus social media). Partners felt that the EWC did not appear to have a concrete intervention and that it was not interactive. HC was criticized for trying to implement too many activities and not taking into account social determinants.

> I suppose I could adapt the content for [our population], but, you know I shouldn't have to adapt everything. I mean it's not just white people that live in Canada, right? —Health organization

Furthermore, half the food retailers and media respondents as well as a minority of health organizations believed that the EWC messaging was not interesting or effective enough to break through noise around health messages and grab the public's attention to affect behavior change.

> So, there's innovative in terms of the creative, so yes, the creative was good creative, but to me innovative means that there's something about it that's going to break through and be compelling, and in helping consumers to make different choices. But I think in general, the Eat Well campaign was just another education campaign. —Food retailer

The majority of media respondents and a minority of both food retailers and health organizations felt that poor campaign visibility was a major challenge.

> Yea, but did it really reach enough people? It wasn't because of a lack of interest… It's more that the campaign wasn't visible enough to impact many people, you know. —Media

In-kind partners were the only ones to experience challenges around commitments to implement foreseen campaign activities consistently over multiple phases throughout the year. The multiple activation periods of the campaign made it difficult for in-kind partners to maintain implementation throughout the year, resulting in what appears strong activation at the start of the campaign and fewer activities being carried out for subsequent phases of the campaign.

> It is extremely expensive to get visibility, we have a large network to cover, so we did [the activity] once for Health Canada, and then we didn't repeat [the activity]. —Food retailer

**Resources**

Material resources was a prominent facilitating theme for all groups of partners. Respondents spoke positively about the EWC resources as being high quality, ready-to-use good tools that were practical.

> The aspect of developing a campaign with really nice visual content, it's what sets itself apart from other campaigns. I think it's the [EWC's] strength; the quality of the materials produced. —Media

Human resources that facilitated implementation included making support staff available, having specific expertise in line with the EWC and a good fit between key staff and the EWC. Financial resources were a facilitating factor for a minority of partners in each group. Only food retailers spoke of their organizations allocating a budget as being a facilitator, whereas a minority of respondents from each group of partners felt that HC subsidizing costs, for example by providing material resources, was a facilitating factor.

> Health Canada was funding the development of the artwork […] and they helped fund a lot of base costs and then we also paid for production and materials and distribution and added support and staff and that type of thing. So, it was a jointly funded program. —Food retailer

On the other hand, limited financial resources were experienced by nearly all food retailers, the majority of health organizations and half of the media respondents.

> Of course, we could have done more, but with the budget we had… we tried to do the best that we could. —Food retailer

Respondents spoke about having to make extra investments, absorb activity costs, having a limited or no budget and having to make trade-offs between choosing to invest in EWC activities over other initiatives. Limited human resources and expertise were mentioned by half the food retailers and health organizations and a minority of media respondents. Specific challenges included the lack of manpower and expertise, poor

staff fit and issues managing staff. In-kind partners mentioned challenges regarding the materials provided by HC not being in a usable format to meet their needs or not having the capacity to adapt materials for their clients/public.

> We don't really have the manpower here to do all that [adapt resources]. I'd really like it if people [Health Canada] could help us out. —Health organization

**Partnership factors**

Partnership factors emerged only as facilitating factors. A good relationship between HC, collaborative effort and a positive experience were facilitators described across partner groups.

> "I think we have a very good relationship with health Canada. Certainly part of our mandate is partnerships. I think [our organization] really sees the benefits of participating in partnerships […] the end result is bigger than the effort that you put in when you partner with someone else." — Health organization

Having worked with HC in the past was a facilitator for some media and health organizations.

> I'm pretty sure that it went much smoother, because we knew we had a process [from working together previously]… and we could manage their expectations better. —Media

The use of a creative and advertising liaison, contracted by HC, was described as a facilitator only by media partners.

**Developer traits**

Overall, HC's ability to ensure good communication was an important facilitator among partner groups, particularly for food retailers and the media. Examples of strong communication mentioned included providing positive feedback and making themselves very available.

> They gave us really good positive feedback on the content we were delivering, and that they liked it and they thought it was relevant and great. So, there was sort of a positive reinforcement. I think, that was really good. —Media

A minority of partners also portrayed HC's nice, helpful and polite nature as a facilitating factor. Only in-kind partners described HC as being supportive and flexible of implementation activities and their expectations of partners' contributions. In addition, the establishment of trust with HC as being a facilitator was mentioned only by media partners.

> In the end, there was really mutual trust, and in the end, they knew that if we showed up, it was going to be great. —Media

Almost half of the respondents mentioned difficulty having to work under HC's demanding parameters; tough approval process, rigidity and changes to mandates. The approval process was a major implementation barrier for all partner groups, especially all members of the media. Last minute changes to mandates were big challenges only for the media. In addition, all media partners and a minority of food retailers expressed a high level of rigidity from HC with regards to control over messaging and details of campaign activities.

> Health Canada sort of came back with more and more strict guidelines about what we could and couldn't say—Food retailer

Partners in every group mentioned communication issues. Partners felt that the conference style communication with HC was inefficient. Some media and food retailers felt that they had little to no direct contact with HC. Finally, communication gaps were major challenges for half the food retailers and media respondents and some health organizations.

> They weren't necessarily sharing details of the campaign and how the campaign was going to roll out. We knew that the food retailers were participating, because we saw in the grocery stores […] not necessarily, because we'd been told by Health Canada. —Health organization

**Collaborator traits**

Accommodating, committed, philanthropic nature and trusted source were the subthemes identified as facilitating collaborator traits. Whereas, frustrated, political issues, limited flyer space and issues working with competitors were competitor traits that were barriers to implementation. The strong perceived level of commitment and implication of food retailers and the media were considered as an important facilitating factor.

> I think they were equally motivated to see this campaign succeed, and so were actively involved and well-resourced, yeah. —Food retailer

Some health organizations and media spoke of their reputation as trusted sources of health information.

> We are trusted, well respected so… you know it [EWC partnership with HC] just makes sense. —Health organization

A few respondents from each group felt frustrated and expressed disappointment regarding the EWC implementation.

> I guess because there wasn't a lot of promotion done by Health Canada in our region, that even with all that we did, it still fell a little short. —Food retailer

Food retailers experienced unique challenges; running the same campaign as a major competitor and constraints for flyer space to promote the EWC over paid ads for product placement.

> It's a tough sell, because a flyer is to promote food and food products and this was more messaging, and even when we have our own programs around health and wellness, we struggle to find space in the flyer to promote them. —Food retailer

Political constraints over health messaging priorities were uniquely expressed by health organizations.

> Politically, the communications division was unable to participate actively. —Health organization

### Target population factors

Audience segmentation was a barrier to implementing the EWC that was mentioned by a minority of food retailers, media respondents and a majority of health organizations. The target population was segmented in terms of preferences for local media content versus mainstream mass-media content, traditional media versus social media and different regional realities across the country.

> It's such a challenge to disseminate anything across Canada, to so many people, so I just think that what Health Canada has done in terms of dissemination is more than they have ever done, but it's still a challenge. You still talk to people like health professionals that don't know about it. So, it's just the nature of the size of Canada more than anything. —Health organization

Food retailers and the media spoke about the target population's lack of readiness to make dietary changes, lack of time, perceptions about the affordability of healthy foods and lack of knowledge as barriers to their responsiveness.

> Not everyone is ready to change, not everyone wants to change […] you can't please everyone. —Media

## Discussion

Overall, many of the facilitators and barriers that emerged in this study (e.g. communication, resources and time) have also been identified in program implementation literature (289, 291) suggesting that regardless of the implementation context, similar themes are likely to emerge. This observation may help anticipate certain commonly experienced challenges, which can be taken into account during collaborative intervention planning.

Many similar barriers and facilitators were experienced across partner groups despite differences in their relationships with HC. Furthermore, similar themes (e.g., resources and communication) emerged as both barriers and facilitators. HC's capacity as strong communicators was a facilitating factor that emerged from interviews with all partner groups, and has been identified as a key implementation success factor for various

interventions (292, 293). Communication can be an important facilitator for implementation and building strong partnerships (289). However, poor communication can cause frustration and limit partners' ability to maintain or implement and intervention. Organizations should dedicate resources to keeping their partners informed, providing feedback and maintaining an open flow of communication in a consistent manner with all partners.

The most prominent facilitating theme was the material resources that HC provided to its partners. Moreover, having adequate human resources was identified as a facilitator for both the media and health organizations. Having access to adequate resources (material and human) is often identified as a facilitator in implementation evaluations, whereas inadequate resources is an impediment (293). The nature of the campaign was another prominent facilitating factor for food retailers and media respondents. This finding indicates that regardless whether a partnership is in-kind or contractual, partners are likely to be more open when the topic of the initiative is a cause that is universally valued by the organization (294). The nature of the EWC may have played a role in influencing organizations' level of commitment and implication to its activities, particularly when the company's values and or mission align with campaign objectives, which is supported by the strong relationship between compatibility of an innovation and its assimilation within an organization (275).

Two themes emerged as being completely unique to the media; trust of HC and working with an excellent liaison. The importance to media of being trusted by HC may be a reflection of their capacity to maintain good working relationships whilst working under tough parameters. This aligns with the finding that partnership factors were extremely important facilitators for the media including working collaboratively, having a positive partnership experience and previous experience working with HC. Furthermore, particular personality traits such as the media's understanding and their flexibility were likely to facilitate tough working parameters, especially during changes to mandates. These findings are backed by expert agreement that public-private partnerships need to be governed by mutual trust and respect, which are key to ensuring transparency and

open communication allowing for collaborations to succeed (294).

Contrary to the EWC adoption (286), barriers were more prominent during the implementation process. Elements that had either facilitated (e.g., social participation) or challenged (e.g., strict control of information by HC) the organizational adoption of the EWC (286) re-emerged during implementation, reinforcing the strong connection between adoption and implementation and their potential impacts on reach and effectiveness (284). Other qualitative studies have highlighted the importance of taking into consideration the contextual nature of factors associated with healthy eating program and policy implementation (295-297). Granular level analysis of sub-themes revealed salient differences between partner groups that are contextual in nature and are particularly important given the setting of an intervention implemented by cross-sector partners. For example, food retailers experienced challenges regarding dedicating flyer space and working with their competitors, whereas media respondents were the only ones to mention issues with mandate changes and health organizations were alone to speak of political issues. These differences between partners demonstrates that models for private-public partnerships cannot be one-size-fits-all and should be flexible enough to cater to the different realities of organizations from multiple sectors (262). Working in close collaboration with cross-sector implementers can assist in addressing solutions to overcome barriers ensuring optimized execution of an initiative (285). Pre-intervention discussions and advanced planning can help anticipate contextual barriers by gaining a strong knowledge of partners' realities. Collaborative planning can even help avoid unique barriers particular to specific partners and reduce the likelihood that commonly experienced facilitators become barriers.

The primary barriers experienced by all partners related to time, the intervention strategy and having limited financial resources. Time was the most prominent theme for all partners providing an indication of the importance of advance planning regardless of the type of organization. Both time (298-301) and financial resources (302-304) are known and very common barriers to intervention implementation often experienced at both the organizational and user levels. There appears to be a need for strategies to help

organizations minimize time and cost-related barriers to cross-sector partnerships with health agencies. Even though nearly all partners mentioned time as a major barrier to implementation, the nature of the challenge differed according to partner group and/or partnership agreement; in-kind partners spoke about the time intensive nature of the mandate whereas delays and tough timelines were mainly issues for the media and health organizations. A large majority of partners cited issues with the intervention strategy used by HC. The EWC was a one-off campaign; however, had it been a program, the perceived lack of intervention support could translate to the rejection or discontinuance of the innovation potentially impacting the capacity for maintenance of a longer-term intervention (305). Collaborative planning and strong communication to help partners understand the intervention strategy and rationale can be potential solutions for not only overcoming this type of barrier, but also to leverage partners' expertise to find alternative or more appropriate strategies.

For health organizations, audience segmentation appeared to be a concern for intervention implementation. The vast geographic expanse, different regional realities with regards to health needs and variable access to media in Canada is a major challenge for any kind of national intervention. From a social marketing perspective, segmenting an audience to determine which groups to target for an intervention and subsequently tailoring it to meet their needs is a strategic standard; however, this type of strategy involves considerable resources (222). Nevertheless, in contexts where mass media access may be variable, there are potential ethical considerations of using a non-segmented approach, which may inadvertently exclude segments with less knowledge and further promote health disparities (306). For one health organization in particular, mass media access was a major impediment to the adoption of the EWC (286), which turned into a challenge during implementation and concern that a non-segmented approach could exacerbate health inequities and exclude populations that were not part of the mainstream target audience. The risks and benefits of employing a segmented approach would need to be carefully weighed. It is important that interventions adopt the full scope of criteria to effectively implement a social marketing campaign (219). The intervention strategy was strongly critiqued by partners, which is understandable given

that the intervention's main strategy (social marketing) did not appear to adhere to recommended benchmark criteria laid out by experts (218, 221). It was not clear to partners that the campaign sought to change behavior, the prime objective of social marketing, or whether it was just "another education campaign". Furthermore, partners perceptions of poor campaign visibility indicate that the marketing mix criteria may not have been adequately addressed for the EWC.

As mentioned previously, collaborative planning can anticipate and minimize barriers. While all collaborators were defined as "partners", there was a major distinction in their involvement depending on the types of their agreements with HC. Johnstong and Finegood (262) criticise the overgeneralisation of all types of collaborations as "partnerships" when there is no shared-decision making or planning involved in the relationship, and suggest the use of "public-private interaction or engagement". The later term better describes many of HC's partners, particularly those involved in in-kind agreements. To improve future interventions, it is important to define the extent of partnerships, their roles and engage them in shared decision-making. These actions may help achieve greater alignment between the private and public sector, facilitating implementation for all parties involved, and ultimately leveraging partners expertise to increase the reach and effectiveness of an intervention (262).

The authors are confident that data saturation was approached as no new information came from additional interviews. Due to small sample size and easy identification of highly recognizable organizations we had to group participants into partner groups (food retailers, media and health organizations), and describe experiences collectively resulting in a loss of data richness from the unique experiences of individual organizations. On the other hand, the identification of high-level themes and subthemes, particularly those that were experienced across partner groups and those with strong dualities, are likely to be applicable to a wide range of government cross-sector partners in various settings and are not just contextual facilitators and barriers specific to the implementation of the EWC.

## Conclusion

Many barriers identified mirrored facilitators, and implementation of cross-sector initiatives could be enhanced by focusing on strengthening universally experienced elements (i.e., resources and communication). Strategies to overcome recurrent known barriers such as time are needed to optimize intervention implementation. Cross-sector partners have different organizational realities and will likely experience unique types of barriers. The effectiveness of an intervention could theoretically be optimized through engaging cross-sector partners in collaborative planning prior to implementation in order to foresee and address strategies to overcome potential barriers. In particular, the following practice points are recommended for public health organizations engaging in cross-sector partnerships.

- The importance of strong communication during all phases of implementation is not to be underestimated. Communication can be a strength when well executed, but communication gaps can seriously hinder effective and efficient implementation. Furthermore, poor communication or communication gaps can lead to unnecessary frustration and feelings of neglect. Consistent and appropriate communication throughout an intervention should include timely notices of changes to mandates, regular updates and feedback about performance and outcomes.
- Participatory planning of interventions is crucial when working in partnership, and it is particularly relevant for cross-sector collaborations where realities and resources of the parties involved may differ considerably. Participatory planning will prevent facilitators from turning into barriers and help anticipate barriers associated with specific types of partners. Furthermore, partners from different sectors likely have specific expertise that can be leveraged to optimize intervention strategies and outcomes. Therefore, including partners in intervention planning may minimize wasted time and resources during implementation.
- Advanced planning and prior agreements could help avoid unintended cessation of activities and facilitate the integration of an intervention within an organization.

When engaging in-kind collaborations with cross-sector partners, it is necessary to understand their individual realities in terms of level of commitment, material and financial resources, competing interests and organizational capacity.

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## Conflict of interest

The authors declare that they have no competing interests.

## Authorship

M.A.F.developed the data analysis methodology, analysed the data and wrote the manuscript. S.D. and V.P. were involved in developing the study design, development of the data analysis methodology and corroborating methods. M.M. was involved in developing the study design and corroborating methods. M.T. was involved in data collection and data analysis. All authors were involved in reviewing and editing the manuscript.

## Ethics of human subject participation

This study was conducted according to the guidelines laid down in the Declaration of Helsinki and all procedures involving human subjects were approved by the Comité d'éthique de la recherche avec les êtres humains de l'Université Laval (# 2013-055) and the Comité d'éthique de la recherche en santé de Université de Montréal (#13-118-CERES-R) research ethics committees. Written and informed consent was obtained from all participants. As per participant consent, confidentiality was maintained by modifying or omitting gender, number, region and language identifiers in excerpts reported.

# Tables

**Table 3.1 Key characteristics of participating organizations**

| Characteristic | Frequency (n) | Percent (%) |
|---|---|---|
| Type of partner | | |
| Food retailers (retailers and retail associations) | 8 | 38 |
| Media (media, advertising, and spokespeople) | 6 | 29 |
| Health organizations (Non-governmental organizations, provincial, territorial and federal) | 7 | 33 |
| Type of agreement | | |
| Contractual (paid or cost-sharing) | 7 | 33 |
| In-kind agreements (volunteer) | 14 | 67 |
| Regional activity†* | | |
| National | 8 | 38 |
| Most Provinces and Territories | 2 | 10 |
| West Coast and Prairies | 3 | 14 |
| Central Canada | 4 | 19 |
| Maritimes or Far North | 4 | 19 |

† Regional definitions: West Coast, British Columbia; Prairies, Alberta, Saskatchewan and Manitoba; Central Canada, Ontario and Quebec; Maritimes, Newfoundland and Labrador, New Brunswick, Nova Scotia and Prince Edward Island; Far North, Yukon Territory, Northwest Territory and Nunavut. * Some groups were combined to maintain the confidentiality of easily identifiable participants.

**Table 3.2** Major themes identified by different groups of cross-sector partners as facilitators and barriers to the implementation of the Eat Well Campaign: Food Skills (2013–2014)

| | Facilitators (n sources = 20) | | | | Barriers (n sources = 21) | | | |
|---|---|---|---|---|---|---|---|---|
| | FR | M | HO | Total | FR | M | HO | Total |
| Operational elements | 0 | 0 | 0 | 0 | 8 | 6 | 6 | 20 |
| Intervention factors | 8 | 6 | 3 | 17 | 7 | 6 | 6 | 19 |
| Resources | 6 | 6 | 6 | 18 | 8 | 3 | 6 | 17 |
| Partnership factors | 6 | 6 | 5 | 17 | 0 | 0 | 0 | 0 |
| Developer (Health Canada) traits | 6 | 5 | 5 | 16 | 5 | 6 | 3 | 14 |
| Collaborator traits | 5 | 6 | 5 | 16 | 6 | 2 | 4 | 12 |
| Target population factors | 0 | 0 | 0 | 0 | 5 | 5 | 6 | 16 |

FR, Food retailers; M, media; HO, health organizations

**Table 3.3** Descriptions of themes and sub-themes that emerged as facilitating factors for cross-sector partners during the implementation of the Eat Well Campaign: Food Skills (2013–2014)

| Themes and subthemes | Description | Number of partners |
|---|---|---|
| **Resources** | | 18 |
| Material ressources | Good quality or attractive posters, visuals, information sheets and advertising ressources | 16 |
| Financial resources | Adequate budgets allocated to execute activities | 9 |
| Human resources | Sufficient and competent staff available to execute activities | 5 |
| **Intervention factors** | | 17 |
| Nature of the campaign | The positive, easy going, socially accepteable messages made the campaign easy to promote | 15 |
| Organized | Activites were well organized and planned | 6 |
| Easy work | The activites were easy to implement | 5 |
| Subsequent phases easier | The second and subsequent phases were easier to implement than the first | 4 |
| **Partnership factors** | | 16 |
| Good relationship | Good working relationships between collaborators made implementation easier | 10 |
| Collaboration | Many organisations working together to advance the same objective | 9 |
| Positive experience | Being involved in the EWC was a good experience for partners | 8 |
| Worked together before | Having previous work experience with Health Canada made implementation easier | 5 |
| Excellent liaison | Having a liaison made working with Health Canada easier | 3 |
| **Developer (Health Canada) traits** | | 16 |
| Good communicators | Essential information communicated at appropriate times and feedback provided | 12 |
| Nice, helpful, polite | Health Canada's staff were pleasant | 5 |
| Flexible and supportive | Health Canada provided support for activity implementation and gave partner's flexibility | 5 |
| Trusting | Gainning Health Canada's trust was important | 3 |
| **Collaborator traits** | | 16 |
| Understanding and accomodating | Sympathetic, tolerant and forgiving of inconveniences, obliging and cooperative | 11 |
| Committed | Dedication to campaign implementation | 10 |
| Philantropic nature | Generous and benevolent, interested in the welfare of clients/population | 7 |
| Trusted source | Partner's were a reputable source of information and expertise | 4 |

**Table 3.4** Descriptions of themes and sub-themes that emerged as barriers for cross-sector partners during the implementation of the Eat Well Campaign: Food Skills (2013–2014)

| Themes and subthemes | Description | Number of partners |
|---|---|---|
| **Operational elements** | | 20 |
| Time | Delays, tight timelines and time consuming activities | 19 |
| Integration conflicts | Difficulties integrating campaign activities into organizational plans | 12 |
| Restrained mandate | Limitations to contracts and agreements that prevented the best implementation of activities | 4 |
| **Intervention factors** | | 19 |
| Issues with strategy | Criticism of the appropriateness of the campaign strategy | 12 |
| Ineffective messaging | Criticism and doubts over the ability for campaign messages to break through to the audience | 8 |
| Visibility | Some campaign elements were not adequately promoted | 7 |
| Activity maintenance | Could not continue activities or had to reduce extent of implementaton in 2nd and subsequent phases of the campaign | 5 |
| **Resources** | | |
| Financial resources | Inadequate or no budget allocated to the campaign | 13 |
| Human resources and Expertise | Inadequate staff allocated to the campaign | 9 |
| Material | Materials not adapted to population or not in an appropriate/usable format | 17 |
| **Target population factors** | | 4 |
| Audience segmentation | Differences within the population | 16 |
| Level of readiness | Population may not be open to campaign messages and behavior change | 8 |
| Time restrictions | Parents have busy schedules and might not have time to change behaviors | 6 |
| Affordability | Perceptions that healthy eating is not affordable | 5 |
| Lack of knowledge | Parents might not have enough knowledge to make changes | 4 |
| **Developer traits** | | 4 |
| Demanding work | Tough approval process, rigidity or processes, control of information, changes to mandates and directions | 14 |
| Poor communicators | Communication gaps, inefficient communication, little or no direct contact with Health Canada | 10 |
| **Collaborator traits** | | 9 |
| Frustrated | Expressions or disappointment or annoyance about activity implementation | 12 |
| Flyer space constraints | Competition with valuable advertising space | 7 |
| Political constraints | Government policies or programming that prevented implementation of activities | 5 |
| Reservations working with competitors | Difficulties working collaborating with competitors | 3 |

## Figures

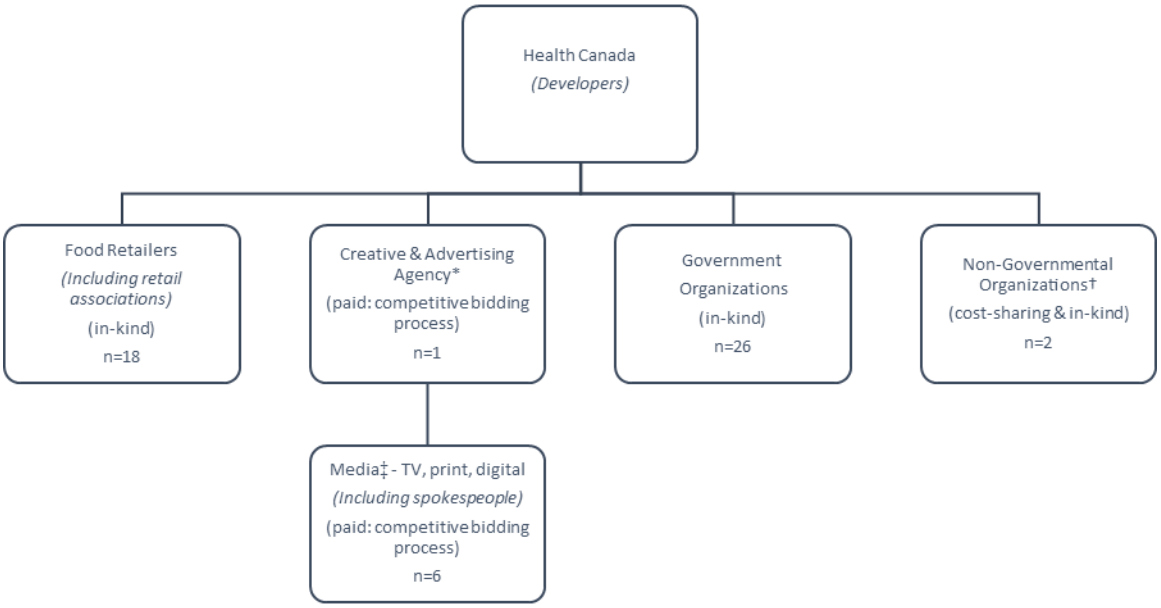


**Figure 3.1. The *Eat Well Campaign: Food Skills* collaboration.** * The creative and advertising agency was an intermediary between individual food retailers, the media and Health Canada. † For reporting purposes, Non-Governmental Organizations were combined with Government Organizations and are collectively called "health organizations". ‡ For reporting purposes, media partners were combined with the creative and advertising agency and are collectively called the "media". (Reprinted with permission by Fernandez et al. 2016)

# Chapter 4 — Reach and perceived effectiveness of the Eat Well Campaign: Food Skills


## Résumé

« Bien manger » était une campagne médiatique de grande envergure développée par Santé Canada, visant à promouvoir la planification de repas auprès des parents canadiens. L'objectif de cette étude était de déterminer la portée et l'efficacité perçue de « Bien manger » parmi un échantillon transversal de parents (n = 964) à l'aide d'un questionnaire électronique. Quarante-et-un pourcent des parents ont vu la campagne et les vignettes à la télévision étaient l'élément le plus reconnu. La ville de Québec et les régions rurales de Québec avaient les taux les plus élevés de personnes ayant vu la campagne, tandis que Vancouver, Winnipeg et Toronto avaient les taux les plus faibles. La campagne était la plus visible parmi les francophones, les personnes à faible revenu et les personnes sans éducation universitaire. La majorité des personnes ayant vu la campagne ont rapporté des attitudes positives envers la planification de repas.



The manuscript presented in this chapter is entitled: **Promoting meal planning through mass media: Awareness of a nutrition campaign among Canadian parents**

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**Promoting meal planning through mass media: Awareness of a nutrition campaign among Canadian parents**

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## Abstract

**Background:** The Eat Well Campaign (EWC) was a Canadian federal mass media campaign that promoted meal planning to parents.

**Objective:** Evaluate the reach of the EWC among parents and assess perceptions about its effectiveness on meal planning attitudes.

**Methods:** A sample of parents (n=964) responsible for meal preparation was recruited through random digit dialing. Participants completed an online survey about EWC awareness, perceived effectiveness, and attitudes, beliefs and self-efficacy about meal planning.

**Results:** 41% of respondents (390/964) were aware of the campaign; Quebec City and rural Quebec had the highest rates of awareness, whereas Vancouver, Winnipeg and Toronto had the lowest. Awareness was greater among parents with lower income, basic education and French-speakers. Campaign intensity was associated with greater odds of reporting positive attitudes towards the EWC and meal planning ($p<.05$). Campaign awareness was significantly associated with greater odds of believing that meal planning helps maintain a healthy diet (OR=1.68, CI 1.03-2.74) and planning meals (OR=1.66, CI 1.03-2.54), but not self-efficacy, in adjusted models.

**Conclusions:** This is the first study to evaluate the promotion of meal planning through mass media. The EWC demonstrated evidence of success in terms of equitable access to a nutrition initiative by reaching lower income and less educated parents.

## Key words

Food and nutrition; health promotion; mass media; evaluation studies; meal planning

## Introduction

Risk factors for many chronic diseases, mortality and morbidity are dominated by unhealthy dietary practices (42). Improving dietary intakes of the population is a public health priority and policy strategies that involve multiple domains of influence (organizational, community and government) are likely to have a greater reach, be more equitable and sustainable (17). Communication through mass media is one such policy strategy that has demonstrated effectiveness by improving dietary intakes, particularly increasing intakes of fruits and vegetables and limiting intakes of sodium (18).

Mass media health education campaigns have the possibility of reaching large proportions of a target population (307) and are expected to have small-to-moderate effects on individuals' health attitudes, knowledge and behaviors, which may translate into major population impacts (223, 308). Mass media health education campaigns are tools used by public health practitioners at government agencies and nonprofit organizations to promote healthy behaviors (309). These campaigns have four key elements in common: achieve a specific outcome (e.g., change in health attitudes); target a large number of people; have a defined timeframe and; use organized communication channels and activities (e.g., newspapers, television, posters) (310). While hygiene campaigns have demonstrated incredible success by reducing dirty hands by 50% in Ethiopia over a three-year period (311), a 5% change in behavior is considered as a realistic benchmark for a successful mass media health campaign (220). To achieve this level of success, however, campaigns needs to reach a high level of exposure for audience recall and awareness (312). Research suggests that saturation coverage (i.e. campaign intensity and frequency) are the most important components for affecting behavior change (311).

Campaign evaluation research is indispensable to driving the field of health communication forward (309). The purpose of evaluating the outcomes of a mass media health education campaign are to determine whether it achieved its set objectives, determine what worked well and what needs further improvement and to determine learning points to inform and improve future campaigns (313). In physical activity

promotion, campaign awareness, measured by the number of messages recalled, was associated with greater pedometer use in the Canada on the Move initiative (314). In a sexual health campaign, respondents aware of the Get Yourself Tested campaign were more likely to report engaging in the behaviors promoted (315). Awareness of nutrition campaigns “Five A Day” and “Fruits and Veggies — More Matters” was associated with greater odds of consuming at least five servings of fruits and vegetables per day (316). Nutrition campaigns that have been evaluated have generally focused on promoting fruit and vegetable consumption and in some cases sodium, fat, or sugar reduction (17). Little is known about the impacts of mass media interventions promoting other dietary practices (18). A key barrier to healthy eating and food preparation is time, and dietary practices such as meal planning are thought to be viable solutions that facilitate healthy eating.

The Eat Well Campaign: Food Skills (EWC) was a Canadian mass media campaign to promote family meal planning and preparation to Canadian parents. The overall objective of this study was to evaluate the EWC among a cross-section of Canadian parents with a post-campaign online survey. We hypothesized that the EWC reached the majority of Canadian parents and improved their perceptions and behaviors about meal planning. Specific aims included determining: 1) the awareness, intensity and frequency of the EWC; 2) differences in awareness according to parents’ sociodemographic characteristics; 3) perceptions about the EWC effectiveness; 4) the effect of the EWC intensity and frequency on perceived effectiveness; and 5) the associations between EWC awareness and self-reported meal planning attitudes, behaviors and self-efficacy.

## Methods

### Campaign Description

The EWC was a multicomponent healthy eating and education awareness initiative developed by Health Canada (a federal health agency) to promote family meal planning to parents of children 2–12 years old. The EWC was a stand-alone campaign with

belief, education, and behavioral components that had the following objectives: 1) increase the number of Canadians who believe it is important to plan meals; 2) increase the number of Canadians who believe it is important to involve family in meal planning; 3) provide Canadians with information related to meal planning skills; 4) increase the number of Canadians who are knowledgeable about how to plan meals; and 5) increase the number of Canadians that plan meals (Health Canada, unpublished). The campaign was disseminated in English and French throughout the country by HC over a year (2013-14) with the help of cross-sector partners from the retail food industry, media and health organizations to increase its reach and effectiveness (286). It included a comprehensive set of strategies to deliver nutrition messaging to Canadian parents using multiple channels (TV, print, online, food retail outlets and public health offices) along with a tool box of resources for health professionals. While the campaign focused on meal planning, other nutrition messaging was disseminated concurrently. For the purpose of this study, the evaluation was limited to objectives around meal planning messaging and the key campaign elements that were disseminated through mass media. These elements included public service announcements with the Mr. Zucchini cartoon character, which were disseminated online, in food retail outlets and in store flyers, but may have also been shared by regional public health offices. Editorials and infographics were published monthly in two popular women's print magazines (*Coup de Pouce* and Canadian Living). Vignettes with two celebrity families (Saskia Thuot and The Wilsons) were televised on Canadian cable networks. Two campaign spokeswomen (Isabelle Huot and Christine Cushing) made public appearances and starred in vignettes that appeared on social media. Finally, editorials were produced for websites (e.g., Huffington Post). Campaign messages were developed to accommodate different media channels, be seasonally appropriate and easily adaptable by partner organizations. HC tested key campaign visuals and messages with focus groups prior to launching the campaign.

**Recruitment and Data Collection**

A geographically representative sample of Canadian parents responsible for meal preparation was recruited by a professional recruitment firm over the phone using

random digit dialing. Recruitment began at the end of the EWC in late March 2014 and continued until July 2014 until representation from each province and territory mirroring population statistics was achieved and at least 1100 participants had activated the survey link and responded to key questions about campaign awareness. The desired sample size (n = 1100) was based on estimating campaign reach (awareness) of at least 50% ± 3% (OpenEpi.com). The inclusion criteria were: adults ≥ 18 y, Canadian citizens, parents with at least 1 child (2–12 y), living with child(ren) at least 50% of the time, being responsible for meal preparation at least 50% of the time, understanding French or English, having access to the Internet and having a valid e-mail address. Parents who met inclusion criteria and accepted to be included in the study were e-mailed consent forms and a link to a web-based survey by the recruitment firm. If the survey was not completed within two weeks of dispatching the email, members of the research team would then send a maximum of three follow-up reminders to all participants by email and/or telephone, the survey closed at the end of August 2014. Consent was given by activating the link to the survey. Parents who completed surveys were entered into a draw to win one of three iPads. This study was approved by XXX and YYY institutional review boards. Surveys included three questionnaires that collected: 1) standard sociodemographic characteristics, 2) data on recognition of EWC elements and perceived effectiveness of the campaign and 3) questions about meal planning from a general food literacy questionnaire. These questionnaires were designed by the research team to assess the impacts of the EWC.

**Description of Variables**

**Reach.** Campaign reach (awareness) was defined as the recognition of at least one of five key campaign elements presented (Mr. Zucchini caricature, vignettes with celebrity families, magazine editorials, spokeswomen and web editorials). Unaware parents were defined as having no recall of any campaign elements presented. Campaign intensity was determined on a scale of 1 to 5 with each integer representing the number of campaign elements recognized. Campaign frequency was defined as the number of times parents reported seeing campaign elements over a 12-month period and is presented as a monthly average.

**Perceived effectiveness.** Only parents who were aware of the campaign responded to the 10 statements about attitudes, knowledge, and behaviors of the EWC objectives and messaging. These responses were dichotomized. For example, “a lot more” or “more” = 1 (perceived effectiveness = yes) and “not more nor less” or “less” or “a lot less” = 0 (perceived effectiveness = no). Parents were also asked about their agreement to 10 other statements about positive and negative effects of the campaign on themselves and their families (Table 4.1). At the end of the questionnaire, aware parents were given the opportunity to comment on the EWC.

**Meal planning attitudes, behaviors and self-efficacy.** Three items from a general food literacy questionnaire were used to compare meal planning attitudes, behaviors and self-efficacy between aware and unaware parents: 1) planning makes it possible to eat well by ensuring a range of food choices (meal planning attitude), 2) I have been planning our family meals (meal planning behavior), and 3) I feel very competent in planning our meals (meal planning self-efficacy) (Table 4.1). Responses to these three items were dichotomized.

## Data Analysis

Descriptive statistics were used to summarize the overall reach (i.e., campaign awareness, intensity and frequency) and perceived effectiveness (i.e., 10 statements about the EWC). Chi-squared tests were used to determine whether or not differences existed in awareness according to sociodemographic variables. According to these results, sociodemographic variables with significant differences in awareness were further explored using multiple logistic regression models in relation to each campaign element controlling for sex, age and month the survey was completed. To estimate the geographic dispersion of the EWC’s awareness, multilevel analyses were performed using MLwiN 2.25 (Center for Multilevel Modelling, Bristol, UK, 2012). Using 6-unit alphanumeric postal codes, participants’ province of residence was further broken-down into a total of 49 regions across the country. These regions represented census metropolitan areas (population > 100,000), agglomeration areas (10,000 < population <

100,000) and rural areas (< 10,000). Due to the small sample size, small towns and municipalities (populations < 10,000) were combined into a single group for each province. For example, rural Quebec contained all participants in the province of Quebec that did not reside in a census metropolitan area or agglomeration area. The intraclass correlation coefficient was computed to estimate the proportion of between-region variance in EWC awareness (317).

Multiple logistic regression models were used to explore the effect of campaign intensity and frequency on perceived effectiveness. All regression models controlled for age, sex, month survey was completed, dominant official language, province of residence, ethnicity, income, education and religious affiliation. Campaign intensity and frequency were treated as continuous variables. Finally, multiple logistic regression models tested associations between EWC awareness and self-reported meal planning attitudes, behaviors and self-efficacy. Results were considered statistically significant at $p < .05$. Statistical analyses were done using SAS 9.4 (SAS Institute Inc., Cary, NC, 2012). Respondent comments were analyzed with NVivo 10 (QSR International Pty Ltd., Victoria, Australia, 2013) using semi-qualitative thematic analysis (318).

## Results

### Sample

A total of 2201 eligible Canadian parents were recruited into the study using random digit dialing and 1293 agreed to participate by activating the survey link. Of participants, only those who completed all relevant survey questions were retained for analysis (n = 964) (Figure 4.1). Sociodemographic characteristics of the study population are listed in Table 4.2.

### Reach

Of 964 parents, 390 (40.5%; 95% CI 37.4, 43.6) were aware of the EWC, recognizing at least 1 campaign element. While vignettes were recognized by 51.7% of aware parents, other elements were also recalled by at least 16% of aware parents (Table 4.3). For

campaign intensity, 50.1% of aware parents recalled 1 out of the 5 elements and less than 1% recalled all 5 (Figure 4.2). Campaign frequency as a whole was relatively low with the majority of aware parents (72.9%) recalling the EWC  1 or less times per month (Figure 4.3).

Campaign awareness differed significantly across sociodemographic variables (dominant official language, province/territory, ethnicity/culture, income, education, and religious affiliation) (Table 4.2). There were significant differences in awareness of individual campaign elements according to different sociodemographic variables, generally indicating greater overall awareness among French-speaking Canadians, Quebec residents, parents with lower income (< $40,000/year) and parents without university education. Parents with lower income had significantly higher odds of awareness to all the campaign elements compared to parents with higher income. French-speaking Canadians had greater awareness to all campaign elements except the web (Table 4.3). Campaign awareness varied geographically across Canada. Conditional on age, sex, education level and income, 9.8% of the total variation in EWC awareness was accounted for by region of residence. Among the 49 regions, the highest awareness was observed in rural Quebec and Quebec City, while the lowest awareness was observed in Winnipeg, Vancouver and Toronto ($p < .05$) (Figure 4.4).

**Perceptions About the EWC Messages**

**Perceived effectiveness of the EWC.** Among parents aware of the EWC, the majority reported that it was more important to plan and include family in meal planning. Less than half of parents exposed to the campaign found the messages were relevant for family meal planning or preparation and even fewer found them useful for family meal planning or preparation. Just under a third of parents reported feeling more knowledgeable about meal planning. Similarly, less than a third actually reported planning more family meals and fewer than a quarter reported cooking more meals (Table 4.1).

**Perceived positive and negative impacts of the EWC.** Less than a third of parents indicated that the EWC had positive impacts on their families such as making family meals more enjoyable and a minority of parents reported negative effects of the campaign such as increasing the sense of guilt as a parent (Table 4.1).

**Effect of campaign intensity and frequency on perceived effectiveness.** For every additional campaign element that parents recalled (campaign intensity), there were significant increases (i.e., between 35.9% to 109.7%) in the odds of perceiving that EWC was effective, for every effectiveness measure reported. Similarly, each additional time per month that parents reported seeing the campaign (campaign frequency) was significantly associated with increased (i.e., between 28.6% to 63.6%) odds of perceiving the EWC as effective. The measures for belief and knowledge components, however, were not significant for campaign frequency (Table 4.4).

**Parents' comments about the campaign.** Approximately a third of aware parents (34%, n = 130), left comments about their awareness of, feelings about and suggestions for the EWC. Among comments, the most frequent theme (n = 47) identified was the perception that the campaign had no impact: "…it has had NO influence on my eating habits or meal preparation." The second most identified theme (n = 46) was that parents did not feel they were really aware of the EWC despite having recognized some campaign elements: "I just remember seeing the Wilson's on TV but I honestly do not recall ever hearing of this eat well campaign or seeing it anywhere". The next most frequent themes indicated that planning (n = 24) and healthy eating (n = 23) behaviors were already present among some parents aware of the campaign (Table 4.5).

### Meal Planning Attitudes, Behaviors and Self-Efficacy

Campaign awareness was significantly associated with greater odds of believing that meal planning helps maintain a healthy diet (meal planning attitudes) compared to parents not aware of the EWC, OR = 1.68 (95% CI 1.07-2.65). This relationship remained significant even after adjusting for multiple potential confounders; age, sex, language, region, ethnicity, family type, employment, income, education and month

survey was completed, OR = 1.68 (95% CI 1.03-2.74). Campaign awareness was not initially significantly associated with greater odds of planning more meals (meal planning behaviors), OR = 1.41 (95% CI 0.96-2.07); however, the relationship became significant after controlling for multiple potential confounders, OR = 1.66 (95% CI 1.03-2.54). Associations between campaign awareness and feeling competent to plan meals (self-efficacy) were not significant in crude (OR = 1.12; 95% CI 0.82-1.55) or fully adjusted models (OR = 1.21; 95% CI 0.86, 1.71).

## Discussion

Overall, the EWC did not reach the majority of Canadian parents; however, it was particularly effective in reaching French Canadians, and parents with basic education and lower income. While the latter two groups are traditionally harder to reach, it appears that the mass media strategies used to deliver the EWC were successful in this case. French Canadians tend to view Canadian-based French content (319) that is potentially very concentrated (with highly recognizable “local” celebrities), whereas English media in Canada is diluted with American, foreign and online competitors. Campaigns disseminated via mass media may be very effective in reaching French-speakers but have less capacity to penetrate English-speaking audiences. Of promotional strategies, television vignettes appeared to be a key delivery channel; however, they only reached half of parents; therefore, other dissemination channels cannot be neglected. Nevertheless, televised vignettes were particularly effective in reaching parents with basic education and lower income (< $40,000). This finding may indicate that these groups are higher consumers of conventional TV, which is very effective in reaching lower-income Canadians. The rates of conventional TV use are, however, declining across the country, particularly among younger Canadians (18–34 y) in favor of internet viewing (319). These potentially rapidly changing trends in traditional media use need to be considered when planning future mass media campaigns.

The variation in campaign awareness in cities across Canada indicates that the campaign may not have been overly successful in penetrating parents living in large

cosmopolitan cities such as Toronto and Vancouver. These differences may be due to potentially different media usage patterns or demographics in regions across Canada. Differences in reach across sociodemographic groups reinforce the need for formative research and the importance of audience segmentation prior to campaign development to identify the most appropriate communication strategies with messages tailored to specific groups (320). A recent systematic review of social marketing interventions suggested that programs using segmentation are better positioned to influence their audience (321).

The EWC reached a significant proportion of parents (40.5%); however, adequate exposure of the campaign may not have been attained. The majority of parents only reported awareness of 1 out of the 5 campaign elements and indicated a very mild campaign frequency (≤ 1/month). The fleeting awareness to the EWC is in part corroborated by comments from parents indicating that despite being exposed to the campaign they did not feel they were aware or impacted by it. The effectiveness of an intervention is linked to the strategies used to implement it. Only 39% of HC's partners that were interviewed for the process evaluation reported having a National presence (286), indicating that the campaign dissemination may be geographically concentrated in regions where partners had a greater presence/influence. Barriers and facilitators to the EWC implementation by HC's partners have been reported elsewhere and support parents' comments about not being overly aware of the campaign (322). In fact, it was reported that a large number of HC's partners who helped disseminate the campaign had criticisms over the appropriateness of the campaign strategy as well as doubts about its ability to penetrate the target population and affect behavior change (322). High campaign exposure does not automatically translate into the high campaign awareness that is necessary for a media campaign to be effective (323). Greater EWC intensity (number of elements exposed) was significantly and positively associated with perceived effectiveness among parents, which reinforces the importance of adequate campaign visibility and awareness. HC's partners reported the lack of resources as a prominent barrier to the EWC implementation, particularly financial resources (322). While media-method approaches have been shown to be effective in altering dietary

practices (324), increased funding will allow for the use of multiple media channels and longer campaign duration to improve awareness, intensity and frequency of media messages (308).

The perceived effectiveness was relatively high for belief components and low to moderate for knowledge and action components. These results indicate that parents generally perceived the EWC to be successful in increasing awareness in the importance of meal planning, but fewer parents reported believing that the campaign was useful, provided adequate knowledge or helped them plan more. Nevertheless, campaign awareness was associated with significantly greater odds of reporting better attitudes towards planning meals and actually planning meals, but there were no differences in self-efficacy. These results are supported by a meta-analytic review measuring the effectiveness of mass media health campaigns, which found that mass media methods were successful in changing behaviors and knowledge but not self-efficacy (220). To improve self-efficacy through mass media campaigns, instructional material such as brochures or celebrity spokespeople could be used (220). The results also indicate that despite perceptions of lack of awareness, the EWC provided some evidence of positive associations between campaign awareness and meal planning attitudes. Nonetheless, cursory exposure to the EWC was likely insufficient to promote significant behavior change among parents. While attitude and behavior components were reportedly improved over the short-term, persistent changes in behavior components need more time and repeated exposure (325). Mass media or paid advertising campaigns can be extremely successful in promoting small changes in health behavior; however, successful interventions have focused on a small number of specific behaviors (e.g., choosing 1% milk instead of whole-milk) and not multiple complex behaviors (e.g., education and awareness of planning and family meal preparation). Broad campaigns of limited duration that target multiple behaviors are not thought to be highly successful (17). While nutrition education alone is insufficient to affect behavior change (326), multicomponent healthy promotion strategies that include mass media campaigns with focused messaging have reported successes in promoting healthy eating at both national and community levels (18).

**Strengths and limitations**

The present study was a third-party post-intervention evaluation of the EWC; therefore, the research team was not involved in its planning and had little knowledge about the intervention's rationale and design. It was not possible to collect pre-campaign data to compare participants before and after the intervention and the context of the evaluation study did not allow for the use of existing validated questionnaires; therefore, it was not possible to determine whether associations between awareness and meal planning attitudes and behaviors were attributed to the EWC or other residual confounding factors such as initial interest in the topic.

Reach was defined as recall of at least 1 of the 5 campaign elements presented, which provided a good indication of awareness but remains an estimation dependent on recall. To consider differences in recall, we controlled for the month that parents responded to the survey (April to August 2014) in logistic regression models. The parents sampled were representative of the different regions in Canada; however, as a group they were more educated, composed of more two-parent families, and less ethnically/culturally diverse than the general population. The study topic could have created a sampling bias by recruiting parents who were more engaged and interested in healthy eating or a social desirability bias; therefore, parents may be more likely to recognize and recall the campaign elements and report positive beliefs regarding meal planning. Given the specific context of the EWC, results cannot be generalized to other campaigns or populations. However, the results will be useful to help public health practitioners and decision makers improve communication strategies to reach parents.

Evaluations should be an integral part of campaign development to monitor short-term health attitudes and behaviors as well as longer-term health outcomes. Future government campaigns need to incorporate evaluation into intervention planning to ensure that the outcomes are clearly defined, measurable, focused on behavior change and aligned with evaluation objectives (327). An integrated robust evaluation designed concurrently with the intervention will also minimize biases, confounding factors and

concerns about establishing causality by providing opportunities to collect longitudinal data from both an exposed and a comparison group to evaluate specific campaign objectives over time (328). Future campaigns may be more effective if they employ simple and consistent messaging by focusing on a single behavior rather than attempting to influence multiple dimensions of eating practices at the same time (e.g., meal planning and family involvement in meal planning) (17). Furthermore, pre-campaign consumer-oriented research (i.e., formative research) with a sound basis in behavior change theory is essential to ensure messages are tailored to the appropriate audiences. Social marketing strategies provide guidance to refine and tailor mass media campaigns. Finally, to maximize awareness and subsequently induce behavior change, significant investments should be made to increase campaign duration, intensity and frequency (211).

Results from this study provide valuable insight into the reach and effectiveness of a multichannel mass media intervention that promoted family meal planning. This study supports the importance of evaluating and reporting public health campaign outcomes, ideally by an independent body that will submit research findings to peer-review, in a transparent and objective manner. In addition to incorporating an evaluation component into health communication interventions, public health practitioners are encouraged to carefully plan interventions by conducting formative research, including collecting baseline data, to judiciously select key messages, audiences and the most appropriate behaviors to change prior to launching potentially costly mass media campaigns.

## Conclusion

This is the first study to evaluate the promotion of meal planning through mass media as a solution to target time barriers related to healthy eating. Despite limitations, as a mass media campaign, the EWC demonstrated evidence of success in terms of equitable access to a nutrition initiative by reaching lower income and less educated parents. While confounding factors remain, positive associations between campaign awareness and positive attitudes towards meal planning are supported by three sources of data in this study: 1) subjective perceptions of effectiveness by the majority of aware

parents that reported it was important to plan and include family in meal planning; 2) increased odds of parents believing it was important to plan meals and planned more meals with greater campaign intensity; and 3) an objective comparison between aware and unaware parents indicating aware parents had greater odds of believing meal planning helps maintain a healthy diet. Using formative research to understand audience diversity and how to effectively reach different segments of the population will be key to move forward with new campaigns, particularly in countries with non-homogenous populations such as Canada.

## Funding

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## Conflict of interest

The authors declare that they have no conflict of interest.

# Tables

**Table 4.1. Items about perceptions about the campaign effects and general meal planning**

| ***Items about perceived effectiveness of the Eat Well Campaign (n = 390)*** | ***Proportions of respondents aware of the campaign in agreement*** |
|---|---|
| *Beliefs and attitudes* | |
| 1. As a result of the campaign, I have believed it more important to plan meals in order to make healthier food choices. | 61.1% |
| 2. As a result of the campaign, I have believed it more important to involve my family in meal planning in order to make healthier food choices. | 58.2% |
| 3. How relevant do you find the messages of the “Eat Well” campaign for planning your family meals (relevant or very relevant)? | 42.1% |
| 4. How relevant do you find the messages of the “Eat Well” campaign in order to prepare your family meals (relevant or very relevant)? | 38.3% |
| 5. How have the messages disseminated during the “Eat Well” campaign been useful for planning your family meals (useful or very useful)? | 26.8% |
| 6. How have the messages disseminated during the “Eat Well” campaign been useful for preparation your family meals (useful or very useful)? | 27.6% |
| *Knowledge* | |
| 7. As a result of the campaign, I feel more knowledgeable about how to plan meals in order to make healthier food choices. | 32.2% |
| *Behaviors* | |
| 8. As a result of the campaign, I have planned more of our family meals in order to make healthier choices | 31.9% |
| 9. As a result of the campaign, I have cooked more of our family meals | 22.8% |
| 10. Have you discussed the “Eat Well” campaign with friends and family? | 12.2% |
| ***Items about positive and negative effects of the Eat Well Campaign (n = 390)*** | ***Proportions of respondents aware of the campaign in agreement*** |
| *Positive effectsof the Eat Well Campaign* | |
| 1. For me and my family, the “Eat Well” campaign has made family meals more enjoyable. | 10.6% |
| 2. For me and my family, the “Eat Well” campaign has inspired me to take time to plan family meals. | 20.6% |
| 3. For me and my family, the “Eat Well” campaign has provided tips and tricks to increase my children’s involvement in mealtime activities. | 25.2% |
| 4. For me and my family, the “Eat Well” campaign has given my family an occasion to discuss healthy eating. | 18.4% |
| 5. For me and my family, the “Eat Well” campaign has been a source of information to help improve the quality of our meals. | 27.4% |

| | |
|---|---|
| 6. For me and my family, the “Eat Well” campaign has helped me plan family meals more effective. | 13.3% |
| *Negative effects of the Eat Well Campaign* | |
| 7. For me and my family, the “Eat Well” campaign has increased my sense of guilt as a parent | 8.6% |
| 8. For me and my family, the “Eat Well” campaign has created more frustration | 1.6% |
| 9. For me and my family, the “Eat Well” campaign has led to family conflicts over food. | 1.6% |
| 10. For me and my family, the “Eat Well” campaign has given me more responsibilities. | 1.9% |
| ***Items about meal planning attitudes, behaviors and self-efficacy (n = 883)*** | ***Proportions of all respondents in agreement*** |
| *Attitudes* | |
| 1. Planning makes it possible to eat well by ensuring a range of food choices. | 84.7% |
| *Behaviors* | |
| 2. I have been planning our family meals. | 88.9% |
| *Self-efficacy* | |
| 3. As a parent, I feel very competent in planning our meals. | 76.4% |

**Table 4.2. Sociodemographic characteristics of Canadian parents according to awareness of the Eat Well Campaign (EWC)**

| Variable | Total (%) n = 964 (100) | Aware (%) n = 390 (40.5) | Unaware (%) n = 574 (50.5) | Chi-square *P*-value |
|---|---|---|---|---|
| Sex | | | | .46 |
| Female | 775 (80.4) | 318 (41.0) | 457 (58.8) | |
| Male | 189 (19.6) | 72 (38) | 117 (61.9) | |
| Age (mean, SD) | | | | .51 |
| Years | 39.3 (6.0) | 39.2 (6.3) | 39.4 (5.8) | |
| Dominant official language | | | | |
| English | 744 (77.2) | 249 (33.5) | 495 (66.5) | <.001 |
| French | 220 (22.3) | 141 (64.1) | 79 (35.9) | |
| Provinces and Territories | | | | <.001 |
| British Columbia | 121 (12.5) | 33 (27) | 88 (73) | |
| Alberta | 108 (11.1) | 34 (32) | 74 (69) | |
| Saskatchewan | 27 (3) | 8 (30) | 19 (70) | |
| Manitoba | 33 (3) | 9 (27) | 24 (73) | |
| Ontario | 390 (40.5) | 144 (36.9) | 246 (63) | |
| Quebec | 204 (21.2) | 134 (65.7) | 70 (34) | |
| New Brunswick | 26 (3) | 9 (35) | 17 (65) | |
| Nova Scotia | 27 (3) | 9 (33) | 18 (67) | |
| Prince Edward Island | 4 (0) | 1 (25) | 3 (75) | |
| Newfoundland | 17 (2) | 5 (29) | 12 (71) | |
| Territories | 7 (1) | 4 (57) | 3 (43) | |
| Ethnicity or culture | | | | .02 |
| White | 836 (86.7) | 349 (41.5) | 492 (58.5) | |
| Black | 16 (1.66) | 11 (68.8) | 5 (31.3) | |
| First Nations, Métis or Inuit | 21 (2.18) | 8 (38.1) | 13 (61.9) | |
| Asian | 46 (4.77) | 10 (21.7) | 36 (78.3) | |
| Arab | 15 (1.56) | 5 (33.3) | 10 (66.7) | |
| Other/no answer | 30 (3.11) | 11 (35.5) | 20 (64.5) | |
| Number of children | | | | .06 |
| 1 | 184 (19.1) | 66 (35.9) | 118 (64.1) | |
| 2 | 504 (52.3) | 199 (39.5) | 305 (60.5) | |
| 3 | 199 (20.6) | 84 (42.2) | 115 (57.8) | |
| ≥ 4 | 77 (7.99) | 41 (53.3) | 36 (46.8) | |
| Family stucture | | | | .19 |
| Two parent | 845 (87.7) | 338 (40.0) | 507 (60.0) | |
| Single parent | 76 (7.88) | 29 (38.2) | 47 (61.8) | |
| Step-family | 43 (4.46) | 23 (53.5) | 20 (46.5) | |
| Employment status | | | | .17 |
| Full-time | 583 (60.4) | 242 (41.5) | 341 (58.5) | |
| Part-time | 167 (17.3) | 54 (32.3) | 113 (67.7) | |
| Stay at home parent | 152 (15.7) | 65 (42.8) | 87 (57.2) | |
| Unemployed | 24 (2.49) | 12 (50.0) | 12 (50.0) | |
| Other/no answer | 38 (3.94) | 17 (44.7) | 21 (55.3) | |
| Income | | | | .006 |
| < 40,000 | 81 (8.40) | 47 (58.0) | 34 (42.0) | |
| 40,000 to 79,999 | 228 (23.7) | 94 (41.2) | 134 (58.8) | |
| > 80,000 | 528 (54.8) | 197 (37.3) | 331 (62.7) | |
| no answer | 127 (13.2) | 52 (40.94) | 75 (59.1) | |
| Level of education completed | | | | <.001 |
| Primary or secondary | 156 (16.2) | 79 (50.6) | 77 (49.4) | |
| College | 252 (26.1) | 118 (46.8) | 134 (53.2) | |
| University | 556 (57.7) | 193 (34.7) | 363 (65.3) | |
| Religious affiliation | | | | .002 |
| Christian | 619 (64.2) | 278 (44.9) | 341 (55.1) | |
| Other faiths | 57 (5.91) | 18 (31.6) | 39 (68.4) | |

| | | | |
|---|---|---|---|
| None | 244 (25.3) | 82 (33.6) | 162 (66.4) |
| No answer | 44 (4.56) | 12 (27.3) | 32 (72.3) |

**Table 4.3**. Associations between sociodemographic characteristics of parents, total awareness of the Eat Well Campaign (EWC) and awareness of individual campaign elements (n = 964)

| | EWC[1] | | Mr. Zucchini | | Magazines[2] | | Vignettes | | Spokeswomen | | Web | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | OR[3] | (95% CI) | OR[3] | (95% CI) | OR[3] | (95% CI) | OR[3] | (95% CI) | OR[3] | (95% CI) | OR[3] | (95% CI) |
| Awareness (%) | 40.5 % | | 30.3 % | | 41.6 % | | 51.7 % | | 33.5 % | | 16.4 % | |
| Dominant official language (Ref = English) | | | | | | | | | | | | |
| French | ***3.58 | (2.57, 4.97) | ***2.65 | (1.73, 4.06) | *1.54 | (1.03, 2.31) | ***3.74 | (2.61, 5.35) | ***9.77 | (6.33, 15.1) | *0.44 | (0.20, 0.97) |
| Region (Ref = Ontario) | | | | | | | | | | | | |
| British Columbia | *0.623 | (0.64, 1.00) | 1.18 | (0.60, 2.30) | 0.62 | (0.35, 1.12) | 0.60 | (0.31, 1.15) | 0.42 | (0.16, 1.10) | 0.69 | (0.30, 1.60) |
| Prairies | 0.73 | (0.49, 1.08) | 0.79 | (0.41, 1.52) | 0.79 | (0.48, 1.30) | 0.88 | (0.53, 1.46) | *0.36 | (0.15, 0.89) | 0.82 | (0.41, 1.64) |
| Quebec | ***3.28 | (2.27, 4.48) | **2.36 | (1.44, 3.88) | 1.17 | (0.75, 1.82) | ***3.73 | (2.48, 1.46) | ***7.27 | (4.54, 11.7) | *0.42 | (0.19, 0.95) |
| Maritimes and North | 0.90 | (0.54, 1.49) | 1.39 | (0.67, 2.86) | 0.50 | (0.23, 1.07) | 1.10 | (0.58, 2.90) | 0.26 | (0.06, 1.11) | 0.40 | (0.12, 1.34) |
| Ethnicity (Ref = Caucasian) | | | | | | | | | | | | |
| Other | 0.78 | (0.53, 1.15) | *0.47 | (0.223, 0.99) | 1.18 | (0.74, 1.91) | 0.80 | (0.48, 1.32) | 0.91 | (0.50, 1.62) | 0.95 | (0.44, 2.06) |
| Income (Ref = ≥ 80,000) | | | | | | | | | | | | |
| < 40,000 | **2.26 | (1.40, 3.66) | *1.97 | (1.07, 3.66) | *1.91 | (1.10, 3.34) | *1.76 | (1.03, 3.00) | **2.44 | (1.37, 4.37) | *2.39 | (1.14, 5.00) |
| 40,000 to 79,999 | 1.14 | (0.83, 1.57) | 0.71 | (0.42, 1.20) | 0.96 | (0.62, 1.48) | 1.44 | (0.98, 2.10) | 1.29 | (0.82, 2.03) | 0.62 | (0.29, 1.31) |
| no answer | 1.15 | (0.77, 1.71) | 1.17 | (0.65, 2.08) | 1.33 | (0.85, 2.25) | 1.00 | (0.61, 1.66) | 1.08 | (0.81, 2.04) | 1.31 | (0.63, 2.74) |
| Level of education completed (Ref = University) | | | | | | | | | | | | |
| Primary or high school | **1.90 | (1.32, 2.73) | 1.6 | (0.99, 2.61) | 1.00 | (0.61, 1.63) | **2.08 | (1.35, 3.20) | **2.26 | (1.38, 3.72) | 1.38 | (0.68, 2.77) |
| College | **1.64 | (1.21, 2.23) | 0.82 | (0.50, 1.35) | 1.27 | (0.86, 1.88) | ***2.11 | (1.47, 3.04) | **2.26 | (1.47, 3.48) | 1.45 | (0.81, 2.61) |
| Religious affiliation (Ref = Christian) | | | | | | | | | | | | |
| Other faiths or no beliefs | **0.60 | (0.46, 0.80) | *0.64 | (0.42, 0.99) | 0.78 | (0.54, 1.12) | *0.64 | (0.45, 0.91) | *0.54 | (0.35, 0.83) | 0.69 | (0.39, 1.22) |

CI, confidence interval; OR, odd ratio; [1] Awareness to the EWC is defined as recall of at least one campaign element presented; [2] poor model fit; [3] model adjusted for age, sex and month survey was completed.

* p < .05, ** p < .005, *** p < .0001 based on logistic regression models

**Table 4.4. The association between perceived effectiveness of the Eat Well Campaign, campaign intensity and campaign frequency among aware parents (n = 390)**

| | Campaign intensity | | Campaign frequency | |
|---|---|---|---|---|
| | | OR (95% CI) | | OR (95% CI) |
| Believed it was more important to plan as a result of the EWC | **1.77 | (1.32, 2.35) | 1.21 | (0.98, 1.48) |
| Believed it was more important to include family in meal planning as a result of the EWC | ***1.73 | (1.30, 2.30) | 1.17 | (0.95, 1.44) |
| Felt more knowledgeable about meal planning as a result of the EWC | ***1.67 | (1.27, 2.19) | 1.17 | (0.69, 1.43) |
| Planned more as a result of the EWC | ***1.79 | (1.36, 2.35) | *1.32 | (1.09, 1.60) |
| Cooked more family meals as a result of the EWC | ***1.97 | (1.46, 2.66) | **1.42 | (1.15, 1.75) |
| Felt campaign messages were relevant for planning my family's meals | *1.36 | (1.05, 1.75) | **1.37 | (1.12, 1.67) |
| Felt campaign messages were relevant for preparing my family's meals | **1.47 | (1.13, 1.91) | *1.27 | (1.06, 1.56) |
| Felt campaign was useful for planning my family's meals | *1.39 | (1.06, 1.84) | **1.40 | (1.14, 1.72) |
| Felt campaign was useful for preparing my family's meals | **1.49 | (1.13, 1.95) | ***1.45 | (1.17, 1.78) |
| Have discussed the campaign with friends and family | ***2.10 | (1.47, 2.99) | ***1.64 | (1.29, 2.80) |

Controlled for age, sex, month survey was completed, dominant official language, region, ethnicity, income, education and religious affiliation

* p < .05, ** p < .005, *** p < .0001 based on logistic regression models

Campaign intensity was defined as the number of campaign elements recalled

Campaign frequency was defined as the number of times per month the campaign was recalled over the course of a year

**Table 4.5. Exposed parent' comments about the Eat Well Campaign (EWC)**

| Category | Frequency |
|---|---|
| No real impact | 47 |
| Not really aware of the campaign | 46 |
| Already health conscious | 24 |
| Already planning | 23 |
| Helped with healthy eating | 19 |
| The EWC was a good concept | 17 |
| Validated current practices | 9 |
| The EWC needed more visibility | 5 |
| The EWC should be disseminated in schools | 3 |
| Limited time is the problem for healthy eating | 3 |
| Now, plan more because of the campaign | 1 |
| EWC is similar to other campaigns | 1 |
| Children talked about it | 1 |
| The EWC information was frustrating—not for father figures | 1 |

## Figures

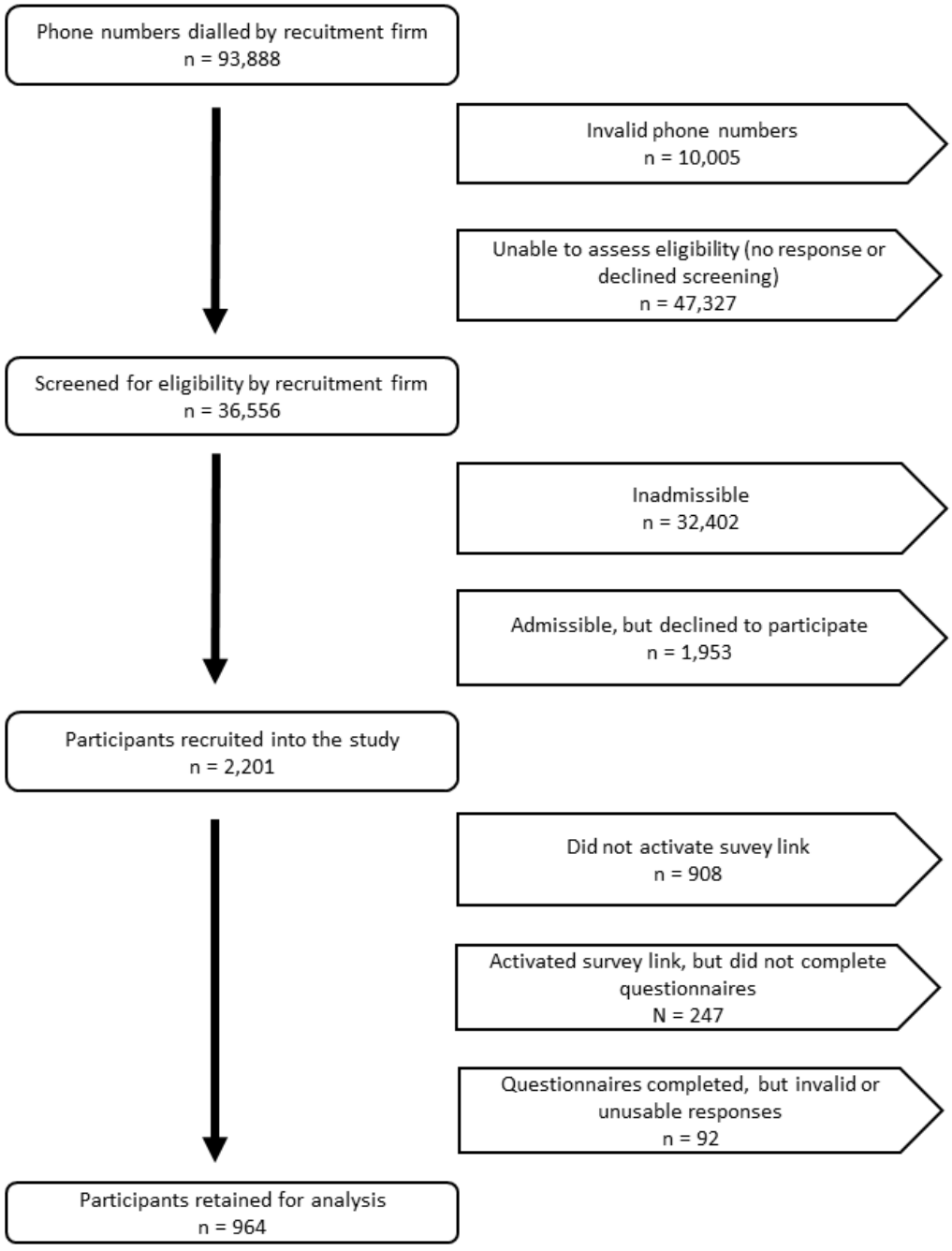


**Figure 4.1.** Recruitment and participant flow chart.

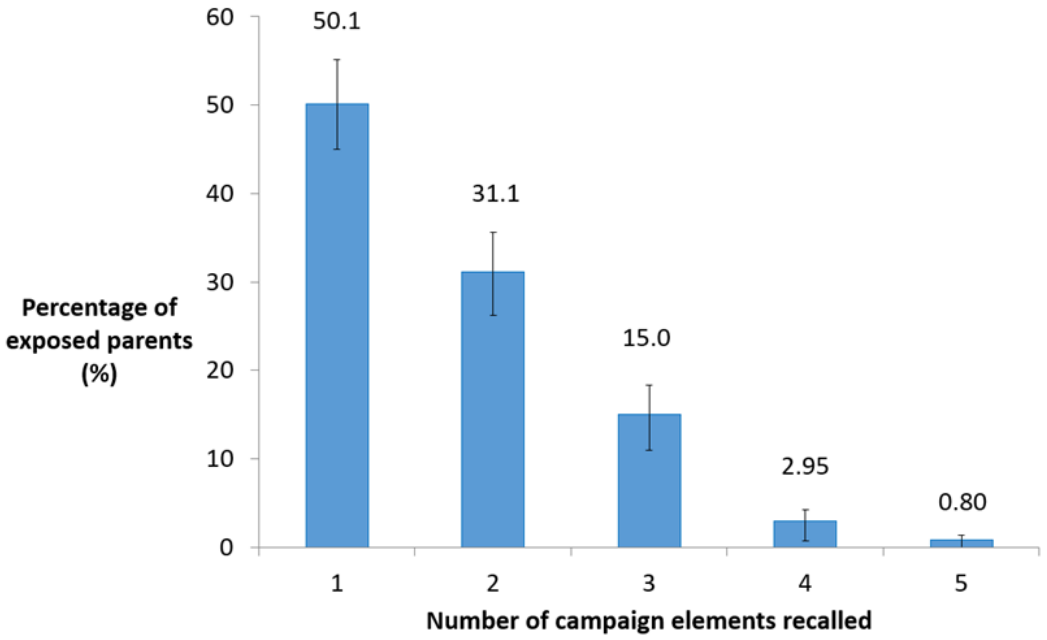


**Figure 4.2**. Campaign intensity. Number of different EWC elements recalled by Canadian parents (n = 390).

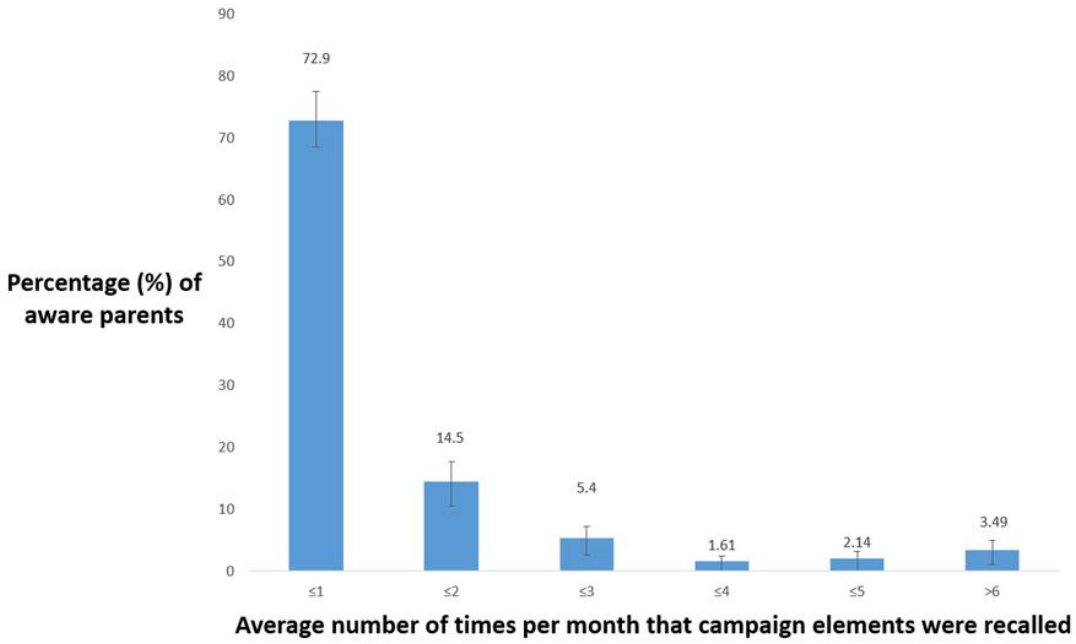


**Figure 4.3.** Campaign frequency (n = 390) among parents aware of the Eat Well Campaign

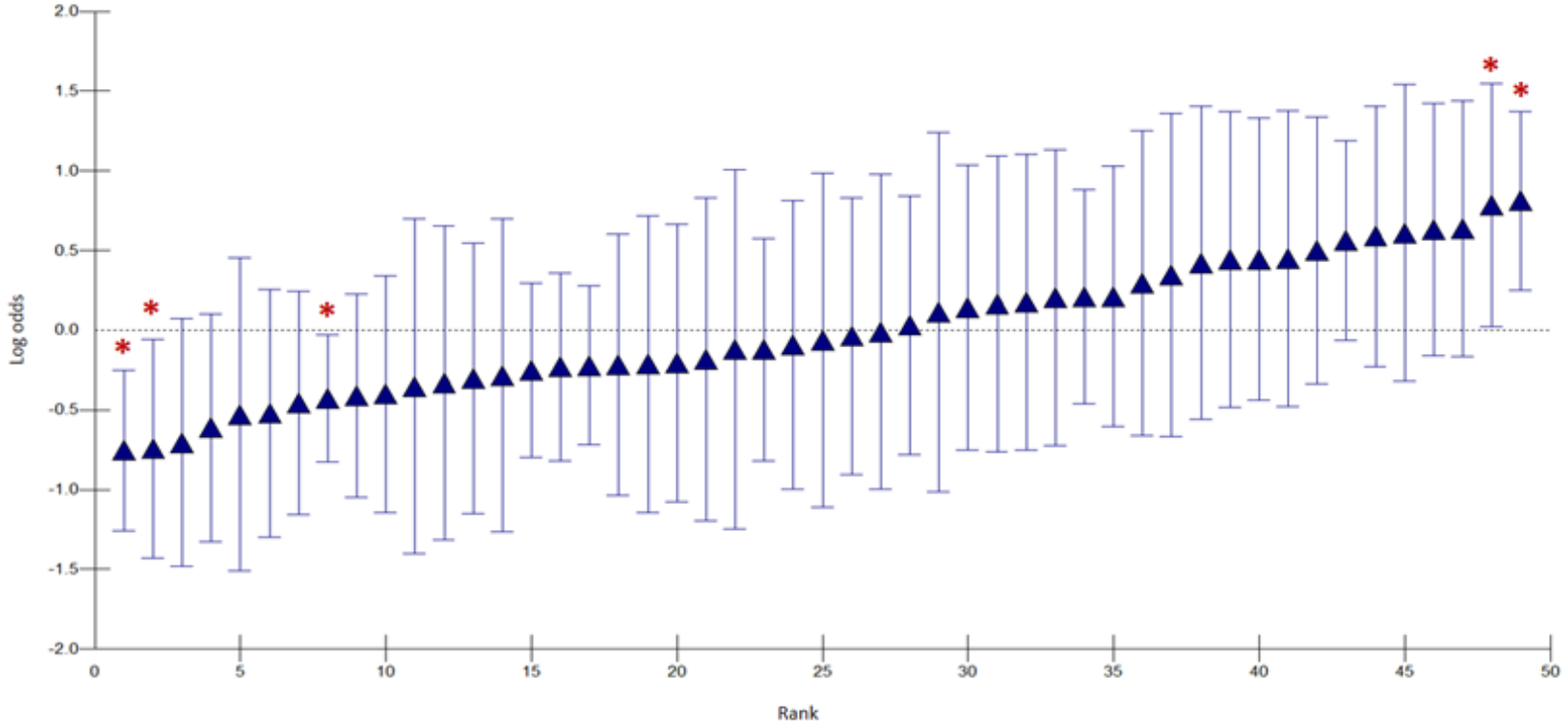


**Figure 4.4.** Caterpillar plot of Canadian census metropolitan, agglomeration and rural areas ranked by awareness of the Eat Well Campaign (EWC) from least aware (left) to most aware (right) (n = 909). Each triangle represents a different census metropolitan, agglomeration or rural area. From left to right, the 10 places in Canada that were the least aware of the EWC were: Vancouver, BC (n = 64)*, Winnipeg, MB (n = 25)*, rural Alberta (n = 16), Hamilton, ON (n = 22), Saskatoon, SK (n = 16), rural British Columbia (n = 23), Toronto, ON (n = 141)*, Calgary, ON (n = 31) and Halifax, NS (n = 19). From right to left, the 10 places in Canada that were the most aware of the EWC were: rural Quebec (n = 47)*, Quebec City, QC (n = 17)*, London, ON (n = 14), Laval, QC (n = 15), Gatineau, QC (n = 7), Terrebonne, QC (n = 13), Montérégie, QC (n = 33), Sudbury, ON (n = 12), rural Manitoba (n = 7), rural New Brunswick (n = 9) and Peterborough, ON (n = 7). *Areas with significantly greater odds of having different awareness to the EWC than the Canadian average (log odds 0.0) are indicated by error bars that do not cross the average. Only parents who provided valid 6-unit postal codes associated with an identifiable Canadian city or town were included in the model. Adjusted multilevel model controlled for age, sex, education and income ($p < .05$).

# Chapter 5 — Diet quality and food literacy


## Résumé

L’objectif était d’examiner les associations entre la qualité de l’alimentation et 22 éléments (provenant de cinq dimensions) de littéracie alimentaire parmi un échantillon transversal de 767 parents canadiens. En général, à l’exception de deux éléments, la majorité des parents ont rapporté un engagement envers chaque élément de littéracie. Il y avait des différences significatives selon le genre pour cinq éléments de littéracie alimentaire. Les deux éléments portant sur les connaissances nutritionnelles et sept des huit éléments portant sur la conceptualisation alimentaire étaient significativement associés à une meilleure qualité de l’alimentation. En revanche, les éléments portant sur la planification, les compétences culinaires et les aspects sociaux n’étaient pas significativement associés à la qualité de l’alimentation. Les connaissances et la conceptualisation alimentaire seraient des dimensions pertinentes à cibler lors de l'élaboration de futures interventions de littéracie alimentaire, tout en prenant en considération les différences potentielles reliée au genre.


The manuscript presented in this chapter is entitled: **Which food literacy items are associated with diet quality among Canadian parents?**


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**Which food literacy items are associated with diet quality among Canadian parents?**

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## Abstract

**Purpose:** To explore the associations between different food literacy dimensions, gender and diet quality among a sample of Canadian mothers and fathers.

**Design/methods/approach:** Canadian parents (n = 767) responsible for household food preparation completed an online survey on food literacy (knowledge, planning, cooking skills, food conceptualisation and social aspects) and dietary intakes. The healthy eating index (HEI) adapted to the Canadian Food Guide (CFG) was calculated from a food frequency questionnaire. Associations between HEI scores and 22 food literacy items were analysed with linear regression models, controlling for sociodemographic variables and multiple testing.

**Findings:** Of respondents, 81% were mothers. The mean HEI score was 76.6 (SD 10.6) and mothers had healthier diets than fathers ($p = 0.01$). More mothers than fathers used CFG recommendations, selected foods based on nutrition labels, made soups, stews, muffins and cakes from scratch and added fruits and vegetables to recipes ($p < 0.05$). More fathers reduced the salt content of recipes than mothers ($p = 0.03$). Both knowledge components and seven out of eight food conceptualisation skills surveyed were significantly associated with better HEI, after controlling for covariates and multiple testing. Planning components, cooking skills and social aspects were not significantly associated with HEI, after controlling for covariates and multiple testing.

**Research limitations/implications:** Knowledge and food conceptualisation are important dimensions to target for future interventions aimed at improving diet quality; however, gender should be considered.

**Originality:** This is the first comparison of multiple dimensions of food literacy in a national sample of Canadian parents.

## Key words

Home economics, food literacy, diet quality, nutrition knowledge, skills, cooking.

## Introduction

Diet-related risk factors predominate priorities for cancer and obesity prevention (3), and poor diet has now surpassed tobacco use as the leading risk factor for cardiovascular disease (2). While the benefits of a healthy diet are known, nutrition promotion needs remain unmet (329). As the burden of non-communicable diseases increases, effective strategies that make it easier for individuals to adopt healthy eating practices are needed. Dietary patterns in childhood are a predictor for diet in adulthood, making youth a critical period for interventions (186). The family environment presents an opportunity to modify dietary practices through parental modeling of positive behaviors (189).

Food environments have evolved over the last four decades to provide a high density of food establishments in close proximity with accessible and affordable convenience foods (pre-made, packaged, ready-to-eat and fast food) (330). Convenience foods, particularly ultra-processed, are associated with inadequate diet quality and greater risk for diet-related chronic diseases (56). These unhealthy food environments create situations in which it is extremely difficult to make healthy dietary decisions on a regular basis by constantly exposing individuals to cues to consume unhealthy foods (331). The public needs to learn how to navigate complex and evolving food environments. Food literacy provides an opportunity to foster resilience to “obesogenic” food environments.

While food literacy is the foundation for healthy eating and touches on multiple dimensions related to food and nutrition, there are no standard definitions or validated tools (27, 73, 75) Very little is known about the dimensions of food literacy that are needed to make healthy dietary decisions. Formative research is needed to understand trends and associations between food literacy components and important nutritional indicators such as diet quality. This will help identify feasible opportunities for food literacy interventions that will have the greatest chance of improving dietary intakes of the public, particularly at the family level. The aim of this study was to assess the prevalence of various food literacy components in a

sample of Canadian mothers and fathers and investigate their association with the diet quality of these parents. A secondary aim of this study was to investigate whether there were differences in food literacy items between mothers and fathers.

## Methods

### Participants eligibility and recruitment

A cross-section of parents from across Canada was recruited in 2014 through random digit dialing for a larger evaluation study about the impacts of a mass media campaign that promoted family meal planning to Canadian parents. Details of the main study and recruitment are presented elsewhere (Blinded et al., submitted). Briefly, the sample consisted of Canadian parents with at least one child between the ages of two and 12, who were primary caregivers and responsible for household meal provisions at least 50% of the time. Parents were invited to complete a web-based survey that included a sociodemographic questionnaire, a questionnaire about food literacy and a validated food frequency questionnaire (FFQ) (254). This study was approved by the XXX (# 111) and the YYY (#222) research ethics committees. Written and informed consent was obtained from all subjects.

### Description of variables

Diet quality was assessed by calculating the healthy eating index (HEI) adapted to the Canadian Food Guide (CFG) (255) from a 136-item validated food frequency questionnaire (254). The adapted HEI combined scores from 10 categories of foods and nutrients for a total score ranging from 0 to 100 points (255).

For this study, questions for the 22 food literacy items were obtained directly from two national Canadian Community Health Surveys (CCHS) pertaining to food skills in 2012 and 2013 (138, 196, 252, 253). The definition of food literacy that informed the present study is based on Pat Vanderkooy's work on food skills (70), which was later adapted by Health Canada. The adapted definition was used to group the 22 food literacy items into five categories;

i. Knowledge components: 1. using recommendations from the CFG; 2. selecting foods based on food labels
ii. Planning components: 3. planning meals before going to the store; 4. having a budget when shopping for groceries; 5. using a written grocery list
iii. Mechanical cooking skills: 6. knife skills; 7. cooking meat; 8. making soups and stews from scratch; 9. making muffins and cakes from scratch
iv. Food conceptualisation: 10. Cooking mostly with whole and basic ingredients; 11. advanced cooking skills; 12. making changes to recipes to make them healthier; 13. by reducing fat; 14. by reducing salt; 15. by reducing sugar; 16. by adding fruits or vegetables; 17. by chosing whole grain options
v. Social aspects: 18. eating main meal with family; 19. involving children in meal suggestions; 20. involving children in grocery shopping; 21. children help prepare meals; 22. children prepare meals on their own.

Of the 22 food literacy items investigated, 15 items were dichotomic and coded 1 = “yes, presence of the item” and 0 = “no, absence of the item”. For consistency and ease of interpretation with multiple linear regression models, the remaining seven categorical variables were dichotomized.

**Statistical analyses**

Linear regression was used to analyse the association between the HEI score of participants and each of the 22 food literacy items, separately. All models also controlled for sociodemographic variables; sex, age, income, education, region in Canada, ethnicity/race, religious beliefs, number of children in household, employment status and family structure. The level of significance was set at $p < 0.05$ and subsequently adjusted with Benjamini-Hochberg’s false discovery rate to control for multiple testing of linear regression models (332). All analyses were conducted with SAS 9.4 (SAS Institute Inc., Cary, NC, 2012).

## Results

### Sample characteristics

Observations from a total of 767 participants were analysed. Of participants, 81.4% were mothers and the mean age for the total sample was 39.7 years (SD 6.1). The mean HEI score was 76 (SD 10.6). There were significant differences in age, income, employment status and diet quality between mothers and fathers. Women were significantly younger and had healthier diets than men ($p < 0.05$). A higher proportion of men worked full-time and lived in households with incomes > $80,000 ($p < 0.05$). The characteristics of participants are presented in Table 5.1.

### Prevalence of food literacy items

Proportions of each food literacy item reported by parents and comparisons between mothers and fathers are presented in Table 5.2. Most parents (81%) reported selecting foods based on nutrition labels, whereas few parents (36%) reported using recommendations from the CFG. In terms of planning, nearly all parents planned meals before going to the store (91%) and sometimes used grocery lists (95%), but just 55% used a budget. The vast majority (≥ 86%) of parents reported very good or good mechanical cooking skills. Over two-thirds of parents reported cooking mostly with whole and basic ingredients, having advanced cooking skills and making changes to recipes to make them healthier. Adding more fruits and vegetables to a recipe was the most common change reported by 70% or parents. The majority of parents (≥ 63%) reported that their families/children engaged in all social aspects of food literacy examined except for one; only 38% of parents reported children cooking on their own (Table 5.2). More mothers than fathers used recommendations from the CFG, selected foods based on nutrition labels, were very good or good at making soups and stews and muffins and cakes, and added more fruits and vegetables to recipes to make them healthier ($p < 0.05$). More fathers than mothers reported reducing the salt content of recipes to make them healthier ($p = 0.0284$) (Table 5.2).

### Associations between food literacy items and diet quality

Both knowledge components analysed were significantly associated with better diet quality, even after controlling for all sociodemographic variables and multiple testing. Parents who sometimes used recommendations from the CFG or selected foods based on nutrition labels had 3.27 (SD 0.81, $p$ <.0001) and 3.50 (SD 0.98, $p$ = .0004) higher HEI scores, respectively, than parents who did not report engaging in these activities (Table 5.3). None of the planning components or social aspects were significantly associated with diet quality. For mechanical skills, being very good or good at making soups and stews and cakes and muffins from scratch were associated with better diet quality; however, the association was attenuated after controlling for sociodemographic variables. All eight food conceptualisation skills investigated (cooking mostly with whole and basic ingredients, having advanced cooking skills, making changes to recipes, reducing fat content, reducing salt content, reducing sugar content, adding fruits and vegetables and choosing whole grain options) were significantly associated with better diet quality in crude models. These associations represented differences in HEI scores ranging from 2.14 to 4.10 between parents reporting these skills and those who did not, and they remained significant after controlling for covariates and multiple testing, except for having advanced cooking skills (Table 5.3).

## Discussion

This study investigated different dimensions of food literacy among Canadian mothers and fathers and their association with different diet quality to identify potential components that can be the focus of a future intervention. Overall, the majority of parents in our study appeared to possess basic food skills and reported higher prevalence of food literacy components compared to a national sample from the CCHS (138, 196). Though all parents surveyed were responsible for food preparation at least 50% of the time, there were gender differences for certain, but not all components of food literacy investigated. In this study only 19% of

respondents were fathers who were responsible for meal preparation at least 50% of the time, which is in line with findings from other Canadian surveys (115). Depending on the food literacy topic, gender may or may not be relevant for future interventions involving parents; however, little is known about these potential differences and their impacts on food literacy or outcomes on dietary intakes. Gender is a key determinant of home-based food preparation (93) and differences in food literacy is a topic that warrants further exploration. Of the five food literacy categories investigated, food and nutrition knowledge and food conceptualisation skills appeared to be the most relevant dimensions for the diet quality of Canadian parents.

**Nutrition knowledge**

In terms of nutrition knowledge, using the CFG and nutrition labels when shopping for groceries were significantly associated with better diet quality. In a national sample of Canadians, using the CFG has been associated with greater chances of consuming the recommended servings of vegetables and fruits (232). Additionally, these findings are supported by a systematic review that found that the majority of studies reported significant positive associations between nutrition knowledge and dietary intakes, particularly fruit and vegetable intakes (98). However, similar to our study, there was a higher proportion of tertiary educated and female participants and there was a lack of validated tools to assess nutrition knowledge and/or dietary intakes (98). Albeit potentially limited, nutrition knowledge is thought to have a positive impact on dietary practices (333). A difference of as little as 2–4 points in HEI represents 0.5-1 portions of fruit and vegetables (255), which could potentially translate into clinical meaningful differences in dietary quality between individuals who apply different aspects of nutrition knowledge and those that do not. The present results as well as previous studies (82, 98) reinforce the value of including critical nutrition knowledge in food literacy interventions aimed at promoting healthy eating such as nutrition campaigns (334).

### Mechanical skills and food conceptualisation

Mechanical skills were not associated with diet quality, but were reported by a higher proportion of parents than conceptual food skills. These findings are consistent with trends from the general Canadian population from a study that used the same variables (138) and a study with Canadian university students (using similar variables) where mechanical skills were rated higher than food conceptualisation (335). Of note, a smaller proportion of parents (71%) reported using mostly whole and basic foods to prepare meals despite a very high proportion of parents reporting good or very good skills at cooking soups and stews (86%) and cakes and muffins (88%) from "scratch". This potentially indicates that despite having the required skills for home-based food preparation or cooking from "scratch", parents may opt for foods that are easy to prepare and could reflect the demand for convenience foods (116). It may also reflect a culinary transition, whereby the public is not as dependent on traditional mechanical cooking skills as they used to be. Retail food environments provide affordable convenient products and technological advancements provide small appliances that allow meals to be prepared with relatively few skills (109). Despite modern conveniences, additional more complex skills are needed to navigate today's "obesogenic" food environments that involve both technical and cognitive capacities (90). While food conceptualisation is not a well-defined term, it involves skills and creative efficiency to use left-overs, create a meal from items in the pantry and fridge or adapt a recipe, and it reflects a skillset that is needed to navigate various interrelated factors that influence our dietary decisions (69). Additional research is needed to define food conceptualisation as a construct of food literacy. In the context of Canadian parents, food conceptualisation and nutrition knowledge dimensions of food literacy appear to be promising targets for future nutrition interventions.

### Planning

Planning meals before going to the store, budgeting and using a written grocery list were not associated with diet quality among Canadian parents. While meal planning may still be extremely relevant to family meal preparation, the three meal

planning items investigated may not have adequately reflected the construct of planning. The construct in general is not well documented in the literature. While meal planning has been associated with healthier diets and adherence to nutritional guidelines in a national sample of French adults (163) as well as with fruit intakes of children in low-income minority American families (164), there is very little other evidence supporting a direct link between planning and dietary or other health outcomes (165, 166). Meal planning is thought to improve the mealtime atmosphere by reducing parental stress (133) and can be considered as a coping strategy to overcome time pressure (67, 145) during food preparation. Evidence supporting the relevance of meal planning for making healthier dietary decisions is based on the notion that planning is a strategy to overcoming time-related barriers to meal preparation and (132, 133, 135, 144).

### Social aspects

Generally, components like frequency of family meal preparation of sharing meals are associated with nutritional health (97, 195). Our study, however, looked at the diet quality of parents and not youth, and this association may be less pronounced than among young people, which could explain the lack of relevant findings among adults. Dietary practices are developed in childhood and adolescence and will persist into adulthood (186). Despite the absence of a direct association between social aspects and dietary quality among parents, these elements remain important to the social context and social environments of food literacy, which may have other positive health implications that extend beyond nutrition indicators (198, 205).

### Strengths and limitations

While very informative, this study had several limitations. Despite the use of random digit dialling to recruit parents from across the country, a greater proportion of parents had a university education or belonged to two-parent families and a smaller proportion self-identified as visible minorities than the general Canadian population, indicating a self-selection bias. The cross-sectional nature of the study

prevents from drawing cause and effect conclusions. The relatively small proportion of fathers involved in food preparation in the study prevented gender stratification. Additionally, questions were not validated components of food literacy and did not consist of an exhaustive inventory of all possible food literacy items. Although relevant for the exploratory nature of this study, future studies should focus on developing and using validated measurements of food literacy that have well defined constructs to ensure content, face and criterion validity that is necessary for a reliable nutrition assessment tool (336).

The items studied were identical to those used in the CCHS allowing for comparison with a national sample. Additionally, the five categories provided a global indication of how the association between diet quality and unique items may vary in magnitude and strength. Furthermore, the sample size was large enough to control for multiple potential confounders and use conservative statistical analysis with the false discovery rate, which added robustness to the results and conclusions.

**Conclusion**

The present study was successful in identifying two dimensions of food literacy, nutritional knowledge and food conceptualisation, that were strongly associated with diet quality. To our knowledge, this study is the first to examine the association between diet quality and multiple food literacy dimensions in a population of Canadian parents. Results from this study contribute to the body of literature on the state of cooking and food preparation skills among parents and their relative importance to dietary intakes. This work could be advanced by developing and using well defined validated constructs in addition to exploring the association between food literacy dimensions and non-nutritional indicators of health such as well-being and social determinants of health. Results from the present study will be useful to direct and inform opportunities for food literacy interventions in Canada; however, there is also a need to understand how different food skills interact with each other to influence dietary intakes.

# Tables

**Table 5.1. Sociodemographic characteristics and Healthy Eating Index (HEI) score of Canadian mothers and fathers**

| Variable | Total | | Mothers | | Fathers | | *P*-value* |
|---|---|---|---|---|---|---|---|
| | n (%) | | n (%) | | n (%) | | |
| | 767 (100%) | | 624 (81.4%) | | 143 (18.6%) | | |
| Age (mean, SD) | | | | | | | 0.01 |
| Years | 39.7 | 6.1 | 39 | 5.9 | 41 | 6.3 | |
| Dominant official language | | | | | | | 1.00 |
| English | 606 | 79.0 | 493 | 79.0 | 113 | 79.0 | |
| French | 161 | 21.0 | 131 | 21.0 | 30 | 21.0 | |
| Region | | | | | | | 0.06 |
| British Columbia | 104 | 13.6 | 85 | 13.6 | 19 | 13.9 | |
| Prairies† | 130 | 17.0 | 116 | 18.6 | 14 | 9.8 | |
| Ontario | 319 | 41.6 | 248 | 39.7 | 71 | 49.7 | |
| Quebec | 152 | 19.8) | 127 | 20.4 | 25 | 17.5 | |
| Maritimes‡ | 62 | 8.1 | 48 | 7.7 | 14 | 9.8 | |
| Ethnicity or culture | | | | | | | 0.32 |
| Caucasian | 662 | 86.7 | 543 | 87.0 | 119 | 83.2 | |
| Black | 15 | 2.0 | 14 | 2.2 | 1 | 0.7 | |
| First Nations, Métis or Inuit | 14 | 1.8 | 12 | 1.9 | 1 | 1.4 | |
| Asian | 37 | 4.8 | 27 | 4.3 | 10 | 7.0 | |
| Arab | 10 | 1.3 | 7 | 1.1 | 3 | 2.1 | |
| Other/no answer | 29 | 3.8 | 21 | 3.4 | 8 | 5.6 | |
| Number of children | | | | | | | 0.63 |
| 1 | 162 | 21.1 | 128 | 20.5 | 34 | 23.8 | |
| 2 | 388 | 50.6 | 315 | 50.5 | 73 | 51.1 | |
| 3 | 164 | 21.4 | 135 | 21.6 | 29 | 20.3 | |
| ≥ 4 | 53 | 6.9 | 46 | 7.4 | 7 | 4.9 | |
| Family structure | | | | | | | 0.21 |
| Two parents | 669 | 87.2 | 538 | 86.2 | 131 | 91.6 | |
| Single parent | 61 | 8.0 | 54 | 8.7 | 7 | 4.9 | |
| Step-family | 37 | 4.8 | 32 | 5.1 | 5 | 3.5 | |
| Household income | | | | | | | 0.02 |
| < 40,000 | 65 | 8.5 | 59 | 9.5 | 6 | 4.2 | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 40,000 to 79,999 | 179 | 23.3 | 145 | 23.2 | 34 | 23.8 | |
| > 80,000 | 417 | 54.4 | 326 | 52.2 | 91 | 63.6 | |
| no answer | 106 | 13.8 | 94 | 15.1 | 12 | 8.4 | |
| Level of education completed | | | | | | | 0.12 |
| Primary or secondary | 125 | 16.3 | 98 | 15.7 | 27 | 18.9 | |
| College | 202 | 26.3 | 174 | 27.9 | 28 | 19.6 | |
| University | 440 | 57.4 | 352 | 56.4 | 88 | 61.5 | |
| Employment status | | | | | | | |
| Full-time | 452 | 58.9 | 327 | 52.4 | 125 | 87.4 | <0.0001 |
| Part-time | 135 | 17.6 | 130 | 20.8 | 5 | 3.5 | |
| Stay-at-home parent | 129 | 16.8 | 20 | 3.2 | 5 | 3.5 | |
| Unemployed | 26 | 3.4 | 126 | 20.2 | 3 | 2.1 | |
| Other | 25 | 3.3 | 21 | 3.4 | 5 | 3.5 | |
| Religious affiliation | | | | | | | 0.12 |
| Christian | 478 | 62.3 | 396 | 52.4 | 82 | 57.3 | |
| Other faith | 40 | 5.2 | 28 | 20.8 | 12 | 0.7 | |
| None | 209 | 27.3 | 165 | 3.2 | 44 | 30.8 | |
| No answer | 40 | 5.2 | 35 | 20.2 | 5 | 3.5 | |
| Diet quality (mean, SD) | | | | | | | 0.01 |
| Healthy eating index score | 76.6 | 10.6 | 77 | 10.7 | 75 | 10.1 | |

* The level of significance was set at P < 0.05; † Alberta, Saskatchewan and Manitoba; ‡ New Brunswick, Nova Scotia, Prince Edward Island

**Table 5.2. Comparison of food literacy items between Canadian mothers and fathers**

| | Food literacy components | Proportion of parents "yes" n = 767 | Proportion of mothers "yes" n = 624 | Proportion of fathers "yes" n = 143 | Chi-square P-value* |
|---|---|---|---|---|---|
| ***Knowledge components*** | | | | | |
| 1 | Sometimes use recommendations from the Canadian Food Guide | 36.0% | 37.8% | 28.6% | **0.04** |
| 2 | Sometimes select foods based on nutrition labels | 80.7% | 82.5% | 72.5% | **0.007** |
| ***Planning components*** | | | | | |
| 3 | Plan meals before going to the store | 90.6% | 90.2% | 92.3% | 0.45 |
| 4 | Sometimes have a budget when shopping for groceries | 54.7% | 55.2% | 52.1% | 0.51 |
| 5 | Sometimes use a written grocery list | 95.1% | 95.3% | 94.3% | 0.64 |
| ***Mechanical cooking skills*** | | | | | |
| 6 | Very good or good knife skills | 94.3% | 94.8% | 92.1% | 0.22 |
| 7 | Very good or good at cooking meat | 90.4% | 90.1% | 91.3% | 0.68 |
| 8 | Very good or good at making soups and stews from scratch | 85.9% | 88.5% | 76.3% | **0.0003** |
| 9 | Very good or good at making muffins and cakes from scratch | 87.7% | 90.7% | 74.8% | **< 0.0001** |
| ***Food conceptualisation*** | | | | | |
| 10 | Cook mostly with whole and basic ingredients | 70.6% | 70.8% | 69.8% | 0.81 |
| 11 | Have advanced cooking skills (can prepare most dishes or frequently prepare sophisticated dishes) | 67.8% | 68.0% | 66.9% | 0.80 |
| 12 | Ever made changes to a recipe to make it healthier | 86.2% | 86.1% | 86.4% | 0.92 |
| 13 | By reducing its fat content | 57.5% | 56.2% | 62.9% | 0.14 |
| 14 | By reducing its salt content | 54.8% | 52.9% | 62.9% | **0.03** |
| 15 | By reducing its sugar content | 60.1% | 61.1% | 55.9% | 0.26 |
| 16 | By adding more fruits or vegetables | 70.1% | 72.6% | 59.4% | **0.002** |
| 17 | By choosing whole grain options | 53.1% | 53.7% | 50.4% | 0.47 |
| ***Social aspects*** | | | | | |
| 18 | Eat main meal every day or almost every day with family | 82.3% | 81.6% | 85.3% | 0.29 |
| 19 | Children involved in making meal suggestions | 85.5% | 86.2% | 82.4% | 0.25 |
| 20 | Children involved in grocery shopping | 70.4% | 80.3% | 70.9% | 0.88 |
| 21 | Children help prepare or cook meals | 64.1% | 64.3% | 63.6% | 0.88 |
| 22 | Children prepare or cook meals on their own | 37.6% | 38.9% | 32.1% | 0.14 |

* The level of significance was set at $P < 0.05$

**Table 5.3. Unadjusted and adjusted mean differences in Healthy Eating Index (HEI) scores according to food literacy attributes of Canadian parents**

| | Food literacy components | Crude model | | | Complete model† | | |
|---|---|---|---|---|---|---|---|
| | | β | SD | *P-value* | β | SD | *P*-value |
| | ***Knowledge components*** | | | | | | |
| 1 | Sometimes use recommendations from the Canadian Food Guide | 3.48 | 0.80 | *** <.0001** | 3.27 | 0.81 | ***<.0001** |
| 2 | Sometimes select foods based on nutrition labels | 4.22 | 0.96 | *** <.0001** | 3.50 | 0.98 | ***0.0004** |
| | ***Planning components*** | | | | | | |
| 3 | Plan meals before going to the store | 1.22 | 1.32 | 0.3580 | 0.45 | 1.34 | 0.7274 |
| 4 | Sometimes have a budget when shopping for groceries | -0.31 | 0.78 | 0.6859 | 0.67 | 0.82 | 0.4198 |
| 5 | Sometimes use a written grocery list | 0.27 | 1.79 | 0.8825 | -0.10 | 1.81 | 0.9560 |
| | ***Mechanical cooking skills*** | | | | | | |
| 6 | Very good or good knife skills | 0.57 | 1.66 | 0.7292 | 0.13 | 1.66 | 0.9402 |
| 7 | Very good or good at cooking meat | 1.00 | 1.31 | 0.4445 | 1.09 | 1.32 | 0.4086 |
| 8 | Very good or good at making soups and stews from scratch | 3.00 | 1.10 | ***0.0076** | 2.02 | 1.12 | 0.0710 |
| 9 | Very good or good at making muffins and cakes from scratch | 3.04 | 1.17 | ***0.0096** | 1.93 | 1.20 | 0.1086 |
| | ***Food conceptualisation*** | | | | | | |
| 10 | Cook mostly with whole and basic ingredients | 2.86 | 0.84 | ***0.0007** | 2.47 | 0.86 | ***0.0041** |
| 11 | Have advanced cooking skills (can prepare most dishes or frequently prepare sophisticated dishes) | 1.88 | 0.82 | ***0.0223** | 1.72 | 0.82 | 0.0366 |
| 12 | Ever made changes to a recipe to make it healthier | 3.89 | 1.11 | ***0.0005** | 3.59 | 1.13 | ***0.0015** |
| 13 | By reducing its fat content | 4.36 | 0.76 | ***<0.0001** | 4.00 | 0.76 | ***<0.0001** |
| 14 | By reducing its salt content | 4.13 | 0.76 | ***<0.0001** | 4.10 | 0.76 | ***<0.0001** |
| 15 | By reducing its sugar content | 2.48 | 0.78 | ***0.0015** | 2.14 | 0.79 | ***0.0068** |
| 16 | By adding more fruits or vegetables | 3.34 | 0.83 | ***<0.0001** | 3.03 | 0.84 | ***0.0003** |
| 17 | By choosing whole grain options | 3.41 | 0.76 | ***<0.0001** | 3.30 | 0.77 | ***<0.0001** |
| | ***Social aspects*** | | | | | | |
| 18 | Eat main meal every day or almost every day with family | 2.17 | 1.01 | 0.0311 | 1.77 | 1.04 | 0.0884 |
| 19 | Children involved in making meal suggestions | 2.30 | 1.09 | 0.0355 | 2.37 | 1.13 | 0.0360 |
| 20 | Children involved in grocery shopping | 0.90 | 0.85 | 0.2913 | 1.25 | 0.87 | 0.1483 |
| 21 | Children help prepare or cook meals | 1.25 | 0.80 | 0.1204 | 1.21 | 0.81 | 0.1369 |
| 22 | Children prepare or cook meals on their own | 0.18 | 0.80 | 0.8210 | -0.01 | 0.84 | 0.9895 |

†Complete model controlled for age, sex, education, income, number of children, family type, dominant official language, region, ethnicity/race and employment status, * Values that met criteria for statistical significance after adjusting for the false discovery rate (Benjamini-Hochberg procedure) to take into account multiple testing. The level of significance for each model tested is different and depends on the number of tests, its p-value and its rank. By using this procedure, some models may not meet the criteria for statistical significance despite presenting p-values < 0.05.

# Chapter 6 — Employment status, diet quality and food literacy


## Résumé

L'objectif était d'explorer les associations entre le statut d'emploi, la qualité de l'alimentation et des éléments de la littéracie alimentaire en analysant les réponses à un questionnaire électronique d'un échantillon transversal de 767 parents canadiens. Le statut d'emploi n'était pas significativement associé aux éléments de littéracie alimentaire. Le temps était l'obstacle à la préparation de repas le plus fréquemment rapporté, sans égard au statut d'emploi, mais il était une barrière plus importante pour les parents travaillant à temps complet comparé aux autres statuts d'emploi. Les préférences ou restrictions alimentaires et les problèmes de santé ou d'allergies de membres de la famille étaient des obstacles moins importants pour les parents travaillant à temps plein comparé aux autres statuts d'emploi. Comme le temps était un obstacle important, le manque de temps devrait être pris en considération lors de la promotion de toute initiative concernant la préparation de repas maison.


The manuscript presented in this chapter is entitled: **Full-time employment, diet quality and food skills of Canadian parents**


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**Full-time employment, diet quality and food skills of Canadian parents**

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## Abstract

**Purpose:** To explore the associations between full-time employment status, food skills and diet quality of Canadian parents.

**Methods:** A representative sample of Canadian parents (n = 767) were invited to complete a web-based survey that included sociodemographic variables, questions about food skills and a validated FFQ. Results were analyzed with linear and logistic regression models, controlling for sociodemographic variables.

**Results:** After controlling for covariates and multiple testing, there were no statistically significant differences in foods skills between parents' employment status. Time was the most reported barrier for meal preparation, regardless of work status, but was significantly greater for full-time compared to other employment status ($p$ <.0001). Additionally, parents who worked full-time had lower odds of reporting food preferences or dietary restrictions ($p$ = .0001) and health issues or allergies ($p$ = .0003) as barriers to food preparation, compared to parents with other employment status. These results remained statistically significant even after controlling for covariates and multiple testing.

**Conclusions:** Overall, food skills did not differ significantly between parents' employment status. Time, however, was an important barrier for most parents, especially those working full-time. To promote home-based food preparation among parents, strategies to manage time scarcity are needed.

## Introduction

The determinants of home cooking and their relationship to healthy eating are complex; however, numerous studies have reported associations between cooking skills, time availability and employment, and home-based cooking (93). Over the years, the time women spend on housework including core tasks such as cooking has declined while men's has increased, but not to the same extent, resulting in an overall decrease in time households spend on domestic chores (113). Less time spent cooking has been associated with employment status, particularly among women (130, 337). Despite increased participation of fathers in domestic tasks (113, 338, 339), 80% of women in Canada are primarily responsible for household meal planning and preparation (115). Women have progressively taken on jobs with greater responsibility and pay (340), which is attributed to reduced time availability for cooking and food preparation (115). Greater time availability and employment have been identified as important determinants of home cooking (93).

In addition to changes in the labor force, there have been shifts in the food environment, which have led to increased availability, variety, and abundance of processed foods (semi-prepared, ready-to-eat, and take-out foods) (108). Increased reliance on processed foods provides fewer opportunities to transfer food preparation knowledge and abilities to children (136, 341, 342). Changes in home-based food preparation have been attributed to the normalization of processed foods (330) and increased demand for convenience foods that are easy and quick to prepare (157), particularly among busy parents (173). Consumption of UPF foods is a predictor of poor diet quality in Canada, whereas increased consumption of home-made meals is thought to improve the diet (56). Time, however, remains a major limitation to home-based food preparation (115, 135, 343, 344).

A Synthesis Paper identified the need for better understanding of the determinants of cooking and food preparation skills in Canada (115). The present study aligns with the recent conceptual framework developed by Mills et al. (2017) on the determinants and outcomes of home cooking (93). As such, we expect this study to

contribute to a greater understanding of the relationship between the food skills needed for home food preparation and potential time constraints of working parents. The aim of this study was to examine associations between foods skills and employment status in a sample of Canadian parents through exploratory analyses of a secondary database. The overarching hypothesis is that parents who work full-time have less time to prepare meals and have fewer food skills, ultimately resulting in a poorer diet quality.

## Methods

### Recruitment and data collection

As part of an evaluation of HC's Eat Well Campaign: Food Skills (2013/2014), a representative sample of Canadian parents were recruited by a professional firm using random-digit-dialing. The inclusion criteria for the study were: adults (≥ 18 yo), having ≥ 1 child (2–12 yo), living with child(ren) ≥ 50% of the time and being responsible for meal preparation ≥ 50% of the time, being a Canadian Citizen, understanding either French or English, having access to the Internet, and having a valid e-mail address. Parents who participated were entered into a draw to win one of three iPads. Surveys were completed between April and August 2014. Parents who met inclusion criteria and agreed to participate were sent a consent form containing a link to a web-based survey by e-email and provided informed consent by activating the link.

### Ethics approval

Approval was obtained by the *Comité d'éthique de la recherche avec les êtres humains de l'Université Laval* (#2013-055) and the *Comité d'éthique de la recherche en santé de Université de Montréal* (#13-118-CERES-R).

**Description of variables**

The survey included questionnaires that collected: 1. Sociodemographic information (i.e., age, gender, language, region, number of children, family type, employment status, education, income, and religious beliefs); 2. Dietary data through a validated FFQ (254). Diet quality was calculated from the FFQ using a healthy eating index (HEI) adapted to the CFG (255) and; 3. Food skills questions that were taken from the CCHS Rapid Response Annex on Food Skills (138, 196). Questions regarding common food skills, barriers to meal planning, and strategies for meal preparation identified in key Canadian food skills resources were also included (135, 345). For the purpose of this study, we will be using "food skills" to refer to the concept of "food literacy"(27, 73) as defined by Pat Vanderkooy (70). Variables were categorized according to components from Vanderkooy's (70) definition of food skills adapted by HC (230). For the purpose of this study, these components included:

1) *Food and nutrition knowledge*; CFG and nutrition label use
2) *Meal planning*; using a grocery list, budget, or planning meals before going to the grocery store, and planning meals within the last 6 months
3) *Mechanical cooking skills*; Chopping skills, cooking meat/fish, making soups/stews and cakes/muffins from scratch
4) *Food conceptualization*; using whole ingredients, having advanced cooking skills, and modifying ingredients (salt, fat, sugar, fruit, vegetables, and whole grains) to make recipes healthier
5) *Social aspects of food*; eating family meals and including children in grocery shopping, meal suggestions, preparation, and cooking.

**Data analysis**

All statistical tests were conducted with SAS 9.4 (Carey, North Carolina). Employment status was dichotomized into full-time and other employment status (part-time, stay-at-home, unemployed, unable to work, undefined work status and retired). Most dependent variables were dichotomous (yes = 1 and no = 0), and

nominal variables were dichotomized for logistic regression. For example, the variable “Currently plan meals” was dichotomized with 1 = “I have been planning our family meals for longer than six months” and “I have been planning our family meals for less than six months” and 0 = “I do not plan our family meals, but think I may start to in the next six months”, “I do not plan our family meals, and do not think I will start to in the near future”, and “I do not plan our family meals, but think I may start to in the near future”. Additional details describing the coding for each variable can be found in Supplemental Table 6.1. The HEI score was treated as a normally distributed continuous variable, controlling for age and sex.

Logistic regression models were adjusted by controlling for gender, age, education, income, language (English or French), region (British Columbia, the Prairies, Ontario, Quebec, and the Maritimes), number of children, and family type (single-parent, two-parent, or step-family). Employment status according to gender that was used in subgroup analyses is described in Supplemental Table 6.2. Parents with full-time employment were compared to part-time, stay-at-home, and auxiliary employment status (unemployed, unable to work, undefined work status, and retired). Only significant models of subgroup analyses were reported in the text but results from all models are found in Supplemental Tables 6.3 and 6.4. Mothers working full-time were compared to mothers with other employment status and results resembled those for all parents (results not shown). There were too few fathers in the sample who worked part-time (n=18) to conduct separate analyses. For all analyses, the level of significance was set at $p < .05$ and then adjusted with the Benjamini-Hochberg false discovery rate to correct for multiple testing (332).

## Results

### Sociodemographic variables and diet quality

There were 2201 eligible participants that were recruited for the study and received the links to the web-survey. Of eligible participants, 1286 responded or started the questionnaire and 767 participants (34.8%) completed all questions used for

analyses. Of respondents, 58.9% reported full-time employment and 81.4% were mothers. There were significant differences in work-status (full-time employment vs. other employment) according to gender, language, region, number of children, income, and education (Table 6.1). The mean HEI score was 76.6 (standard deviation=10.6). Based on the HEI score, employment status was not associated with diet quality ($p$ =.38).

**Food skill components**

Parents working full-time had lower odds of planning meals ($p$=.01), having good or very good skills in baking muffins or cake from scratch ($p$=.01), making changes to recipes ($p$=.04), adding more fruits and vegetables to make a recipe healthier ($p$=.02), compared to parents with other employment status (Table 6.2). After adjusting for sociodemographic variables, differences between employment status for making changes to recipes ($p$=.11) and making muffins or cake from scratch ($p$=.14) were attenuated, while planning meals remained significant ($p$=.01) and cooking main meals mostly with whole and basic foods became significant ($p$=.02) (Table 2). After controlling for multiple testing with the false discovery rate, there were no longer any statistically significant differences in food skills between parents with full-time employment and other employment status. Additionally, in subgroup analyses, none of the models reached statistical significance after controlling for the false discovery rate, comparing full-time employment to part-time, stay-at-home or auxiliary employment groups (Supplemental 6.3).

**Meal planning barriers and meal preparation strategies**

Limited time, lack of ideas, and food preferences were the most common barriers for meal planning reported by participants (Figure 1a), whereas shopping to ensure having all ingredients, planning meals ahead, and using simple cooking methods were the most frequently reported strategies to facilitate meal planning (Figure 1b). Full-time working parents had significantly lower odds of reporting family food preferences or dietary restrictions ($p$<.0001), family health issues ($p$=.001), and

financial resources ($p$=.004) as barriers to meal planning, but greater odds of reporting time as a barrier ($p$<.0001), compared to parents who did not work full-time. After controlling for covariates, financial resources was attenuated; however, the other associations remained unchanged (Table 6.3). After controlling for multiple testing with the false discovery rate, in fully adjusted models, differences between full-time and other employment status remained statistically significant for lack of time (OR=3.22; CI 2.25, $p$<.0001), food preferences (OR=0.57; CI 0.41-0.79, $p$=.001) and health issues (OR=0.48; CI 0.30-0.78, $p$=.003).

In subgroup analyses, in fully adjusted models, after controlling for multiple testing, there were no statistically significant differences between full-time and part-time employment groups for any meal planning barriers. However, there were statistically significant differences between full-time and stay-at-home parents for lack of time (OR=3.82; CI 2.44-5.99, $p$<.0001), food preferences (OR = 0.55 CI 0.36-0.85, $p$ =.007), and health issues (OR=0.39; CI 0.22-0.70, $p$=.001), after controlling for covariates and multiple testing. There was also a statistically significant difference for lack of time (OR=3.54; CI 1.85-6.77, $p$=.0001) between the full-time and auxiliary employment groups, after controlling for covariates and multiple testing. There were no statistically significant associations in subgroup analyses for strategies to facilitate meal preparation (Supplemental Table 6.4).

## Discussion

### Diet quality

This study investigated the associations among food skills, diet quality and employment status. Contrary to our overarching hypothesis, diet quality, was not associated with employment status in this study, but this has also been observed in Australia. A study examining diet quality in a sample of Australian working mothers, found that usual working hours had little impact on their diets. Authors suspected that more education and knowledge of working women might offset barriers such as time (346). Our sample was primarily composed of women and the majority of

participants working full-time also lived in households with higher income. Therefore, these households may be able to afford better quality foods, potentially offsetting any negative impacts of time availability on diet quality related to food skills.

**Food skills**

No statistically significant associations between food skills and employment were observed in this study. The majority of Canadians may already possess the "basic" food skills that were examined. The CCHS Rapid Response Food Skills annex (2013), which included a national representative sample of over 9000 Canadians (>12 years old), reported that 63% of respondents could prepare most dishes, especially with a recipe, and the proportion was as high as 72% for women (138). Similarly, over 70% of adults in the region of Waterloo in Ontario reported being able to prepare cakes/muffins and soups/stews from scratch (111). The sample of parents in our study was relatively homogenous composed mainly of mothers responsible for meal preparation in their household at least 50% of the time; therefore, likely possessed "basic" food skills. In our sample, 94% of respondents reported being able to prepare most dishes, especially with a recipe and 88% reported being good or very good at making muffins and cakes with a recipe. With this in mind, it is possible that food skills in our sample were better than the general population, and it may be difficult to distinguish differences between groups who were already skilled. Additionally, it is possible that the questions used in this study that were derived from the CCHS did not use enough categories to distinguish between different skills. For example, nearly all respondents (91%) in our study reported planning meals before going to the store; however, the question does not permit us to distinguish between planning frequency or how far in advance parents plan. There is a need to develop and validate tools to assess different aspects of food skills.

**Meal preparation barriers and meal planning strategies**

More frequent meal preparation is associated with consumption of a healthier diet (347), however employment presents a barrier to cooking (348). One study reported that mothers who worked 8 hours per day, spent on average 38 minutes per day less preparing food than mothers not working (349). Our study results suggest that regardless of employment status, time is a major constraint for Canadian parents who want to cook for their families, but is a more significant barrier for parents employed full-time, compared to stay-at-home or auxiliary employment status. While planning helps parents manage time pressures by doing activities like shopping for groceries on work breaks and packing leftovers for lunch, these activities are also time-consuming (141). Meal preparation and planning involve a complex set of activities (69) that take time, which may not be a realistic expectation for certain groups that experience time scarcity as a barrier to healthy eating (55, 66, 350).

People react to time scarcity differently, therefore, recognizing which groups can use organizational skills and self-efficacy to manage time is key to understand food choices and identify practical solutions for healthy food provisioning (118). Greater understanding of the interactions between time scarcity, time management, and self-efficacy is extremely relevant when attempting to promote food skills. Given the time scarcity parents experience, particularly employed mothers (351), coping strategies are needed to help parents integrate food preparation into their family life. Storfer-Isser and Musher-Eizenman (145) suggest that interventions designed specifically for the needs of overloaded parents may help these parents prepare simple and fast meals for their families. A similar suggestion to tailor interventions to different types of parents was made by Dwer et al. (344). Both time constraints and the burden of meal preparation have been cited are barriers to family meals and tailored solutions to address the realities of time constrained parents have included engaging youth in meal preparation and delivering interventions remotely or through the workplace (344).

In our study, it is unclear why food preferences or dietary restrictions and health issues or allergies of a family member were more important meal preparation barriers for parents who stayed-at-home compared to parents working full-time. Dietary preferences of family members is a commonly reported barrier for food preparation (130, 136, 348) and we can speculate that stay-at-home moms may have more available time than employed parents and put more energy into accommodating family preferences or dietary restrictions. It is possible that family health issues were the reason that parents stayed-at-home; however, we did not have details about the health issues of family members to understand why it is such an important barrier for stay-at-home parents.

**Limitations and strengths**

This study has some limitations associated with data collection and tools. As the questionnaires were not validated and did not include exhaustive lists of all food skill components, we cannot ensure content or face validity. Furthermore, the questions themselves obtained from the CCHS were not explicit and may have been subject to interpretation by respondents. Categorical data made statistical analysis challenging and several multivariate models were not valid. While random-digit-dialing was used to recruit participants and the sample was geographically representative of Canadian parents, there was a much higher proportion of university-educated parents and a lower proportion of visible minorities than in the general population indicating a selection bias. Despite limitations, the study sample was sufficiently large to control for multiple covariates. Furthermore, by controlling for multiple testing with the false discovery rate, we can be confident in the robustness of the results. To our knowledge, the present study is the first to investigate the association between employment status and multiple components of food literacy in a national Canadian cohort.

## Conclusion

While this study did not find any statistically significant associations between food skills and employment status among Canadian parents, study limitations prevent us from drawing a firm conclusion that there are no associations in this population. Formative research is needed to uncover determinants and drivers of food literacy among key populations such as parents. Our study, however, did find that time is a major barrier for food preparation for all parents regardless of work status. Furthermore, time was consistently a more important barrier for full-time working mothers and parents compared to parents with other employment status. These results indicate that while work status may not be associated with foods skills, reduced time availability related to working full-time is an important barrier. To promote home-based food preparation and family meals, our results suggest that food literacy interventions may need to focus on coping strategies to reduce time-related barriers.

## Relevance to practice

Future research should investigate time scarcity, time management, and self-efficacy in relation to food skills in order to optimize interventions promoting home-based meal preparation. Until further evidence is amassed, clinical dietitians need to be conscious of clients/patients' time constraints when proposing dietary counseling that involves home-based food preparation, and public health nutritionists should prioritize promoting dietary practices that are easy to integrate within the reality of a working parent's busy lifestyle. To advance the field of food literacy, there is a need to develop and validate tools to assess and monitor food skills.

# Tables

**Table 6.1. Characteristics of parents according to employment status**

| Variable | Total (%) | Full-time employment (%) | Other employment* (%) | *P*-value |
|---|---|---|---|---|
| | n = 767 | n = 452 (58.9) | n = 315 (41.1) | |
| Parent | | | | <0.0001 |
| Mother | 624 (81.4) | 327 (52.4) | 297 (47.6) | |
| Father | 143 (18.6) | 125 (87.4) | 18 (12.6) | |
| Age (mean, SD) | | | | 0.92 |
| Years | 39.7 (6.1) | 39.7 (5.7) | 39.7 (6.5) | |
| Dominant official language | | | | 0.002 |
| English | 606 (79.0) | 340 (56.1) | 266 (43.3) | |
| French | 161 (21.0) | 112 (69.6) | 49 (30.4) | |
| Region | | | | <0.0001 |
| British Columbia | 104 (13.6) | 47 (45.2) | 57 (54.8) | |
| Prairies (Alberta, Saskatchewan and Manitoba) | 130 (17.0) | 59 (45.4) | 71 (54.6) | |
| Ontario | 319 (41.6) | 203 (63.6) | 116 (36.4) | |
| Quebec | 152 (19.8) | 101 (66.5) | 51 (33.6) | |
| Maritimes (New Brunswisk, Nova Scotia, Prince Edward Island) | 62 (8.1) | 42 (67.7) | 20 (32.3) | |
| Ethnicity or culture | | | | 0.36 |
| Caucasian | 662 (86.7) | 393 (59.4) | 269 (40.6) | |
| Black | 15 (2.0) | 9 (60.0) | 6 (40.0) | |
| First Nations, Métis or Inuit | 14 (1.8) | 4 (28.6) | 10 (71.4) | |
| Asian | 37 (4.8) | 22 (59.5) | 15 (40.5) | |
| Arab | 10 (1.3) | 6 (60.0) | 4 (40.0) | |
| Other/no answer | 29 (3.8) | 18 (62.1) | 11 (37.9) | |
| Number of children | | | | <0.0001 |
| 1 | 162 (21.1) | 111 (68.5) | 51 (31.5) | |
| 2 | 388 (50.6) | 240 (61.9) | 148 (38.1) | |
| 3 | 164 (21.4) | 86 (52.4) | 78 (47.6) | |
| ≥ 4 | 53 (6.9) | 15 (28.3) | 38 (71.7) | |
| Family stucture | | | | 0.80 |
| Two parent | 669 (87.2) | 395 (59.0) | 274 (41.0) | |
| Single parent | 61 (8.0) | 37 (60.7) | 24 (39.3) | |
| Step-family | 37 (4.8) | 20 (54.1) | 17 (46.0) | |
| Household income | | | | <0.0001 |
| < 40,000 | 65 (8.5) | 13 (20.0) | 52 (80.0) | |
| 40,000 to 79,999 | 179 (23.3) | 95 (53.1) | 84 (46.9) | |
| > 80,000 | 417 (54.4) | 288 (69.1) | 129 (30.9) | |
| no answer | 106 (13.8) | 56 (52.9) | 50 (47.2) | |
| Level of education completed | | | | 0.02 |
| Primary or secondary | 125 (16.3) | 60 (48.0) | 65 (52.0) | |
| College | 202 (26.3) | 120 (59.4) | 82 (40.6) | |
| University | 440 (57.4) | 272 (61.8) | 168 (38.2) | |
| Religious affiliation | | | | 0.45 |
| Christian | 478 (62.3) | 280 (58.6) | 198 (41.4) | |
| Other faith | 40 (5.2) | 27 (67.5) | 13 (32.5) | |
| None | 209 (27.3) | 125 (59.8) | 84 (40.2) | |
| No answer | 40 (5.2) | 20 (50.0) | 20 (50.0) | |
| Diet quality (mean, SD) | | | | 0.38 |
| Healthy eating index score | 76.6 (10.6) | 76.9 (10.6) | 76.2 (10.4) | |

* Other employment status includes part-time, stay at home, unemployed, unable to work, retired, and unspecified employment status.

**Table 6.2. Food skills of Canadian parents with full-time employment compared to parents with other employment status***

| Variable | Crude model | | | Adjusted model† | | |
|---|---|---|---|---|---|---|
| | OR | 95% CI | *P*-value | OR | 95% CI | *P*-value |
| *Knowledge components* | | | | | | |
| Sometimes use recommendations from Canada's Food Guide | 0.87 | (0.65, 1.18) | 0.38 | 0.97 | (0.68, 1.38) | 0.86 |
| Sometimes select foods based on nutrition labels | 0.75 | (0.51, 1.09) | 0.13 | 0.72 | (0.46, 1.12) | 0.14 |
| *Planning components* | | | | | | |
| Currently plan meals | 0.54 | (0.34, 0.84) | ‡0.007 | 0.49 | (0.29, 0.82) | ‡0.006 |
| Plan meals before going to the store | 0.88 | (0.53,1.45) | 0.61 | 0.67 | (0.37, 1.20) | 0.17 |
| Sometimes have a budget when shopping for groceries | 0.8 | (0.60, 1.07) | 0.13 | 0.85 | (0.59, 1.21) | 0.35 |
| Sometimes use a written grocery list§ | 1.11 | (0.57, 2.15) | 0.77 | | | |
| *Mechanical skills* | | | | | | |
| Very good or good skills in peeling, chopping, or slicing vegetables§ | 1.13 | (0.61, 2.10) | 0.69 | | | |
| Very good or good skills in cooking a piece of raw meat, chicken or fish | 1.15 | (0.71, 1.88) | 0.58 | 1.32 | (0.75, 2.31) | 0.34 |
| Very good or good skills in cooking a soup, stew or casseroles from scratch | 0.73 | (0.50, 1.13) | 0.16 | 0.67 | (0.40, 1.12) | 0.12 |
| Very good or good skills in baking muffins or cake from scratch with a recipe | 0.55 | (0.34, 0.89) | ‡0.01 | 0.66 | (0.38, 1.15) | 0.14 |
| *Food conceptualisation* | | | | | | |
| Cook main meals mostly with whole and basic foods | 0.81 | (0.58, 1.11) | 0.19 | 0.64 | (0.44, 0.94) | ‡0.02 |
| Can prepare most dishes or frequently prepare sophisticated dishes using basic ingredients§ | 1.02 | (0.75, 1.40) | 0.88 | | | |
| Ever made changes to a recipe to make it healthier | 0.63 | (0.40, 0.97) | ‡0.04 | 0.66 | (0.40, 1.10) | 0.11 |
| By reducing its fat content§ | 1.05 | (0.78, 1.40) | 0.75 | | | |
| By reducing its salt content | 1.01 | (0.76, 1.35) | 0.94 | 1.00 | (0.72, 1.40) | 0.98 |
| By reducing its sugar content | 0.75 | (0.56, 1.01) | 0.06 | 0.77 | (0.55, 1.09) | 0.14 |
| By adding more fruits or vegetables | 0.69 | (0.50, 0.95) | ‡0.02 | 0.90 | (0.62, 1.30) | 0.56 |
| By choosing whole grain options | 0.79 | (0.59, 1.06) | 0.11 | 0.82 | (0.59, 1.14) | 0.23 |
| *Social aspects* | | | | | | |
| Eat main meal every day or almost every day with family at home | 0.85 | (0.58, 1.25) | 0.40 | 0.71 | (0.45, 1.12) | 0.14 |
| Children make suggestions for family meals | 0.7 | (0.46, 1.07) | 0.10 | 0.86 | (0.70, 1.93) | 0.56 |
| Children participate in shopping for groceries | 1.13 | (0.83, 1.56) | 0.44 | 1.24 | (0.85, 1.79) | 0.26 |
| Children help prepare meals or cook foods | 0.94 | (0.69, 1.27) | 0.67 | 1.05 | (0.74, 1.49) | 0.80 |
| Children prepare or cook meals by themselves | 0.77 | (0.57, 1.04) | 0.08 | 0.88 | (0.61, 1.26) | 0.48 |

* Other employment status includes part-time, stay at home, unemployed, unable to work, retired, and unspecified employment status.

†Adjusted model controled for age, sex, education, income, number of children, family type (two-parent, single parent or step-family), language and region

§ Multiple logistic regression models resulted in poor model fit ($p$ >.05) and are not reported.

‡ The false discovery rate (Benjamini-Hochberg procedure) was used to adjust for multiple testing. The level of significance for each model tested is different and depends on its $p$-value. Using this procedure, none of the models tested in the Table 6.2 met the criteria for statistical significance, despite presenting $p$-values <.05.

**Table 6.3. Meal planning barriers and preparation strategies of Canadian parents with full-time employment compared to parents with other employment status***

| | Crude model | | | Adjusted model† | | |
|---|---|---|---|---|---|---|
| **Variable** | OR | 95% CI | *P*-value | OR | 95% CI | *P*-value |
| *Meal planning barriers* | | | | | | |
| Lack of time | 2.35 | (1.73, 3.18) | ‡**<.0001** | 3.22 | (2.25, 4.63) | ‡**<.0001** |
| Food preferences or dietary restrictions of family members | 0.53 | (0.39, 0.70) | ‡**<.0001** | 0.57 | (0.41, 0.79) | ‡**0.001** |
| Health issues or allergies of a family member | 0.48 | (0.32, 0.73) | ‡**0.001** | 0.48 | (0.30, 0.78) | ‡**0.003** |
| Financial resources | 0.59 | (0.41, 0.85) | ‡**0.004** | 1.08 | (0.68, 1.72) | 0.74 |
| Acess to a variety of fresh and affordable foods | 0.74 | (0.50, 1.11) | 0.14 | 0.73 | (0.46, 1.18) | 0.20 |
| Responsabilities not shared between family members | 0.96 | (0.67, 1.38) | 0.83 | 1.18 | (0.78, 1.80) | 0.43 |
| Lack of ideas | 0.90 | (0.67, 1.20) | 0.46 | 0.91 | (0.65, 1.27) | 0.57 |
| *Meal preparation strategies* | | | | | | |
| Planning meals ahead | 0.74 | (0.52, 1.04) | 0.08 | 0.69 | (0.46, 1.03) | 0.07 |
| Shopping to ensure have all ingredients§ | 0.82 | (0.53, 1.25) | 0.35 | | | |
| Cooking meals in advance | 1.04 | (0.78, 1.39) | 0.78 | 0.90 | (0.64, 1.26) | 0.54 |
| Involving other family members in meal preperation | 1.04 | (0.77, 1.39) | 0.81 | 1.30 | (0.56, 3.00) | 0.61 |
| Using simple cooking methods§ | 0.94 | (0.68, 1.31) | 0.67 | | | |
| Combining fresh food with prepared/processed foods | 0.84 | (0.61, 1.14) | 0.26 | 1.02 | (0.71, 1.46) | 0.91 |
| Freezing meals | 0.75 | (0.56, 1.01) | 0.06 | 0.71 | (0.51, 1.00) | 0.05 |

* Other employment status includes part-time, stay at home, unemployed, unable to work, retired, and unspecified employment status.

†Adjusted model controled for age, sex, education, income, number of children, family type (two-parent, single parent or step-family), language and region

‡ The false discovery rate (Benjamini-Hochberg procedure) was used to adjust for multiple testing. The level of significance for each model tested is different and depends on its *p*-value. Using this procedure, tests with the 4 smallest p-values in crude models and 3 smallest p-values in adjusted models met the criteria for statistical significance.

## Figures

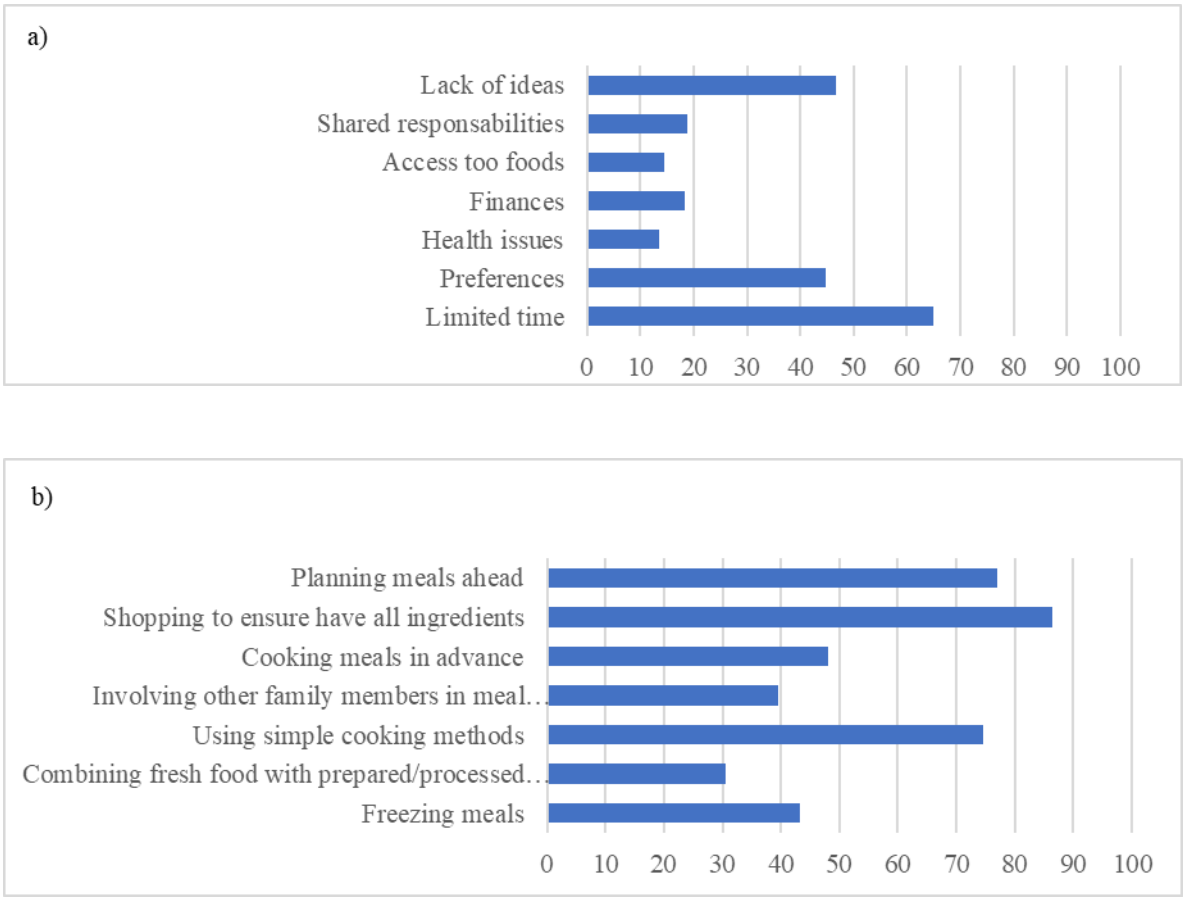


Figure 6.1. Meal planning barriers (a) and strategies to facilitate meal preparation (b) reported by Canadian parents (%)

## Supplemental tables

**Supplemental table 6.1. Questions about food skills, meal planning barriers, meal planning strategies, coding of variables, and sources of information for questions**

| | Questions | Dichotomous coding "1" | Dichotomous coding "0" | Proportion of events (i.e., "1") | Sources of information for questions |
|---|---|---|---|---|---|
| 1 | When shopping for groceries, do you sometimes use recommendations from Canada's Food Guide? | Yes | No | 36% | CCHS Annual Component FS1-Q170 |
| 2 | When shopping for groceries, do you sometimes select foods based on nutrition labels? | Yes | No | 81% | CCHS Annual Component FS1-Q180 |
| 3 | What statement best applies to you? | I do not plan our family meals, and do not think I will start to in the near future | I have been planning our family meals for less than six months | 86% | Developped by team, based on stages of behavior change |
| | | I do not plan our family meals, but think I may start to in the next six months | I have been planning our family meals for longer than six months | | |
| | | I do not plan our family meals, but think I may start to in the near future | | | |
| 4 | When shopping for groceries, do you sometimes plan meals before going to the store? | Yes | No | 91% | CCHS Annual Component FS1-Q160 |
| 5 | When shopping for groceries, do you sometimes have a budget on how much you can spend? | Yes | No | 55% | CCHS Annual Component FS1-Q140 |

| | | | | | |
|---|---|---|---|---|---|
| 6 | When shopping for groceries, do you sometimes use a written grocery list? | Yes | No | 95% | CCHS Annual Component FS1-Q150 |
| 7 | How would you rate your skills in peeling, chopping, or slicing vegetables or fruit? | Very good | Basic skills | 94% | CCHS Annual Component FS2-Q50 |
| | | Good | Very limited/no skills | | |
| 8 | How would you rate your skills in cooking a piece of raw meat, chicken or fish? | Very good | Basic skills | 90% | CCHS Annual Component FS2-Q80 |
| | | Good | Very limited/no skills | | |
| 9 | How would you rate your skills in cooking a soup, stew or casseroles from scratch? | Very good | Basic skills | 86% | CCHS Annual Component FS2-Q90 |
| | | Good | Very limited/no skills | | |
| 10 | How would you rate your skills in baking muffins or cake from scratch with a recipe? | Very good | Basic skills | 88% | CCHS Annual Component FS2-Q110 |
| | | Good | Very limited/no skills | | |
| 11 | When preparing the main meal at home, which of the following your family do most often? (By main meal, we mean the meal of the day that requires the most preparation) | You use mostly whole basic foods such as vegetables, fruits, pasta, legumes and meat | You use mostly easy to prepare foods such as frozen lasagna | 71% | CCHS Annual Component FS2-Q20 |
| | | | You use a mix of whole basic foods and easy to prepare foods | | |
| | | | You buy ready-to-eat food or takeout or delivery | | |
| 12 | How would you describe your ability to cook from basic ingredients? | I can prepare most dishes | I don't know where to start when it comes to | 67% | CCHS Annual Component FS2- |

| | | | | | |
|---|---|---|---|---|---|
| | | | cooking | | Q30 |
| | | I frequently prepare sophisticated dishes | I can do things such as boil an egg or cook a grilled cheese sandwich but nothing more advanced | | |
| | | | I can prepare simple meals but nothing too complicated | | |
| | | | I can cook most dishes if I have a recipe to follow | | |
| 13 | Have you ever adjusted a recipe to make it healthier? | Yes | No | 87% | CCHS Annual Component FS2-Q120 |
| | How did you make it healthier? | | | | CCHS Annual Component FS2-Q130 |
| 14 | by reducing its fat content? | Yes | blank response | 57% | |
| 15 | by reducing its salt content? | Yes | blank response | 55% | |
| 16 | by reducing its sugar content? | Yes | blank response | 60% | |
| 17 | by adding more fruits or vegetables? | Yes | blank response | 70% | |
| 18 | by choosing whole grain options? | Yes | blank response | 53% | |
| 19 | When at home, how often do you usually eat the main meal with your family sitting at the table together? (By main meal we mean the meal of the day that requires the most preparation) | Every day | About 2 or 3 times a week | 82% | CCHS Annual Component FS1-Q100 |
| | | Almost every day | About once a week | | |
| | | | Rarely or never | | |
| 20 | Do children in your household make suggestions for family meals? | Yes | No | 85% | CCHS Annual Component FS1-Q50 |

| | | | | | |
|---|---|---|---|---|---|
| 21 | Do children in your household participate in shopping for groceries? | Yes | No | 70% | CCHS Annual Component FS1-Q60 |
| 22 | Do children in your household help to prepare meals or help cook foods (e.g., cutting, stirring, peeling, washing)? | Yes | No | 63% | CCHS Annual Component FS1-Q70 |
| 23 | Thinking about the three meals of the day, do children in your household prepare meals or help cook foods by themselves? | Yes | No | 38% | CCHS Annual Component FS1-Q80 |
| | What obstacles do you encounter when planning your family meals? Mark all that apply. | | | | Developped by team, based on key litterature |
| 24 | lack of time | Yes | blank response | 65% | |
| 25 | Food habits, preferences or aversions of certain family members (i.e., vegetarian, doesn't like vegtables, etc.) | Yes | blank response | 45% | |
| 26 | Health issues of food allergies of certain family members | Yes | blank response | 13% | |
| 27 | Limited financial resources | Yes | blank response | 18% | |
| 28 | Limited access to a variety of fresh and affordable foods | Yes | blank response | 15% | |
| 29 | Tasks not shared between family members | Yes | blank response | 19% | |
| 30 | Lack of ideas for ensuring variety | Yes | blank response | 47% | |
| | What strategies do you adopt to facilitate meal preparation? Mark all that apply | | | | Developped by the team, based on key litterature |
| 31 | Planning meals in advance | Yes | blank response | 77% | |
| 32 | Shopping to ensure I have everything I need to prepre meals | Yes | blank response | 86% | |
| 33 | Cooking meals in advance | Yes | blank response | 48% | |

| | | | | |
|---|---|---|---|---|
| 34 | Involving other family members in meal preparation | Yes | blank response | 40% |
| 35 | Using simple cooking methods and tools (i.e., slow cooker, BBQ, food processor, blender, etc.) | Yes | blank response | 74% |
| 36 | Assembly cooking (or "semi" home-made cooking), i.e. combining of fresh food and prepared/processed food | Yes | blank response | 31% |
| 37 | Freezing meals | Yes | blank response | 43% |

CCHS, Canadian Community Health Survey

**Supplemental Table 6.2. Employment status by sex**

| Employment status | Total | | Mothers | | Fathers | | |
|---|---|---|---|---|---|---|---|
| | n = 767 | % | n = 624 | % | n = 143 | % | *P*-value for difference |
| Full-time | 452 | 58.9% | 327 | 52.4% | 125 | 87.4% | < 0.0001 |
| Part-time | 135 | 17.6% | 130 | 20.8% | 5 | 3.5% | 0.3458 |
| Stay-at-home | 129 | 16.8% | 126 | 20.2% | 3 | 2.1% | 0.4385 |
| Auxilliary* | 51 | 6.7% | 41 | 6.6% | 10 | 7.0% | 0.9641 |

* Auxilliary employment status Includes parents who are unemployed (n = 21), have undefined work status (n = 18), are unable to work (n = 8), and are retired (n = 1)

**Supplemental Table 6.3. Food skills of Canadian parents with full-time employment compared to parents with part-time, stay-at-home or auxiliary employment status***

| | Part-time† | | | Stay-at-home† | | | Auxiliary employment status†* | | |
|---|---|---|---|---|---|---|---|---|---|
| | OR | 95% CI | *P*-value | OR | 95% CI | *P*-value | OR | 95% CI | *P*-value |
| ***Knowledge components*** | | | | | | | | | |
| Sometimes use recommendations from Canada's Food Guide | 0.94 | (0.62, 1.45) | 0.79 | 0.79 | (0.50, 1.25) | 0.31 | 0.972 | (0.49, 1.92) | 0.93 |
| Sometimes select foods based on nutrition labels | 0.72 | (0.42, 1.23) | 0.23 | 0.67 | (0.38, 1.16) | 0.15 | 0.28 | (0.10, 0.79) | ‡0.02 |
| *Planning components* | | | | | | | | | |
| Currently plan meals | 0.38 | (0.18, 0.77) | ‡0.008 | 0.48 | (0.24, 0.96) | ‡0.04 | 0.65 | (0.26, 1.65) | 0.37 |
| Plan meals before going to the store | 0.65 | (0.30, 1.44) | 0.29 | 0.78 | (0.38, 1.64) | 0.52 | 0.66 | (0.23, 1.93) | 0.45 |
| Sometimes have a budget when shopping for groceries | 1.17 | (0.76, 1.80) | 0.48 | 1.41 | (0.88, 2.26) | 0.16 | 0.66 | (0.32, 1.36) | 0.26 |
| Sometimes use a written grocery list§ | | | | | | | | | |
| *Mechanical skills* | | | | | | | | | |
| Very good or good skills in peeling, chopping, or slicing vegetables§ | | | | | | | | | |
| Very good or good skills in cooking a piece of raw meat, chicken or fish§ | | | | | | | | | |
| Very good or good skills in cooking a soup, stew or casseroles from scratch | 0.39 | (0.19, 0.81) | ‡0.01 | 0.46 | (0.23, 0.90) | ‡0.02 | 1.36 | (0.62, 2.97) | 0.45 |
| Very good or good skills in baking muffins or cake from scratch with a recipe§ | | | | | | | | | |
| *Food conceptualisation* | | | | | | | | | |
| Cook main meals mostly with whole and basic foods | 0.50 | (0.30, 0.82) | ‡0.007 | 0.69 | (0.43, 1.13) | 0.14 | 1.16 | (0.59, 2.29) | 0.66 |
| Can prepare most dishes or frequently prepare sophisticated dishes using basic ingredients§ | | | | | | | | | |
| Ever made changes to a recipe to make it healthier | 0.92 | (0.50, 1.71) | 0.80 | 0.5 | (0.24, 1.02) | 0.06 | 0.53 | (0.18, 1.50) | 0.23 |
| By reducing its fat content§ | | | | | | | | | |
| By reducing its salt content | 1.22 | (0.81, 1.84) | 0.34 | 1.08 | (0.70, 1.66) | 0.74 | 0.74 | (0.39, 1.43) | 0.38 |
| By reducing its sugar content | 0.85 | (0.56, 1.28) | 0.43 | 0.65 | (0.42, 1.02) | 0.06 | 0.67 | (0.34, 1.31) | 0.24 |
| By adding more fruits or vegetables | 0.93 | (0.60, 1.46) | 0.76 | 0.53 | (0.32, 0.90) | ‡0.02 | 1.18 | (0.60, 2.31) | 0.64 |
| By choosing whole grain options | 0.80 | (0.53, 1.20) | 0.28 | 0.72 | (0.47, 1.12) | 0.14 | 1.04 | (0.55, 1.97) | 0.90 |
| *Social aspects* | | | | | | | | | |
| Eat main meal every day or almost every day with family at home | 0.77 | (0.43, 1.38) | 0.38 | 0.48 | (0.25, 0.93) | ‡0.03 | 1.78 | (0.86, 3.68) | 0.12 |
| Children make suggestions for family meals | 0.58 | (0.29, 1.16) | 0.12 | 0.97 | (0.51, 1.83) | 0.92 | 0.92 | (0.34, 2.50) | 0.86 |
| Children participate in shopping for groceries | 1.42 | (0.92, 2.20) | 0.12 | 0.97 | (0.59, 1.60) | 0.91 | 1.58 | (0.78, 3.22) | 0.21 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Children help prepare meals or cook foods | 1.00 | (0.65, 1.54) | 1.00 | 1.22 | (0.77, 1.93) | 0.93 | 0.84 | (.42, 1.68) | 0.61 |
| Children prepare or cook meals by themselves | 0.75 | (0.49, 1.16) | 0.19 | 0.80 | (0.50, 1.28) | 0.34 | 1.1 | (0.53, 2.30) | 0.79 |

* Auxiliary employment status includes unemployed, unable to work, retired and undefined

§ Multiple logistic regression models resulted in poor model fit ($p > 0.05$) and are not reported.

†Adjusted model controled for age, sex, education, income, number of children, family type (two-parent, single parent or step-family), language and region

‡ The false discovery rate (Benjamini-Hochberg procedure) was used to adjust for multiple testing. The level of significance for each model tested is different and depends on its *p*-value. Using this procedure, none of the models tested in the Supplemental Table 3 met the criteria for statistical significance, despite presenting *p*-values < 0.05.

**Supplemental Table 6.4**. Meal planning barriers and preparation strategies of Canadian parents with full-time employment compared to parents with part-time, stay-at-home or auxiliary employment status

| | Part-time† | | | Stay-at-home† | | | Auxiliary employment status†* | | |
|---|---|---|---|---|---|---|---|---|---|
| | OR | 95% CI | *P*-value | OR | 95% CI | *P*-value | OR | 95% CI | *P*-value |
| *Meal planning barriers* | | | | | | | | | |
| Lack of time | 1,765 | (1.15, 2.70) | ‡ 0.01 | **3.82** | **(2.44, 6.00)** | **‡<.0001** | **3.54** | **(1.85, 6.77)** | **‡ 0.0001** |
| Food preferences or dietary restrictions of family members | 0.586 | (0.39, 0.88) | ‡ 0.01 | **0.552** | **(0.36, 0.85)** | **‡ 0.007** | 0.50 | (0.26, 0.95) | ‡ 0.03 |
| Health issues or allergies of a family member | 0.489 | (0.28, 0.86) | ‡ 0.01 | **0.393** | **(0.22, 0.70)** | **‡ 0.001** | 0.90 | (0.32, 2.54) | 0.84 |
| Financial resources | 1.34 | (0.72, 2.50) | 0.36 | 1.38 | (0.76, 2.52) | 0.29 | 0.47 | (0.23, 0.98) | ‡ 0.04 |
| Acess to a variety of fresh and affordable foods | 0.78 | (0.43, 1.43) | 0.42 | 0.94 | (0.49, 1.79) | 0.85 | 0.41 | (0.19, 0.87) | ‡ 0.02 |
| Responsabilities not shared between family members | 1.06 | (0.64, 1.78) | 0.82 | 1.81 | (0.98, 3.31) | 0.06 | 0.68 | (0.32, 1.44) | 0.31 |
| Lack of ideas | 0.75 | (0.49, 1.13) | 0.17 | 0.96 | (0.62, 1.50) | 0.87 | 1.47 | (0.75, 2.89) | 0.26 |
| *Meal preparation strategies* | | | | | | | | | |
| Planning meals ahead | 0.563 | (0.33, 0.97) | ‡ 0.04 | 0.69 | (0.40, 1.17) | 0.17 | 0.56 | (0.33, 0.97) | 0.72 |
| Shopping to ensure have all ingredients§ | | | | | | | | | |
| Cooking meals in advance | 0.72 | (0.47, 1.09) | 0.12 | 1.54 | (0.97, 2.54) | 0.07 | 0.50 | (0.26, 0.97) | ‡ 0.04 |
| Involving other family members in meal preperation | 0.90 | (0.59, 1.38) | 0.63 | 1.55 | (0.97, 2.49) | 0.07 | 0.87 | (0.46, 2.49) | 0.68 |
| Using simple cooking methods§ | | | | | | | | | |
| Combining fresh food with prepared/processed foods | 1.11 | (0.71, 1.75) | 0.65 | 1.2 | (0.74, 1.94) | 0.47 | 0.57 | (0.29, 1.10) | 0.09 |
| Freezing meals§ | | | | | | | | | |

* Auxiliary employment status includes unemployed, unable to work, retired and undefined

§ Multiple logistic regression models resulted in poor model fit ($p > 0.05$) and are not reported.

†Adjusted model controled for age, sex, education, income, number of children, family type (two-parent, single parent or step-family), language and region

‡ The false discovery rate (Benjamini-Hochberg procedure) was used to adjust for multiple testing. The level of significance for each model tested is different and depends on its *p*-value. Using this procedure, none of the models comparing full-time to part-time employment met criteria for statistical significance. Comparing full-time employment to stay-at-home, the **3 smallest p-values** met the criteria for statistical significance. Comparing full-time to auxiliary employment status, **the smallest p-value** met criteria for statistical significance.

# Chapter 7 — Conclusion

## General discussion

The main objective of this dissertation was to evaluate the public health impacts of a federal mass media campaign that promoted food literacy to Canadians. Process and impact evaluations of the EWC were conducted by exploring the reach, effectiveness, adoption and implementation dimensions of the RE-AIM evaluation framework. This thesis also explored the associations between five dimensions of food literacy, diet quality and employment status of Canadian parents with the intention of informing the content of future food literacy interventions and identifying research needs. The body of research developed for this dissertation was summarized through five original scientific manuscripts and two lay language documents. Work presented in this thesis has created new scientific knowledge that contributes to:

1) Innovative findings about collaborations between cross-sector partners working in a unique context with government to disseminate a national nutrition initiative;
2) Providing unique insight into the audience segmentation of parents across Canada;
3) Producing national data about food literacy within Canadian families and how these skills impact diet quality;
4) Fostering engagement in knowledge transfer and exchange with key decision makers such as HC.

Overall, the work presented in this thesis has highlighted numerous limitations in public health and food literacy that are, in part, inherent to the field to population health research and the field of nutrition, but can be strengthened. This chapter will highlight the general findings from this thesis and discuss additional considerations as they relate to the food literacy and future research needs.

**Part 1 and 2. The process and impact evaluations of the EWC**

Few, if any, formal evaluations have been done on national nutrition programs or campaigns in Canada. Therefore, the results presented in this thesis represent a unique perspective of a national nutrition campaign that was delivered by a federal agency and evaluated by a third party in an objective manner. The Skills Study was an exclusive opportunity to conduct a formal evaluation of the public health impacts of the EWC that involved both the target population (Canadian parents) and the organizations that implemented it (HC's cross-sector partners).

The process evaluation informs public health agencies about implementing health initiatives with the use of collaborations from multiple sectors. A recent study on declining child obesity prevalence rates has highlighted the value of cross-sector partnerships in supporting public health messaging and multilevel initiatives aimed at improving nutrition and physical activity (352). While general practices for government and public-private partnerships have been discussed extensively in the literature (236, 258, 262, 282, 353), cross-sector partnerships in food and nutrition are a newer concept and are not without risk (260). Nevertheless, they are increasingly seen as "the way forward" to resolve health inequities and improve population health (354); however, the nature of cross-sector partnerships specifically in nutrition have not been described in detail or evaluated in the literature. With this mind, the findings from the process evaluation of this thesis are novel. Of note, the finding that the values of an organization, rather than their health-oriented mission, is extremely relevant as they indicate that even the food industry can be valuable and unbiased partners in nutrition initiatives, in particular contexts — food retailers working on a food literacy initiative that aligns with their clients needs. Selecting partners based on shared values that align with common public health goals can help mitigate risks associated with engaging in private sector partnerships and avoid conflicts of interest with organizations who seek to use government partnerships as a means to achieve profits or influence government agendas (261). Partnership expectations and goals need to be

managed through inclusive/collaborative planning and excellent communication, regardless of whether partners are in-kind or contractual or from the private companies, non-profits or the public sector. Findings revealed through the qualitative process evaluation are supported by work done on public-private partnerships in health promotion that reinforce their capacity to strengthen health interventions in a synergistic manner by leveraging resources (355). The results from this thesis have direct implications in informing HC's policies on working with cross-sector partners on nutrition interventions. The findings are also presented in a universal manner that allows for them to be applied to any other public health context and health agency whether it be Federal, Provincial or Territorial or non-profit health organizations.

Though the actual EWC was a multicomponent intervention, the impact evaluation was limited to the mass media component involving HC's specific objectives around meal planning. By evaluating the recall of key campaign elements, the impact evaluation revealed significant differences in campaign awareness across sociodemographic groups and cities around the country. These findings are extremely relevant to Canadian public health agencies targeting parents in national campaigns as they illustrate the extent to which the target audience is segmented. Authors of a Cochrane review examining the effectiveness of mass media interventions for smoking cessation suggest that formative research be used to refine campaigns in order to target specific segments of the population (214). Formative (or consumer-oriented) research is a key part of social marketing campaigns, which helps to identify different groups and tailor solutions according to their specific needs (356). These consumer-centered methods are grounded in the assumption that 'one-size does not fit all' and use formative research to understand the audience's behaviors, barriers, motivations, preferences and readiness for change (219). Using formative research to produce consumer-oriented insight that informs program planning, development and implementation for the health of entire groups or populations (357) is akin to generating patient-oriented research to

improve the health outcomes of individual patients (358), and should be a standard in public health practice.

Positive associations between campaign awareness and meal planning attitudes suggest that EWC may have influenced health attitudes, but not self-efficacy or behaviors. While health communication researchers believe that mass media methods can improve health behaviors, changing habitual behaviors (e.g., eating practices) is more difficult than episodic behaviors (e.g., vaccinations) (308, 311). Nevertheless, evidence on nutrition campaigns suggest that focused campaigns that target a single dietary-related behavior or factor can improve diet (18), particularly when social marketing criteria are employed (219). Furthermore, to achieve change in dietary behaviors, campaign awareness and coverage need to be high (18). Some experts believe that saturation coverage (i.e., repeated campaign exposure) is the most important factor to achieve behavior change with a mass media campaign (311). To support change of habitual behaviors, sufficient funding is required to ensure widespread campaign exposure remains continuous over long periods of time (308). While the EWC's main objective involved meal planning, their partners were free to choose the messages that were the most convenient and fit with their own activities and timelines resulting in a more or less focused campaign. Additionally, other healthy eating messaging aside from meal planning were disseminated concurrently, which could have further diluted the saturation coverage limiting the awareness of the key campaign objectives. Future campaigns would be enhanced by simply applying existing health communication guidance for implementing campaigns (359, 360) and focus on modifying behaviors rather than behavioral factors (i.e., attitudes) (321). Following established best practices such as Andreasen's social marketing benchmark criteria would ensure that behavioral objectives are the primary focus of the intervention and audience segmentation is based on consumer-oriented research (218, 219, 361). Mass media campaigns can be extremely effective in changing health behaviors (308), but to accommodate the diversity of Canadian audiences, organizations will need to

make significant investments to make messages available on various media channels and adapt them to different segments of the population.

Although this Skills Study only examined the mass media component of the EWC, it was part of a multicomponent strategy. The contribution of other intervention components such as a toolbox, community level interventions or information provided directly by health practitioners to the goals of the EWC is unknown. Nevertheless, it can be speculated that the contribution of other intervention components is likely to have been cumulative, contributing to the campaign reach. Mass media interventions, like other healthy eating interventions (362, 363), are stronger when they are supported and integrated into larger multicomponent strategies rather than deployed as stand alone campaigns (18, 210, 364). Similarly, the contribution of cross-sector partnerships to public health interventions is believed to generate synergistic impacts (355) and are thought to be essential component of addressing complex health issues (365). Cross-sector involvement reinforces messages compounding their reach and influence by activating several spheres of influence of the social ecological model of health (209, 234). For example, the EWC tackled the community-level influence through the media, institutional level with the toolbox and social levels with the family environment (Figure 1.5). Although the structure of the EWC was appropriately designed to influence food literacy practices, it was a complex intervention and the contribution of different components and levels of influence on its effectiveness could not be evaluated.

Though the Skills Study presents unique findings with implications for public health practitioners and the development of future health campaigns, a more robust evaluation that is integrated into intervention planning would have been necessary to evaluate the effectiveness of the EWC's mass media component. Table 7.1 below highlights additional data collection time points and types of information that would have been needed to enhance EWC development as well as its evaluation.

| **Table 7.1 A Framework for campaign evaluation for EWC (211)** | | |
|---|---|---|
| Stage of evaluation | Elements of evaluation | Skills Study |
| Pre-program | **Campaign planning and formative evaluation**: | HC informally conducted campaign planning for the EWC. The campaign visuals and messages were tested but a formative evaluation was not conducted. |
| | Epidemiological, behavioral and social assessment; | No epidemiological, behavioral or social assessments were done prior to campaign message that informed campaign design or target population selection. |
| | Identify resources, supports and potential partners | Resources, supports and partners were identified at the pre-program stage and continued to be added during the campaign. |
| | Message development and testing; development of other elements of the campaign | Focus groups were held by an external marketing firm to test specific campaign messages and visuals. Not all messages were evaluated. |
| During the program [process evaluation] | **Process evaluation:** | A qualitative process evaluation was conducted by the Skills Team towards the end of the campaign and continued 6 months after the campaign ended; therefore, it was not an iterative process that could inform campaign implementation. Data was only collected from partners and potentially important key information from the developers (HC) was not formally collected. |
| | Assessing implementation and reach of the campaign elements | Quantitative data could not be collected from HC's partners; therefore, the implementation of individual campaign activities could not be assessed. |
| | Identifying barriers and facilitators to implementation | Qualitative data collected from HC's partners helped to identify barriers and facilitators to implementation and allowed for the development of several recommendations for cross-sector partner involvement. |

| | | |
|---|---|---|
| | | This was done, however, after the campaign and information could not be used to make ongoing adjustments to campaign processes. Barriers and facilitators within HC were not assessed. |
| Before and after — assessing program effects [impact evaluation] | **Impact evaluation:** | Quantitative data was collected from the target population to assess impacts towards the end of the campaign. No pre-campaign assessments were done. |
| | Proximal impact: message awareness, understanding; beliefs, attitudes, intentions or other psychosocial influences on behaviors | Campaign awareness was studied in detail. Beliefs, attitudes and intentions were assessed to a limited extend as no pre-program data was collected. It was not feasible to collect qualitative data with focus group to understand what the target population thought of the campaign. |
| | Distal impact on diet-related behaviors or policy and environmental changes which facilitate healthy eating: health indicators or health status; improved community-level outcomes influenced | Distal impacts were not assessed. |

While causality cannot be conferred based on cross-sectional evidence and mere associations, from the data that could be collected, the Skills Study suggests that the EWC was associated with better attitudes towards components of food literacy in Canada. Furthermore, the use of cross-sector partnerships helped leverage resources by providing additional media channels to disseminate messaging and increase the reach. However, campaigns would benefit from collaborative planning and stronger communication to ensure continued engagement of partners throughout the course of the campaign. Additionally, evaluations need to be integrated into campaign planning so that formative research informs campaign design and process evaluations provide dynamic reactive information (rather than retrospective). These considerations will not only improve campaign

implementation but also guarantee a minimum of pre- and post-intervention data are collected so impacts can be directly attributed to the campaign itself.

**Part 3. Food literacy of Canadian parents**

The third part of this thesis consisted of two studies that focused on exploring 22 items of food literacy (categorised into five dimensions). The objective of Part 3 was to examine the associations between food literacy, diet quality, gender and employment status of Canadian parents with the specific objective of identifying avenues for future research and interventions. The impact of antecedent behaviors to eating such as food shopping, meal planning and cooking are poorly understood. Analyzing behavioral correlates of eating has a practical purpose of informing the direction and content of nutrition interventions (165). While there is no standard definition of food literacy, it involves a wide range of behavioral correlates that support individuals in making healthy food choices (366). Yet, little is known about the relative importance of different dimensions of food literacy for healthy dietary intakes. The main findings from these exploratory studies contribute directly to understanding food literacy behavioral correlates and include: 1) gender differences exist in some food literacy correlates, but not all; 2) certain dimensions of food literacy may be more closely associated with dietary intakes than others (i.e., nutrition knowledge and food conceptualisation); 3) employment status was not significantly associated with any food literacy items; 4) time is a barrier for meal planning, regardless of employment status, but is a greater barrier for parents employed full-time. These findings are novel, because diet quality has not been examined in relation to different dimensions of food literacy concurrently, among a national sample of Canadian parents. These results are significant, because they identify certain dimensions of food literacy that should be priorities for further investigation and healthy eating interventions. In addition, findings validate that all healthy eating initiatives or research need to consider strategies that will overcome time barriers. Finally, results suggest that gender differences need to be considered for family food literacy practices to be inclusive of fathers.

Despite the cross-sectional nature of these two studies, their findings have direct applications for practitioners and implications for food literacy interventions in Canada. It is, however, clear that more research is needed to define behavioral mechanisms that underly food literacy acquisition and its application to healthy eating decisions. Nevertheless, food literacy promotion is not a high-risk topic and it is not necessary to wait for stronger evidence to plan and implement an intervention based on current knowledge (365). Interventions can be implemented alongside additional research to advance the field. For example, there is sufficient support from existing research as well as expert opinion that validates the importance of critical nutrition knowledge in influencing healthy dietary behaviors (82, 334, 367), which can be acted on immediately. It should be noted, however, that alternative views exist whereby other authors believe that nutrition knowledge contributes minimally to eating behaviors (368, 369). This viewpoint, has been engrained through early correlation studies often applied to specific contexts (i.e., reducing fat consumption) (368), and may not be relevant to healthy dietary patterns or overall diet quality. It is also likely that nutrition knowledge as a construct needs to be better nuanced. General nutrition knowledge (e.g., fruits and vegetables are good) may influence behavioral factors (e.g. motivation or intention) but is not likely adequate to change actual dietary behaviors. Critical and functional knowledge (e.g., understanding the application of the nutrition facts education table to make healthier dietary choices) may be more suitable to influence positive and lasting changes in dietary behaviors. Furthermore, nutrition knowledge has been identified as a mediator between unhealthy dietary risk factors related to income and social class (334, 370, 371).

While improving nutrition knowledge alone is likely insufficient to directly translate to improved dietary intakes, its relative importance as a behavioral correlate may actually be underestimated and therefore at times dismissed (334). The DONE Framework has, however, identified nutrition and food knowledge among the top priorities for nutrition and eating that are likely to have a large population-wide impact (26). Nonetheless, interventions that support nutrition knowledge in

combination with other behavioral correlates are needed (233). Research, is still necessary to identify the best methods for implementing nutrition knowledge components into interventions. Additionally, formative research is needed to adequately define and nuance the construct as well as understand its interaction with population-specific sociodemographic contexts and other food literacy correlates. For example, the term “food conceptualisation” in this thesis was examined as a distinct dimension of food literacy adopted from an early definition of food literacy, which is not defined in the literature (70). In new definitions, food conceptualisation can be considered as functional nutrition knowledge — skills, abilities and choices (75, 82). Notwithstanding semantics, food conceptualisation items such as making minor changes to recipes to make them healthier were strongly associated with better diet quality. This type of food literacy item lends itself well to simple clear messaging that is necessary for a successful public health campaign aimed at improving diet quality and warrants consideration (372, 373).

Regardless of the type of nutrition intervention developed, unless time is addressed, home-based food preparation will be a problematic and potentially stressful activity for parents (55, 144). Meal planning in itself is meant to help overcome time barriers to cooking and reduce stress; however, Canadian parents reported that time is an important barrier to meal planning as well. It is not novel that time is a barrier for cooking and healthy eating, but our results support that future food literacy interventions need to legitimately find innovative strategies to overcome time as a barrier to cooking, in addition to meal planning (67, 139, 146).

Food literacy activities investigated in research or promoted in interventions (e.g., EWC) have traditionally focused on women (165). The rationale behind this is rooted in the fact that women are still mainly responsible for household duties (130). However, more than ever, men are contributing to chores such as cooking (121). One participant is the Skills Study reported his frustration over the lack of relevance of the campaign to him as a father figure (Table 4.5). Fathers responsible for household food preparation (at least 50% of the time) were

employed full-time more often, cooked from scratch less and had lower HEI scores than mothers. These results suggest that almost 1/5 Canadian fathers contribute to household food provisioning; however, perhaps their role is neglected in nutrition promotion and research. Given the importance of including all members of the family to facilitate meal preparation (198) and the increasingly important role of men in cooking (121), gender differences should be systematically considered in food literacy and be further investigated.

## Major challenges and considerations for future research

### Study and campaign design

The Skills Study was designed using the RE-AIM Framework for program evaluation (244) rather than a mass media health education campaign (374). Therefore, the study was not designed to specifically capture essential aspects important to campaign evaluation such as number/frequency of impressions and general recall (not aided by images) (375). Data were collected on important program aspects (fidelity and adaptability) that were not necessarily appropriate for the context of a one-time communication campaign. Furthermore, the EWC used social marketing strategies (228), which were not considered in the study design. Therefore, data on key benchmark criteria (behavioral objective, audience segmentation, formative research, exchange, marketing mix, and competition) were not formally collected from HC, their partners or participants (219).

While the EWC was a comprehensive healthy eating initiative, it was elaborated and not well defined making it difficult to target specific active ingredients to evaluate (i.e., key campaign elements). Although the objectives of the EWC were related to meal planning, there were no common key campaign messages on this topic, and messages changed with each activation period. Adding to the complexity of the campaign, the extent of the partners' participation in the EWC was not documented by HC and it remains unclear which activities were carried out by which partners during each activation period, if at all. In fact, partners declined to

provide quantitative checklists of their activities to HC. The EWC was an atypical initiative with inherent challenges of a “real world” public health intervention that made it difficult to develop a comprehensive evaluation, particularly with the resources and timeline available to the Skills Study team. Nevertheless, sufficient qualitative information from partners and quantitative data from parents were collected to prepare five manuscripts and provide recommendations to public health stakeholders about future campaigns.

**Cross-sectional post-intervention evaluation**

The survey was administered towards the end of the campaign and is therefore based on participant recall. While differences in recall were counterbalanced by controlling for the month the survey was completed, not having pre-campaign data limits the nature of the conclusions that can be drawn from the effectiveness study. Ad recall measures are best suited to study designs that can follow a cohort through time (360). Due to the timeline of the study funding, it was impossible to collect data before the intervention or during different activation periods. Without a pre-intervention comparison group, it is not possible to separate major confounding factors, namely interest in healthy eating, from the impact of the exposure to the campaign. Post-intervention only studies based on recall alone introduce several concerns regarding internal validity; self-report bias, exposure to other sources of information about the topic and tendency to pay attention to messages that are personally relevant (360, 376). These potential sources of uncertainty can be reduced or managed with a carefully designed questionnaire that considers multiple measures of exposure (360).

Unfortunately, the tools used to collect data (i.e., 4 questionnaires) had several limitations and many items could not be used as intended. For example, respondents were asked to self-assess whether they were exposed to the campaign or not. In many cases, participants did not believe they had been exposed to the EWC despite having recognized one or several elements of the campaign. Conflicting responses had to be omitted. Participants who were aware

of the campaign were asked questions with slightly different wording ("as a result of the campaign…" vs "over the course of the last year…"), which meant that the exposure group could not be compared to a comparison group for questions directly related to Health Canada's key campaign objectives. Having lost these key comparison questions, 3-items from the food literacy were used to assess the meal planning attitudes, behaviors and self-efficacy. However, the sample size was not derived to assess these small differences in effectiveness for these specific questions.

Several different measures suggested that the EWC was effective in improving attitudes towards meal planning; however, conclusions remain uncertain mainly due to selectivity bias. The use of multiple controls (e.g., income and education) can resolve the validity issue to some extent, but cannot correct for the possibility of reverse causality or spurious results (376). Nevertheless, quasi-experimental studies are important evaluation tools to assess the impacts of interventions that cannot be assessed with a randomized controlled trial; however, researchers need to be aware of limitations and select methods that will enhance internal validity (377). When weaker cross-sectional study designs are the only option to evaluate a campaign, complex statistical methods can be attempted for multivariate causal attribution analysis using different technique that include propensity score matching (378). Stronger relationships between health agencies and academics will help public health practitioners integrate evaluation into campaign planning to ensure that campaign objectives are measurable and can be assessed over time with the most appropriate tools and methods (238).

## Significance and public health implications

### Cross-sector partnerships

Working with the food industry is a controversial topic for nutrition practitioners and researchers (282). Despite popular notions that partnerships with the food industry should be avoided at all costs, these relationships are rarely black and white.

Partnerships are considered important in public health to 1) collaborate with multiple stakeholders on improving food offerings to Canadians and 2) leverage resources, particularly financial, and expertise to exert a greater impact on the nutrition and health of Canadians (379). Government public health nutritionists have particular constraints, responsibilities and ethical issues to consider before entering into a partnership with the food industry (353). Findings from the process evaluation provide a positive example of working with the retail food industry within the context of governmental constraints. This type of result, describing the relationship between HC and its partners, may be construed as an example for public health nutritionists to partner with outside agencies, and more specifically, appropriately selected actors from the food industry.

In today's financial climate, it is increasingly difficult for public health workers to secure sufficient financing forcing them to depend upon collaborations to leverage resources and expertise (236). HC used partnerships with the private sector, other public sector government agencies in Provinces and Territories and the non-profit sector to expand the reach of the campaign and maximize the invested resources to enhance impact. Results from the qualitative interviews contribute to an important evidence base (379) to inform which types of multi-sector partnerships are the most beneficial in leveraging resources as well as indicate instances where missed-opportunities existed. Future initiatives may capitalize on these missed-opportunities (e.g., stronger communication). This data is extremely relevant for decision makers, because it will help them create policies to focus human resources and public health dollars on the partners with the greatest fit.

**Audience segmentation**

Reach data provide cues on how and which Canadian parents are receptive to information about nutrition. In addition, characteristics about the parents that were reached provide indications about how they differ from parents that did not recall the EWC. Understanding segmentation will help differentiate between groups of parents and allow for interventions to be tailored accordingly, which will maximise

exposure and impacts of future campaigns (361). These findings will be useful for any federal or provincial agency that plans public health interventions targeting the family setting helping them create or improve initiatives that are regionally appropriate. Furthermore, hard-to-reach groups/regions that were identified (e.g., university educated parents, Vancouver/Toronto/Winnipeg) will require a greater injection of investment into different media channels to ensure exposure of future campaigns, depending on the specific needs of these groups.

### Informing future interventions and research

Investigating links between dietary intake and food literacy identified specific nutrition-related practices that can be used by public health nutritionists to promote behaviours related to healthy eating at the family level as well as form the basis for more in-depth research. Results specifically respond to preidentified knowledge gaps about determinants of food literacy and its connection to dietary intake (115). Of note, results from the exploratory analyses confirm the importance of time and gender in food literacy interventions and research. This is particularly important given that although men are involved in household food provisioning (108), interventions and research are often focused on women (175). There are many opportunities for further research to understand household gender dynamics and time scarcity in Canada.

## General conclusion

In summary, this thesis evaluated a ‘real-world’ public health nutrition intervention by qualifying the cross-sector partnerships used to implement it and quantifying campaign awareness among Canadian parents. This thesis also explored food literacy in relation to employment status, gender and diet quality of Canadian parents. The combined qualitative and quantitative aspects add richness to the results ultimately making them relevant for a greater number of audiences. The results have potential for versatility in their application as they are relevant for multiple groups of stakeholders involved in nutrition promotion (health

professionals, the food industry and other health partners, government organizations and the scientific community). By providing data that is distinctly Canadian, the principal results from this thesis are highly relevant for HC and dietitians working in Canada.

Overall the results presented in this thesis suggest that mass media campaigns can be a good method to deliver nutrition messages to large numbers of Canadian parents. However, intervention resources need to be focused on a single key message to ensure high exposure coverage. Furthermore, decision makers need to make full use of opportunities to expand visibility and leverage resources by implicating cross-sector partners in advanced collaborative planning. Specific food conceptualisation techniques such as making small changes to recipes to make them healthier was identified as being strongly associated with diet quality and can be used to form the basis for simple messaging of a future campaign. Finally, future interventions that deal with food literacy need to better address time barriers and be more inclusive of fathers involved in meal preparation.

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# Appendices

## Appendix 1.

### Selecting cross-sector partners to work with the federal government on promoting healthy eating

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**Study background and description**

In response to child overweight and obesity being made a public health priority, HC developed a series of healthy eating and education awareness initiatives (225). The final and third initiative was a social marketing campaign, the *Eat Well Campaign: Food Skills* (EWC), that promoted family meal planning and preparation to Canadian parents. HC collaborated with cross-sector partners from the food retail industry, the media and the health sector (Figure 1) to extend the reach and effectiveness of the EWC. Leveraging resources and expertise are important incentives for governments to work with partners. Developing solutions to address complex health problems, such as improving dietary behaviors, is complicated and requires the joint action of multiple sectors from the government, private industry and civil society (256, 257).

The adoption of healthy eating initiatives by cross-sector partners, and motivations for organizations from different sectors to collaborate with a federal body have not been examined. Given that adoption can influence an intervention's effectiveness (266), it is important to understand the factors involved, particularly in the context of adopters from multiple sectors. The objective of this qualitative study was to describe factors that influenced the adoption of the EWC. Findings were based on telephone interviews with 18 of HC's partners. Five main recommendations for public health organizations were derived from the analysis of these interviews (286).

**1. Use a targeted approach to recruit partners**

The adoption rate among cross-sector partners appeared to be extremely high. All partners that were directly invited to participate in the EWC agreed to partner with Health Canada. These partners were intentionally sought out by Health Canada through specific networks or invitations to respond to calls for proposals. Pre-selecting and targeting partners that will likely respond well to an initiative's objectives appears to be a very effective method for recruiting partners.

**2. Find partners that are highly compatible**

All partners that agreed to adopt the EWC had some level of compatibility with the campaign's initiatives, values, audience or staff. Compatibility is a known factor that drives adoption of an initiative by an organization (280). Having a good fit, particularly when it comes to organizational values, appears to be more important than profit oriented or non-health related missions such as entertainment. We recommend identifying partners that would have a good innovation-systems fit with the public health initiative (275).

**3. Use social networks (peer pressure) with high opinion leadership**

Using established networks to recruit organizations provided an automatic partnership base. Some organizations participated, because it was part of their mandate within a specific network, while others felt it would have been impossible

to say no given that their entire professional network was expected to adopt the EWC. Using networks with high opinion leadership value is recommended to recruit partners (268).

**4. Use the agency's reputation as leverage**

Collaborating with or being associated with Health Canada was a major perceived relative advantage of the EWC. Organizations felt that working with a reputable organization would help improve their credibility and social image among their audience or clients. Relative advantages are among the most important factors influencing adoption. Social prestige, of working with Health Canada, is a prominent sub-dimension of relative advantages that is known to have a strong impact on adoption (279). Prominent agencies with high levels of credibility can easily leverage their reputation to recruit the most desirable partners.

**5. Understand adoption barriers**

Only partners that were invited through a third party appeared to reject the EWC. Nothing, however, is know about this group of non-adopters, because they were not made known by the third party to Health Canada and could not be included in the study. Health Canada speculated that non-adoption was likely due to organizations having a smaller size with fewer resources and less capacity to collaborate on initiatives outside of their day-to-day business. Not having any information about this group's reasons for rejecting the EWC has left a knowledge gap unfilled about non-adoption, thus it recommended to routinely collect information about reasons for not adopting an initiative. This is particularly important to better understand how to include a diversity of organizations to ensure multiple sectors implicate themselves and are represented in concerted public health initiatives.

**Conclusions**

Taking into consideration the different needs and expectations of organizations from diverse sectors is important when collaborating with cross-sector partners.

Despite the probable differences of organizational missions between partners from the food retail industry, the media and the health sector, there were commonalities among these partners that led to collaborating with Health Canada and adopting the EWC such as shared values. In Canada, prominent federal bodies like Health Canada with strong reputations are desirable partners and these organizations can leverage their notoriety to attract the highest quality partners to help advance population health goals.

**Appendix 2.**


The Skills Study
The Evaluation of Health Canada's Eat Well Campaign (Food Skills 2013-14) on Family Meal Planning

# Highlights

Key recommendations based on findings from the Skills Study

1. Collaborate with partners that have similar values. These partners are likely to be more engaged, commit to investing resources, and provide added value.

2. Maintain strong communication with all partners and provide feedback, regardless of their role or relative contribution to the initiative. Good communication will help partners feel valued and avoid misunderstandings.

3. Include partners in planning interventions as far in advance as possible, and integrate an evaluation component. Advanced planning will help partners integrate the initiative with their organization's activities, align objectives and ensure adequate resources are allocated. This includes involving researchers in intervention planning so that evaluation objectives and timelines are aligned with the initiative.

4. Select a common overarching public health message that different types of partners would be interested in supporting. Ideally, work with partners to select the main theme and specific messages.



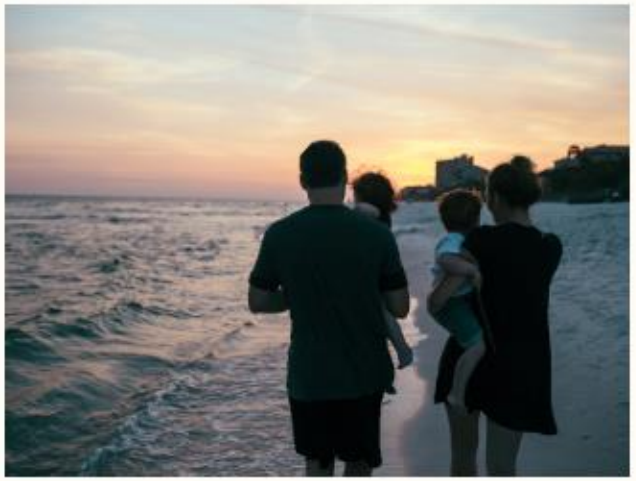
# Working with cross-sector partners

5. Conduct formative research like national surveys and focus groups to understand the target audience. This type of information will help select the most appropriate interventions that are matched to the needs of the population, and develop the best strategies to reach the target audience. Formative research should be conducted before launching a costly mass media intervention.

6. Produce high quality content and resources that can be easily shared and adapted to different populations and across communication platforms.

7. Provide comprehensive tools that will help the public follow-through with changing their health behaviors like how-to-guides, menu planners, checklists and recipes.

8. Mass media campaigns are not stand-alone interventions, but should be part of a larger public health strategy aimed at changing health behaviors.





## Reaching Canadian parents

# Context

The Eat Well Campaign (Food Skills) was a comprehensive nutrition education and awareness initiative developed by Health Canada

A joint research team from Université Laval and Université de Montréal conducted the Skills Study to evaluate the campaign

CONTEXT | Eat Well Campaign

# What was the Eat Well Campaign?

The main goal of the Eat Well Campaign was to promote meal planning to Canadian parents, alongside other nutrition messaging.

Mass media was primarily used to deliver nutrition messaging to Canadian parents, but health professionals and educators also shared messages with the public.

To extend the reach of the campaign and leverage resources, Health Canada collaborated with partners from the retail food industry, the media and health organizations.



## What was the Skills study?

The goals were to understand how Health Canada worked with its partners to deliver nutrition messaging to the public and determine the impacts of the campaign on Canadian parents.

Results are intended to inform decision makers and public health agencies about the most effective ways of collaborating with cross-sector partners to promote health and the best ways to reach Canadian parents.

# Findings

Interviews were conducted with 21 of Health Canada's partners to discuss the Eat Well Campaign. In addition, 964 parents from across Canada filled out an online survey about the campaign.

FINDINGS | Partners

## What did Health Canada's partner's say?

"We felt that Health Canada had a very strong message, but they also didn't really have a huge budget to accomplish this. If this was not Health Canada, for us, it probably wouldn't have been worth our while, but we wanted to make the effort, because we think that it's a good message. " - Media

"They weren't necessarily sharing details of the campaign and how it was going to roll out. We knew that the food retailers were participating, because we saw in the grocery stores [...] not necessarily, because we'd been told by Health Canada." - Health Organization

"It was about seeing how to integrate Health Canada's campaign within our own programming [...] How to activate both and it still make sense to consumers." - Food Retailer

"In our province, because of limited resources, we need to be strategic in the way we do our work. And, it's my experience that it makes more sense to work with our partners than it is to try and do something on our own." - Health Organization



# Who was aware of the campaign?

Of parent's surveyed, 41% were aware of the campaign.

There were geographic differences in awareness with Quebec City and Rural Quebec having the highest rates and Vancouver, Toronto and Winnipeg having the lowest rates.

Awareness was the greatest among parents with lower income, without university education and French-speakers.

Many parents remembered seeing the campaign on TV, but all media channels used were important and contributed to campaign awareness.



## How did the campaign influence parents?

50 % of parents only remembered one aspect of the campaign. The more aspects of the campaign that parent's remembered, the higher the chances that they reported believing it's important to plan and include family in planning. There were also greater chances of parents reporting knowing how to plan, and planned and cooked more family meals.

73 % of parents saw the campaign 12 times or less that year. The more times parents saw the campaign, the greater the chances that they reported knowing how to plan, and planned and cooked more family meals.

Parents who were aware of the campaign had a greater chance of believing that planning is important to eat healthy, compared to parents who did not see the campaign, but it is not known if parents actually planned more meals because of the campaign.
The campaign did not help parents feel more competent about meal planning.

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