



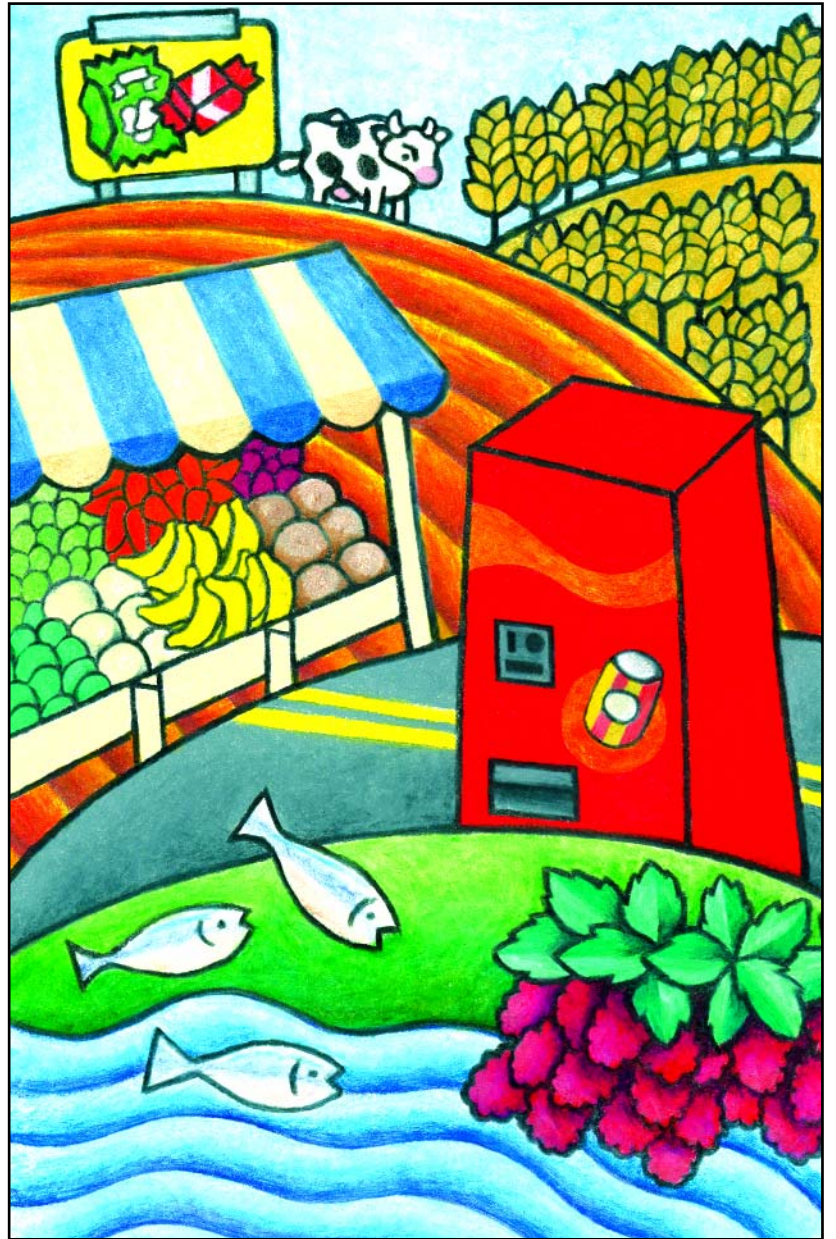
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## Understanding the Forces That Influence Our Eating Habits

What We Know  
and Need to Know



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With the exception of the article by Kim Raine, the articles in this supplement are based on a series of synthesis papers on the determinants of healthy eating produced for Health Canada. The effort and expertise of many individuals, whose contributions made the original papers and the subsequent supplement articles possible, are gratefully acknowledged:

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This supplement is available on the Canadian Public Health Association's website at [www.cpha.ca](http://www.cpha.ca) and the Health Canada website at [www.healthcanada.ca/nutrition](http://www.healthcanada.ca/nutrition).

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\* Sharon Kirkpatrick is currently a Ph.D. candidate in the Department of Nutritional Sciences, Faculty of Medicine, University of Toronto.



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# Foreword from Health Canada

Mary Bush, MSc, RD

The Office of Nutrition Policy and Promotion is pleased to have enabled the development of this special supplement. The collection of seven articles is the culmination of significant effort by more than 20 Canadian researchers in applied nutrition, health promotion and population health.

What people eat is influenced by many factors, such as economic and social factors, the physical environment, the capacity to make healthy eating choices, time and skills to prepare food, and personal buying power. Appropriate action for the promotion and support of healthy eating requires a comprehensive evidence base.

Stakeholders identified the need to synthesize the existing evidence regarding the promotion and support of healthy eating before setting research priorities.<sup>1</sup> The original synthesis papers developed in 2003-2004 and the summary articles in this journal supplement highlight “what we know” and identify knowledge gaps about the determinants of eating. This work offers a step forward in enhancing the evidence base. As the authors point out, the available literature does not support an examination of the complex interactions across determinants, and there is still much to understand. Knowledge development efforts in this area need to be supported so

that our policy and program decisions better address the complexity of factors that influence eating behaviour. Understanding which strategies and interventions are most effective in promoting and supporting healthy eating is also an essential component of a comprehensive evidence base for program and policy decisions. However, a review of the effectiveness of interventions was beyond the scope of the synthesis work undertaken.

The articles in this supplement will be available for use by academics, policy-makers and community health professionals. They provide not only a synthesis of existing literature and recommendations for research but also a basis for involvement in advocating for, or participating in, appropriate research to fill the evidence gaps. Continuing efforts will require partnerships among policy and program decision makers, practitioners and researchers. It is clear that understanding the underlying issues that determine eating behaviour will also require the involvement of other disciplines. Efforts by the Canadian Institutes of Health Research to encourage interdisciplinary and cross-sector research provide hope that research on healthy eating in the context of population health will be enhanced and will supply a strong platform for filling our evidence gaps.

We are at an important moment in time when significant efforts are under way, both internationally and across our country, to support healthy living and prevent chronic diseases. In many cases, practice is ahead of the evidence base as a result of the pressures to take action. There is a need to learn from practice through appropriate research, evaluation and surveillance, and thereby strengthen the evidence base for future decisions.

This supplement offers a call to action. In our search for answers, we need to be creative in our approaches. As we look at the issue of healthy eating within a broad population health framework, we need to challenge ourselves to consider alternative and new frameworks, to work across sectors and with other disciplines. With a coherent approach and collaborative efforts to strengthen our knowledge base, we will contribute to improved nutritional health of Canadians.

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# Foreword from the Canadian Institutes of Health Research\*

John Frank, MD, CCFP, MSc, FRCPC<sup>1</sup>  
Diane Finegood, PhD<sup>2</sup>

Given the worldwide attention to the dramatic increases in overweight and obesity, this special supplement on healthy eating comes at a very opportune time. Healthy eating not only plays a role in the prevention and control of chronic disease but is also a key determinant of human health and development throughout the life course. A comprehensive research agenda on healthy eating and mechanisms to facilitate collaborative problem solving across disciplines and sectors are urgently needed in Canada to advance our knowledge base on the determinants of healthy eating. While the focus has largely been at the individual level (e.g., knowledge of *Canada's Food Guide to Healthy Eating*), we need also to further understand the social, cultural and environmental determinants of healthy eating that operate at the community/neighbourhood, regional, national/provincial/territorial levels and in whole societies. These include, for example, the impact of globalization and how it affects our food supply, and barriers to accessing affordable and personally acceptable food. This evidence base is also needed to inform the policies and programs that have a significant effect on the health and lives of *all* Canadians, regardless of their income, education or ethnicity, or of the places in which they work, live, play and learn.

The Institute of Population and Public Health (IPPH) of the Canadian Institutes of Health Research (CIHR) supports research to further our understanding of the determinants of human health at the individual and population levels on the basis of the bio-psycho-social factors that influence health and well-being over the

life course.<sup>1</sup> As the pre-eminent epidemiologist of our time, Geoffrey Rose, pointed out some 15 years ago, it is only by directly understanding and tackling the “upstream forces” that are shifting entire populations’ distributions of risk factors in an unfavourable way that we can expect to make a significant impact on these health problems,<sup>2</sup> through a strengthened public health infrastructure working in concert with other sectors. IPPH is most concerned with population-level and community-level intervention research to understand and effectively address the underlying drivers affecting the health of populations.

The CIHR Institute of Nutrition, Metabolism and Diabetes (INMD) has identified obesity and maintenance of healthy body weight as its number one strategic priority.<sup>3</sup> Obesity and overweight have been called the fastest growing epidemic of our time, but the good news is that they are potentially reversible. Many levels of government and non-governmental organizations, such as the Chronic Disease Prevention Alliance of Canada, have called for multi-sectoral approaches to combat this significant health problem, its underlying risk factors and their determinants. However, in some instances, the evidence base for intervention effectiveness is weak. In other words, we cannot yet point to a menu of proven, cost-effective policy and program interventions that can be readily implemented in the Canadian context to change or modify the socio-cultural and environmental factors that truly influence this critical aspect of our health.<sup>4</sup> At the core of this challenge is the need to understand the relative contribution of unhealthy eating habits versus that of other

risk factors, such as physical inactivity, and, more important, which strategic mix of interventions can make a difference to preventing and controlling overweight, as well as other common risk factors for chronic diseases. In collaboration with partners, including the Heart and Stroke Foundation of Canada, the Canadian Diabetes Association, the Public Health Agency of Canada and Health Canada, INMD is increasing our capacity and seeking solutions to this complex problem.

In summary, the insights gained from this supplement are intended to contribute towards advancing a relevant research agenda on healthy eating, a key foundation to support evidence-based community programs and healthy public policies. CIHR looks forward to continuing our work with Health Canada’s Office of Nutrition Policy and Promotion, the new Public Health Agency of Canada, and other key actors, towards this end.

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1. Scientific Director, Institute of Population and Public Health

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\* The authors acknowledge the contributions of Erica Di Ruggiero, Associate Director, CIHR-Institute of Population and Public Health, in the preparation of this foreword.

# Preface

Michelle Hooper, MSc<sup>1</sup>

Sharon Kirkpatrick, MHSc, RD<sup>2</sup>

Ann Ellis, MSc, RD<sup>1</sup>

Brenda McIntyre, MHSc<sup>3</sup>

**H**ealthy eating is a critical contributor to overall health at every stage of development and is equally important in reducing the risk of many chronic diseases. Food choices are complex decisions that are influenced by the relation between individual and collective factors, including social and physical environments. Promoting healthy eating for all Canadians requires a better understanding of these factors and their interactions. Currently, significant knowledge gaps exist in our evidence base to support policy and program development. This supplement of the *Canadian Journal of Public Health* provides a collection of summary articles highlighting key findings from a series of synthesis papers on the determinants of healthy eating recently completed for Health Canada's Office of Nutrition Policy and Promotion (ONPP).

## Background

In 2003-2004, a project was undertaken to synthesize the literature on determinants of healthy eating. This project grew out of recommendations from an overview of key knowledge gaps for promotion and support of healthy eating undertaken in 2001. Through the synthesis of information provided by more than 50 key informants, important knowledge gaps and research needs with respect to determinants of healthy eating and the effectiveness of interventions to promote healthy eating were identified.<sup>1</sup> Key informants specifically pointed to the need to consolidate, synthesize and disseminate what is already known in these areas. This was considered necessary for the development of research agendas, to provide a base of information to help inform policy and funding decisions, and to support application and evaluation of best practices.

## Scope of the synthesis papers

*Nutrition for Health: An Agenda for Action*, Canada's national plan of action on nutrition, considers the multiple factors that influence healthy eating and nutritional health within the Framework for Population Health.<sup>2</sup> This Framework, which recognizes that both individual and collective factors affect health and that these factors interact, provided the foundation for the synthesis papers (see Figure 1). "Healthy eating" was defined as "eating practices and behaviours that are consistent with improving, maintaining, and/or enhancing health". The original papers i) summarize the published literature on individual and collective determinants of healthy eating, ii) highlight gaps in knowledge about the determinants and iii) recommend areas for research to address the identified gaps. While it is essential to understand that policies and programs are the foundations for action in promoting and supporting healthy eating, critically reviewing the available evidence on their role was beyond the scope of this project.

Various approaches were considered for the selection of topics for the synthesis papers. The goal was to select a feasible approach that would have the greatest potential for advancing knowledge of the determinants of healthy eating. Ultimately, the papers were oriented by life stage and/or sub-population in an effort to facilitate identification of interrelations between determinants – a key principle of population health. This approach was consistent with the findings from the key informant survey, which concluded that knowl-

edge gaps are probably best addressed through research directed to specific populations. In addition to children and adolescents, seniors, and Aboriginal peoples, the issues of food insecurity and healthy weights were considered priorities regarding the promotion and support of healthy eating.

Building on these priority areas, as well as specific program needs, the synthesis papers focussed on the following topics: children and youth; seniors; Aboriginal populations;\* low-income populations; perceptions of healthy eating; and the bi-directional relation between mental health and eating behaviours. At the time this work was initiated, a synthesis of the literature related to healthy weights was under way through a process led by the Canadian Population Health Initiative (CPHI) of the Canadian Institute for Health Information (CIHI).† This topic was not, therefore, pursued in this series of synthesis papers.

The original synthesis papers were written by Canadian researchers in applied nutrition, health promotion, and/or population health, with particular expertise in the chosen topic areas. Outlines and draft versions of each of the papers were critically reviewed by two to three peer reviewers, as well as the Health Canada project managers. In total, 22 Canadian researchers were involved as authors or reviewers of the original synthesis papers.

## The synthesis

The methods employed to select and critically review the literature are described in each of the papers. Generally, the authors searched relevant electronic databases and hand-searched key journals, covering literature published in the 10 to 15 years preceding 2004. The literature in English and French was reviewed. Literature from countries other than Canada was included, but the authors were asked to consider the applicability of the findings from international sources to the Canadian context. On the basis of the literature synthesis, knowl-

1. Office of Nutrition Policy and Promotion, Health Products and Food Branch, Health Canada

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3. Community Programs Directorate, First Nations and Inuit Health Branch, Health Canada

\* Development of the synthesis paper on determinants of healthy eating among Aboriginal Canadians was undertaken in collaboration with Community Programs Directorate, First Nations and Inuit Health Branch, Health Canada.

† Overweight and Obesity in Canada: A Population Health Perspective (Canadian Institute for Health Information, 2004) is a principal product of this work.

edge gaps and directions for further research were identified.

**Overview**

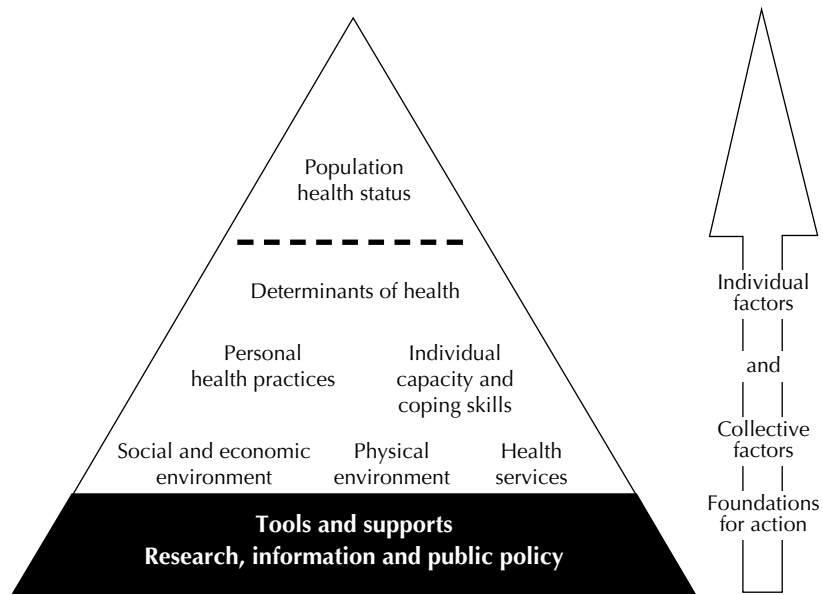
With the exception of the first article by Dr. Kim Raine, the articles in this supplement represent summaries of the original synthesis papers completed for the ONPP. The article by Dr. Raine provides an overview of the complex set of interactions among the determinants of healthy eating. Dr. Raine synthesizes key findings from the original synthesis papers and considers implications for healthy public policy.

The next article focusses on the perceptions of healthy eating. Dr. Marie-Claude Paquette builds on theoretical models suggesting that individuals' ideals and assumptions about food are key determinants of food choice.

The third and fourth articles consider determinants of healthy eating of particular relevance to two life-stage groups. Drs. Jennifer Taylor, Susan Evers and Mary McKenna look at the factors that influence healthy eating in children and youth, and Drs. Hélène Payette and Bryna Shatenstein synthesize the key determinants of healthy eating among community-dwelling elderly people.

Dr. Noreen Willows' paper follows, with a focus on Canada's Aboriginal populations.

Building on sociological theory, Dr. Elaine Power considers the determinants of healthy eating among low-income Canadians, including factors related to socio-economic gradients in eating patterns, food insecurity and inequalities in diet.



**Figure 1.** Framework for Population Health<sup>3</sup>

The final paper in the supplement, by Drs. Janet Polivy and C. Peter Herman, focusses on the bi-directional relation between mental health and eating behaviours.

Each of the papers summarizes the existing literature, identifies gaps in knowledge and offers recommendations for research to enhance the evidence base on the determinants of healthy eating relative to the particular topic discussed. Collectively, the research recommendations presented in this supplement will be an important component of further efforts to build and implement a broader strategy for enhancing the evidence base for promoting and supporting healthy eating in Canada.

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# Determinants of Healthy Eating in Canada

## An Overview and Synthesis

Kim D. Raine, PhD, RD

### ABSTRACT

This article uses a population health perspective to examine the complex set of interactions among the determinants of healthy eating. An overview of current knowledge on determinants of healthy eating was organized as follows: 1) individual determinants of personal food choices and 2) collective determinants, including a) environmental determinants as the context for eating behaviours and b) public policies as creating supportive environments for healthy eating. A conceptual synthesis of the literature revealed that individual determinants of personal food choice (physiological state, food preferences, nutritional knowledge, perceptions of healthy eating and psychological factors) are necessary, but not sufficient, to explain eating behaviour, which is highly contextual. Collective determinants of eating behaviour include a wide range of contextual factors, such as the interpersonal environment created by family and peers, the physical environment, which determines food availability and accessibility, the economic environment, in which food is a commodity to be marketed for profit, and the social environment, in which social status (income, education and gender) and cultural milieu are determinants of healthy eating that may be working “invisibly” to structure food choice. Policy is a powerful means of mediating multiple environments. There are gaps in our understanding of the process of intervening in macro-level environments and the impact of such interventions on the promotion of healthy eating. Collective determinants of food choice and policy contexts for promoting healthy eating, therefore, require investment in research. Applying a population health promotion lens to understanding the multiple contexts influencing healthy eating provides insight into prioritizing research and action strategies for the promotion of healthy eating.

**MeSH terms:** Nutrition; health promotion; public health; social environment; population policy

The promotion of healthy eating in Canada has significant implications for improving the health of populations, locally and globally. For example, the current epidemic of obesity, in Canada and worldwide, is associated with changing eating (and activity) patterns and has significant public health implications.<sup>1</sup> Promoting and supporting healthy eating among Canadians, however, requires a comprehensive understanding of the multiple influences on eating behaviour and the interactions among these determinants.

This paper will provide 1) an overview of determinants of healthy eating by synthesizing the current state of knowledge highlighted in the six individual articles on the determinants of healthy eating in this supplement, and 2) recommendations for research to promote healthy eating based upon identified gaps in knowledge. The synthesis and recommendations will be placed within the context of population health promotion (PHP). “The PHP model draws on a **population health** approach by showing that, in order to improve the health of the people, action must be taken on the full range of health determinants. The model draws on **health promotion** by showing that comprehensive action strategies are needed to influence the underlying factors and conditions that determine health.”<sup>2</sup>

A population health perspective examines the complex set of interactions among the range of individual (biological, behavioural) and collective (social, cultural, physical, economic and political) determinants of health. Applying a population health promotion lens to understanding the multiple contexts influencing healthy eating provides insight into potential means of promoting healthy eating through a wide variety of action strategies that focus on entire populations. Population health promotion is consistent with ecological approaches for multilevel public health strategies to promote healthy lifestyles.<sup>3,4</sup> Ecological approaches can help to organize strategies that work both to help individuals adopt healthy lifestyles and to influence policy in order to create opportunities for social and cultural change. Strategies can be categorized by their predominant focus at the following ecological levels: individual or intrapersonal (individual knowledge, attitudes and behaviour); interpersonal (family and peers); institutional (schools, worksites); community

Centre for Health Promotion Studies, University of Alberta

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(interagency and intersectoral) and public policy.<sup>3</sup> Ecological levels are not discrete but are interconnected.

For the purpose of this overview, determinants of healthy eating and their implications for health promotion action strategies will be organized as follows: 1) individual determinants of personal food choices and 2) collective determinants, including a) environmental determinants as the context for eating behaviours, and b) public policies as promoting environments for healthy eating. This organizing strategy is not meant to artificially separate those determinants of healthy eating that are intimately connected but, rather, to assist the reader in understanding the current state of knowledge of determinants of healthy eating and to assist in prioritizing action strategies for the promotion of healthy eating, as well as to identify gaps for further research.

### **Personal food choices: Individual determinants of eating behaviour**

At first blush, what determines one's eating behaviour, healthy or otherwise, appears to be purely a matter of personal choice. After all, for the majority of the free-living population, the act of putting food into one's mouth is an individual act. Yet, personal food choices are structured by a variety of individual and collective determinants of behaviour. This section focusses on individual determinants, ranging from one's physiological state, food preferences, nutritional knowledge, perceptions of healthy eating and psychological factors.

#### *Physiological Influences*

At both ends of life, physiological development<sup>5</sup> or deterioration with aging<sup>6</sup> influence eating behaviour. Throughout childhood, dietary quality appears to decrease with age. This is perhaps a function of emotional and social development that provides children with more control over food choice and thus is influenced by other individual determinants, such as food preferences and nutritional knowledge.<sup>5</sup> With aging, health status and functional abilities influence food-related behaviours.<sup>7-9</sup> Yet, changes to physiological health status are not beyond intervention, as community resources that provide assistance can enhance seniors' abilities to procure and prepare an adequate diet.<sup>10-12</sup>

#### *Food Preferences*

Although food preferences are highly individual and may indeed have physiological origins (such as innate preferences for sweet and aversions for bitter tastes), social and cultural norms also determine ranges of food preferences. For example, Aboriginal peoples report preferences for traditional foods.<sup>14-20</sup> In children, food preferences are more likely guided by taste alone,<sup>13</sup> whereas external factors (such as environmental cues) contribute more to adult preferences. From a health perspective, preferences for sweet foods are common in children but diminish with age, and preferences for high-fat foods endure.<sup>13</sup> The physiological "anorexia of aging"<sup>21,22</sup> is associated with impaired taste and smell as well as metabolic changes accompanying aging.

#### *Nutritional Knowledge*

Children and adolescents have been shown to demonstrate a general understanding of the connections between food choice and health.<sup>23,24</sup> However, Taylor's review of the research does not consistently show that knowledge influences food choices in these age groups.<sup>5</sup> Among seniors, high awareness of nutrition and health is associated with better food and nutrient intakes.<sup>25-29</sup> In the adult population, nutritional knowledge is intertwined with perceptions of healthy eating.

#### *Perceptions of Healthy Eating*

"Perceptions of healthy eating" are defined by Paquette<sup>30</sup> as the "public's ... meanings, understandings, views, attitudes and beliefs about healthy eating, eating for health, and healthy foods." (pg. S15) Theoretical models suggest that key determinants of food choice are individuals' ideals and their assumptions about food,<sup>31,32</sup> which would include perceptions of healthy eating.

The public's perceptions of healthy eating include consumption of vegetables, fruits and meat; limitations of sugar, fat and salt; and variety and moderation.<sup>30</sup> These elements seem to be influenced by current dietary guidance aimed to improve nutritional knowledge and eating habits. However, other important elements of dietary guidance not generally included in people's perceptions of healthy eating include consumption of grain products and milk products. Non-nutritional ele-

ments that seem central to people's perceptions of healthy eating include the importance of freshness, unprocessed and home-made foods, and the concept of balance.<sup>30</sup>

Perceptions of healthy eating are embedded within cultural meanings of food and health. For example, Willows' review<sup>33</sup> reveals that "food choices based on Aboriginal cultural values may not be congruent with Western scientific constructs regarding the nutritional value of food." (pg. S34) If traditional food is necessary for survival, it is by its very nature health-promoting. The concept that any food, including "store food", may not contribute to health is, therefore, culturally foreign and difficult to grasp.<sup>33</sup>

#### *Psychological Factors*

Polivy and Herman's review<sup>34</sup> highlights that "individual psychological factors that affect eating include personality traits such as self-esteem, body image and restrained eating (chronic dieting), as well as mood and focus of attention." (pg. S44) The authors appropriately point out that there is a bi-directional relation between eating and psychological states, in that not only do psychological factors affect our food choices, but our food choices affect our psychological well-being.<sup>34</sup>

Despite a significant level of research into psychosocial influences on healthy eating for both children and adults over the past decade, the ability of various models of psychosocial variables (e.g., the Theory of Planned Behaviour, Social Cognitive Theory, Transtheoretical Model) to predict individual dietary intake remains low.<sup>35</sup> Increasingly, these models are being refined and expanded to capture aspects of environmental influences on behaviour, including healthy eating.

#### *Summary of Individual Determinants of Healthy Eating*

Personal food choices are structured by a variety of individual determinants of behaviour, ranging from one's physiological state, food preferences, nutritional knowledge, perceptions of healthy eating and psychological factors. However, individual determinants are necessary, but not sufficient, to explain eating behaviour. Healthy eating is much more complicated than personal choice, as eating behaviour is highly contextual.

## Collective determinants, Part 1: Environmental determinants of healthy eating as context for individual behaviour

The term “environment” will be used here to describe a wide range of contextual factors influencing eating behaviour. Environment may be intimate and local, such as the interpersonal environment created by family and peers. Alternately, environment may be further removed from one’s immediate awareness and control, such as the physical environment that determines food availability and accessibility; the economic environment, in which food is a commodity to be marketed for profit; and the social environment, in which social status and cultural milieu are determinants of healthy eating that may be working “invisibly” to structure food choice. This section will attempt to make more visible what is known about environmental determinants of healthy eating and the interactions among these environments.

### *Interpersonal Influences on Healthy Eating*

Family provides an important context for children’s food choices, as family provides the first and immediate social environment in which children learn and practise dietary patterns.<sup>36,37</sup> Family can have both positive and negative effects on eating patterns for all ages of family members. For example, Polivy and Herman’s review<sup>34</sup> revealed that “family...contributes to disturbed eating behaviours and eating disorders, increased consumption in overweight children, and amounts of fruit and vegetables consumed.” (pg. S45) Family food provisioning, or how the available food is distributed within a family, is often influenced by gender, with mothers sacrificing their own food intake to protect their children from hunger when food supplies are scarce.<sup>38</sup> As children age, familial effects take less precedence as social encounters outside the family increase.<sup>39</sup> Throughout life, the effect of peers and others on eating behaviour, particularly the presence of others during an eating episode, may function through an influence on perceived consumption norms.<sup>34</sup> In seniors, social isolation appears to have a negative impact on food intake, particularly among men.<sup>6</sup> Family food provisioning strategies, gender differences in

eating patterns in response to social isolation, and influences of social contacts outside of the family are indications of families’ embeddedness in the broader social environment. This will be explored in more detail in a subsequent section.

### *Physical Environment as a Determinant of Healthy Eating*

The physical environment refers to that which determines what food is available for consumption and access to that food. Obviously, if healthy food is neither available nor accessible, the potential for healthy eating is compromised. Although the Canadian food supply is plentiful, as evidenced by ecological food disappearance data,<sup>40</sup> the nutritional quality of the available food supply is unknown. Do the foods in Canada, in the quantities available, constitute a national food “basket” that is consistent with dietary guidance and nutritional recommendations? The ways in which food is produced, transported, distributed (to markets or through charitable organizations), procured from the land or markets, and purchased from food service locations in communities, worksites and schools vary significantly in a country as geographically and culturally diverse as Canada.

The role of the physical environment is most profound and evident in remote or northern communities, primarily occupied by Aboriginal peoples. As Willows reviews,<sup>33</sup> changes in the physical environment associated with technological development (e.g., hydroelectric dams, deforestation), including environmental contamination, have reduced the availability of traditional foods. Substitution of market foods has not necessarily enhanced the availability of nutritious foods, as high transport cost and spoilage have often led to ready availability of less nutritious, non-perishable foods (e.g., soda, potato chips). The interconnection of the physical environment with the economic environment is evident, since store managers’ stock management practices may be determinants of food availability.<sup>33</sup>

The role of the physical environment in determining healthy eating is less immediately apparent in urban populations. However, the role of the built physical environment becomes more obvious if one considers that the supermarkets offering

inexpensive healthy foods may be less accessible in low-income communities<sup>38</sup> and near seniors’ housing.<sup>6</sup> Most large supermarkets are located near major transportation routes that assume automobile access. Also, food service operations offering less healthy alternatives are ubiquitous in most urban areas, with particularly high accessibility in lower-income neighbourhoods.<sup>41</sup> As low income appears to be a common denominator in physical access, the interconnection of the physical environment with the economic environment is clear.

Even in unique “bounded” physical environments, such as schools, the availability of food low in nutrient density versus healthier food is likely to influence food choice.<sup>5</sup> Promoting healthy food policies in schools, including approved menus for school meals and student stores, guidelines for bag lunches and healthier choices for fundraising, has implications for the promotion of healthy eating through the creation of supportive environments.<sup>42</sup> Herein lies an example of the complexities of the interconnections among determinants, as school food policies to promote healthy eating may be in conflict with the need to generate revenue, as will be discussed further in the economic environment section.

Another area in which social, economic and physical environments intersect explicitly is in the charitable food distribution system in Canada, primarily through food banks. Given that food banks have become institutionalized in Canada,<sup>43</sup> they have become one channel through which low-income Canadians access food regularly, at least for a portion of their total diet, and therefore constitute a “physical environment”. One Canadian study on the nutritional quality of foods available from food banks suggests that access and availability of healthy food may be compromised for this population.<sup>44</sup>

### *Economic Environment as a Determinant of Healthy Eating*

The economic environment, in which food is a commodity to be marketed for profit, has major implications for eating practices in a market-based economy such as Canada. Increasingly, the food industry targets marketing messages at young children, perhaps in recognition of their vul-

nerability to such messages associated with an underdeveloped critical consumer conscience. As well as children's reduced critical thinking abilities, marketers recognize the strong influence children and youth have on the purchasing patterns of caregivers and the large disposable income of current children and youth.<sup>45</sup> As Taylor reviews,<sup>5</sup> from a very young age, children are bombarded with media messages through television advertisements, the bulk of which promote a diet high in fat and sugar, and lower in fruits and vegetables. Exposure to advertisements influences individual determinants of healthy eating such as food preferences and perceptions of healthy eating that give priority to distorted nutritional messages designed to sell individual products, not promote a total diet.<sup>5</sup> Adults are not immune to influence from media.<sup>34</sup>

Marketing food, however, transcends persuasive advertising to include the promotion of less healthy foods in physical environments (school, worksites). The proliferation of soft-drink vending in schools is a prime example of this interconnection of the physical and economic environments. Although soft-drink vending is not commonplace in Canadian elementary schools, it is almost universal in high schools, and many university campuses have entered into exclusive contracts with soft drink manufacturers for exclusive "pouring rights" assumed to engender brand loyalty.<sup>46</sup> As Power eloquently argues in her review,<sup>38</sup> the food industry's primary logic is to make profit, which is often in conflict with the promotion of healthy eating.<sup>47,48</sup> The food industry, through its marketing practices, has a significant influence on the ways in which social norms around eating are shaped. As such, the economic environment intersects with the social environment as a determinant of healthy eating.

Point-of-choice nutrition education in food retail and service operations has been used extensively, in partnership with the food industry, with variable success rates in motivating healthy choices.<sup>49</sup> Pricing strategies have also been used to promote healthy food choices. Evaluation of combined nutrition messages with price reductions suggests that price decreases may be a more powerful means than health messages of increasing consumption of healthy

foods.<sup>50</sup> Thus, this is a strong point for subsidization strategies. Examined critically, however, one must recognize that such programs are likely to be accepted by the food industry only if they prove to be profitable. Public policy, to be discussed in a later section, is a potential means of mediating corporate-driven economic interests to create a social environment more supportive of healthy food choices.

Within Canada, research consistently demonstrates that "the most important barrier to healthy eating is inadequate income."<sup>38</sup> (pg. S39) Income is a determinant of healthy eating that transcends several social groups, notably children,<sup>5</sup> seniors and Aboriginal peoples. In a market-based economy, those with inadequate income to purchase a healthy diet for myriad reasons, including inadequate welfare rates, minimum wage, or higher costs of healthier foods and diets, are unable to fully participate as consumers. Enhancing individual determinants, such as nutritional knowledge, may provide some coping skills, but as Power's review clearly demonstrates,<sup>38</sup> most low-income Canadians demonstrate significant resourcefulness and "buy more nutrients for their food dollar than higher income households." (pg. S39)

Community initiatives to promote healthy eating, such as food policy councils, have been developed as models for influencing the physical and economic determinants of healthy eating by providing ready access to a variety of nutritious, affordable foods. For example, originally developed in response to the need of low-income city dwellers, the Toronto Food Policy Council (TFPC) of the Toronto Board of Health was developed in 1990. The TFPC is a unique organization with membership from large food corporations, conventional and organic farms, cooperatives, unions, social justice and faith groups, and City Council. As such, there is a commitment to a common goal by a variety of stakeholders at the community level and beyond. The Council supports programs, such as Field to Table, that connect low-income inner city residents with farmers in need of a market for their produce, as well as rooftop and community gardens. The TFPC's local action is "balanced by longer-term efforts to develop policies at the municipal and provincial

level that will support Ontario farmers and provide quality, environmentally-sound, nutritious food to the people of Toronto".<sup>51</sup> There is a need for research to determine whether community approaches to address economic determinants of healthy eating are workable in a variety of Canadian contexts, have an impact on food and eating practices at the population level, influence population-level policies that promote supportive environments for healthy eating, and ultimately influence population health status.

### *Social Environment as a Determinant of Healthy Eating*

The previous sections make clear that food and eating have meaning far beyond physical and emotional nourishment. Eating is a socially constructed act that is embedded not only in individual perspectives of healthy eating drawn from dietary guidance and marketing of products but also in physical and economic environments that determine what food is available to us and at what cost. Food and eating also have social, cultural and symbolic functions; food and feeding can signify a sense of belonging, caring and community.<sup>52,53</sup> Our social context and culture is often "invisible" to us, as our immersion in our socio-cultural context assures a "taken-for-grantedness" of our day-to-day experiences. Increasingly, we live in a social environment that disconnects us from the source of our food: food comes from supermarkets and restaurants, not farms and the land or sea. Our social context devalues the preparation of food in the home and promotes quick and easy meals from the freezer. The time investment in sharing meals is less significant than the time saved by drive-through or take-out.<sup>45</sup> Yet, we continue to celebrate life and traditions through sharing food, since food and eating have strong social dimensions.

Our understanding of culture is enhanced by examining that which is culturally foreign to us. For example, as Willows<sup>33</sup> states, "Of importance to understanding the role that culture plays in determining food choice in Aboriginal communities is that the activities required to procure traditional food are not merely a way of obtaining food but, rather, a mode of production that sustains social relationships and distinctive cultural char-

acteristics.” (pg. S33) Juxtaposed against mainstream Canadian culture, which, as previously described, includes a strong social dimension to food and eating, the value of food in sustaining social relationships and cultural characteristics is not foreign at all.

The question that we face is, have we freely chosen our cultural destiny or have we allowed our “choices” to be dictated by interests inconsistent with the promotion of health? If, as Power argues,<sup>38</sup> “one of the conditions for improving the food practices of... Canadians is an improvement in the dominant food culture and food norms, then it will be important to characterize food cultures and food norms in this country, plus the most effective means of shifting them.” (pg. S40) Examining food practices through a broad policy lens is one means of assessing the potential for creating a cultural context and supportive social environment for the promotion of healthy eating.

### **Collective determinants, Part 2: Creating supportive environments for healthy eating through healthy public policy**

Policies define what is considered important and guide our choices. Individuals may have implicit personal food policies and make choices according to family preferences, nutritional value, cost, environmental sustainability, religious or numerous other reasons. Policies at the local, regional and national level can have a significant impact on our collective food choices and thus act as determinants of healthy eating. The capacity to make large-scale macrosystem changes in the social environment to promote healthy eating is, in part, dependent upon political will.

Some of the less controversial and well-established policy approaches to the promotion of healthy eating deal with dietary guidance and attempt to work through improving nutritional knowledge and perceptions of healthy eating. Health Canada promotes the health and well-being of Canadians by collaboratively defining, promoting and implementing evidence-based nutrition policies and standards in documents such as *Canada's Food Guide to Healthy Eating*<sup>54</sup> and *Canada's Guidelines for Healthy Eating*.<sup>55</sup> These documents underpin nutrition and health policies, and

standards and programs across the country, and they serve as a basis for a wide variety of healthy living initiatives. The national plan of action on nutrition, *Nutrition for Health: An Agenda for Action (1996)*<sup>56</sup> builds on the population health model and sets out strategic directions to encourage policy and program development that is coordinated, intersectoral, supports new and existing partnerships, promotes the efficient use of limited resources and encourages relevant research to improve the nutritional health of Canadians.

In a physical environment context, policies that protect the food supply through protection of the natural environment, such as preventing industrial contamination of food and water, have potential macro-level impacts on opportunities for healthy eating. Agricultural policies intersect with economic policies in influencing the availability of a safe, nutritious and affordable food supply.

Given the evidence linking lower socioeconomic status and social inequity to poorer diet and nutritional status, policies that redistribute income and provide a social safety net (income taxes, provincial health care taxes) act to promote health. Protecting and rebuilding Canada's social safety net may hold promise for promoting healthy eating. Specific policies, such as monitoring income support to ensure that it is adequate to purchase the components of a healthy diet, as recommended in *Nutrition for Health: An Agenda for Action (1996)*,<sup>56</sup> may also influence healthy eating.

In the context of a “consumer culture”, policies provide protection to consumers by counterbalancing prevailing marketing motivated by profit, not health. For example, taxation policies could subsidize the cost of low-energy, nutrient-dense food with taxes of sufficient magnitude to affect sales of high-energy, low-nutrient dense foods.<sup>57</sup> These potential policy levers promote healthy eating through a changed price structure for food that favours purchase of more nutritious choices.<sup>58</sup> Taxation has been successfully used in some jurisdictions as a disincentive for snack food purchase<sup>59</sup> or a means to generate revenue for health promotion.<sup>60</sup> It has been noted that Canada's GST/HST system provides a potential model for a changed price structure for food.<sup>41</sup> There

remains much research to be done on the public acceptability of such policies, and on the level of taxation or subsidization necessary to motivate changes in consumer behaviour.

Similarly, given the extent of exposure to food advertising, the majority of which is for foods of lower nutritional quality, restrictions on advertising may hold promise as a policy lever. Given the potential opposition to restrictive advertising by corporations and civil libertarians, it is important to recognize that public support for such policy change is essential for success.<sup>59</sup> Research is needed to evaluate the impact on healthy eating of current advertising restrictions, such as Quebec's restrictions on advertising to children.<sup>61</sup> The role of media literacy training to promote resistance to advertisements also requires investigation. For both taxation and advertising, learning from successes in tobacco reduction is recommended, including taking into account the differences between tobacco and food products. Again, the process of intervening in macro-level environments and the impact of such interventions on the promotion of healthy eating require significant investment in research.

Policy is a powerful means of mediating multiple environments. Dietary guidance mediates an environment of multiple, conflicting food and nutritional messages to create an environment for informed individual choice. Environmental protection policies can mediate the effects of industry on the physical environment by protecting the food supply. Economic policies can mediate food affordability. Social policy can mediate corporate-driven economic interests, support disadvantaged Canadians to become self-sufficient, and can mediate a culture of food consumerism to create a cultural context and supportive social environment for the promotion of healthy eating.

### **SUMMARY AND CONCLUSIONS**

This paper used a population health perspective to examine the complex set of interactions among the determinants of healthy eating. Although determinants of healthy eating are intimately connected, for clarity of understanding the synthesis of current knowledge on determinants of healthy eating was organized as follows:

1) individual determinants of personal food choices, 2) collective determinants, including a) environmental determinants as the context for eating behaviours and b) public policies as creating supportive environments for healthy eating. Individual determinants of personal food choice, including physiological state, food preferences, nutritional knowledge, perceptions of healthy eating and psychological factors, are not sufficient to explain eating behaviour, which is highly contextual. Collective determinants of eating behaviour include a wide range of contextual factors, such as the interpersonal environment created by family and peers, the physical environment, which determines food availability and accessibility, the economic environment, in which food is a commodity to be marketed for profit, and the social environment. Within the social environment, social status (income, education and gender) and cultural milieu are determinants of healthy eating that may be working "invisibly" to structure food choice. Policy is a powerful means of mediating multiple environments.

This overview and synthesis of determinants of healthy eating reveals basic information gaps, partially associated with limitations of food, nutrition and health surveillance, that pose a barrier to understanding the determinants of healthy eating. Development of a comprehensive, integrated food, nutrition and health surveillance system for Canada would create an information base for understanding the determinants of healthy eating at all levels. In addition, ongoing surveillance would facilitate tracking the impacts of interventions.

Applying a population health promotion lens to understanding the determinants of healthy eating provides insight into identifying gaps for further research, which may help prioritize action strategies for the promotion of healthy eating. Although there are some gaps in knowledge regarding individual determinants of healthy eating, there are significant gaps in knowledge regarding collective determinants. Understanding the complex interactions among multiple environments and policy contexts for individual food choice is essential to guide efforts to promote and support healthy eating in Canada. In addition, there are huge gaps in our understanding of the process of intervening in

macro-level environments, including policy-related initiatives, and the impact of such interventions on the promotion of healthy eating. Environmental determinants of food choice and policy contexts for promoting healthy eating, therefore, require significant investment in research.

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# Perceptions of Healthy Eating

## State of Knowledge and Research Gaps

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### ABSTRACT

To effectively promote and support healthy eating among Canadians, there needs to be a better understanding of the factors that influence eating behaviours. Perceptions of healthy eating can be considered as one of the many factors influencing people's eating habits. For this review, "perceptions of healthy eating" are defined as the public's and health professionals' meanings, understandings, views, attitudes and beliefs about healthy eating, eating for health, and healthy foods.

This article's aim is to review and summarize the literature on the perceptions of healthy eating and to identify the current state of knowledge and key knowledge gaps. Databases, the worldwide web, selected journals and reference lists were searched for relevant papers from the last 20 years.

Reviewed articles suggest relative homogeneity in the perceptions of healthy eating despite the studies being conducted in different countries and involving different age groups, sexes and socio-economic status. Perceptions of healthy eating were generally based on food choice. Fruits and vegetables were consistently recognized as part of healthy eating. Characteristics of food such as naturalness, and fat, sugar and salt contents were also important in people's perceptions of healthy eating. Concepts related to healthy eating, such as balance, variety and moderation, were often mentioned, but they were found to be polysemous, conveying multiple meanings.

The main gap identified in this review concerns the lack of knowledge available on perceptions of healthy eating. More data are needed on the perceptions of healthy eating in general, on the influence on perceptions of messages from diverse sources such as food companies, and, most important, on the role of perceptions of healthy eating as a determinant of food choice.

**MeSH terms:** Eating; perceptions; diet; attitude; food habits

To successfully promote and support healthy eating among Canadians, a better understanding of the factors that influence eating behaviour is needed. Theoretical models of food choice suggest that individuals' ideals and their conscious or tacit assumptions about food are key determinants of food choice.<sup>1,2</sup> The perceptions of healthy eating can be viewed as influential on nutritional health within its broad conceptualization, based on the Framework for Population Health.<sup>3</sup>

Over the last century, evolution of nutritional science has increased the complexity of the definition of healthy foods.<sup>4</sup> Many elements of foods must now be taken into consideration to determine their healthiness, e.g., type of fat. Additionally, consumers must combine foods into healthy food patterns and ways of eating. Within this context of complexity, people gather information on food and nutrition from multiple sources, such as television, food labels, food manufacturers and health professionals.<sup>5,6</sup> These sources present nutritional information each in their unique way.<sup>7</sup> People must then give meaning to this information and decide on its usefulness and applicability in their daily life.

Greater understanding of the public's perceptions of healthy eating is essential to assess how current health promotion messages are interpreted and put into practice in daily life in order to develop successful healthy eating messages and interventions.

The objectives of this review are two-fold: 1) to examine and summarize the existing literature on perceptions of healthy eating in children, adolescents, adults and health professionals; and 2) to identify research gaps and future avenues for research in the area of perceptions of healthy eating. For the purpose of this review, "perceptions of healthy eating" are defined as the public's (children, adolescents and adults) and health professionals' meanings, understandings, views, attitudes and beliefs about healthy eating, eating for health, and healthy foods.

Because of the multiple perceptions and meanings of healthy eating, this review rests on a constructivist perspective.<sup>8-10</sup> Within this perspective, healthy eating is understood as constructed within many realities, to have numerous meanings, and to be dynamic and changing over time.

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## LITERATURE SEARCH METHODS

Database and web searches, hand review of selected journals, and reference lists of papers were used to find information on the perception of healthy eating. Reference databases covering the topics of nutrition, medicine, sociology, psychology, aging, nursing, and education (MEDLINE, PubMed, Sociological Abstracts, ERIC, CAB abstracts, PsycINFO, AgeLine, FRANCIS, CINAHL) were searched for Canadian and international scientific literature from 1980 to 2004. Findings of key words were put under two broader terms, an “eating” term (key words: healthy eating, food choice, food habit, food, and food selection) and a “perceptions” term (key words: perception, lay conceptualization, conception, meaning, belief, attitude, interpretation, conceptualization, and meaning), which were intersected; resulting findings were reviewed on screen or printed.

Additional information sources were sought to complement the more traditional channels of the scientific literature, through e-mails sent to personal contacts and consultation of websites of professional associations and health-related organizations. Additional unpublished reports were obtained from the Office of Nutrition Policy and Promotion at Health Canada. While materials collected through these alternative sources are not typically peer-reviewed, they are an essential complement to the paucity of peer-reviewed articles on the topic of healthy eating perceptions.

All articles and reports were examined for inclusion in this review. The inclusion criteria included the following: 1) the objectives of the study were stated as exploring the perceptions of healthy eating, or findings and results explored aspects of healthy eating; and 2) studies were deemed methodologically sound. Methodological soundness was evaluated by examining internal validity, reliability and the objectivity of quantitative studies; and transferability, dependability, confirmability and credibility<sup>10</sup> of qualitative studies. In the end, 38 studies were included in this review.

Since perceptions are likely influenced by culture, it was not assumed at the outset that perceptions of healthy eating in a population group of another country were sim-

ilar to those of Canadians, or that perceptions across Canada are homogenous. These differences limit the transferability of findings and point to the need to replicate studies from other regions or countries. However, international studies are included in this review because of the lack of Canadian data.

### The public's perceptions of healthy eating

In the review of the literature, fundamental elements of the perceptions of healthy eating were found to be 1) vegetables and fruits, 2) meat, 3) low levels of fat, salt and sugar, 4) quality aspects, such as fresh, unprocessed and homemade foods, and 5) concepts of balance, variety and moderation.

While the majority of studies found explored adults' perceptions of healthy eating, studies that focussed on specific age groups, such as persons over 65 year of age, children and adolescents, did not report major differences from adults' perceptions. For that reason, studies from all age groups are included in this section, and differences in perceptions are highlighted in the text. Because of the small number of studies that focussed on variations in perceptions according to socio-economic status (SES), results from these studies have also been included in this section.

Not all studies included in the review were from Canada, but review of the literature strongly suggested that perceptions were relatively homogenous regardless of country, and thus it is appropriate to contrast the perceptions of healthy eating with Canadian dietary guidance. In general, the public's perceptions of healthy eating seem to be heavily influenced by dietary guidance, which recommends vegetables and fruits,<sup>11,12</sup> meat,<sup>11,12</sup> limitations of fat and salt,<sup>11</sup> variety<sup>11,12</sup> and moderation.<sup>12</sup> However, other elements that seem central to people's perceptions of healthy eating are not found in current dietary guidance, such as the importance of freshness, unprocessed and homemade foods, limiting sugar intake and the concept of balance.

#### *Vegetables and fruits*

A good number of the studies involving children, adolescents and adults<sup>6,8,13-27</sup> found that fruits and vegetables were most

often mentioned by participants as healthy foods, as part of a healthy diet or as most important for healthy eating.

Studies that included older respondents, persons over 65 years of age, did not find that the importance of vegetables and fruits to healthy eating varied according to age.<sup>13,28</sup> In addition, the importance of vegetables and fruits does not seem to have changed much with time, as a few older studies, published 20 years ago, also reported that vegetables and fruits were perceived to be an essential part of a healthy diet.<sup>29,30</sup>

However, a few studies<sup>15,28,31</sup> suggested that gender influenced the perception of vegetables and fruits. Women mentioned vegetables and fruits more often as part of a healthy diet,<sup>15</sup> and these foods were perceived to be more suited to women.<sup>28,31</sup> These findings support the notion of gender differences in attitudes to vegetables and fruits.<sup>4,32</sup> In her book, Lupton<sup>4</sup> suggests that light, sweet, soft-textured foods and foods that are easy to digest are associated with women, whereas meat and foods that are harder to digest are associated with men.

In addition, a Canadian study<sup>33</sup> reported on the emergence of a fruit and vegetable morality: “the should syndrome”. In this study, some participants felt obligated to eat vegetables and fruits. The researchers attributed this attitude to current health messages that promote eating vegetables and fruits for their health value, and the status of vegetables as an essential part of an “ideal” diet.

#### *Meat*

In adults, meat was mentioned in the greatest number of studies after vegetables and fruits.<sup>8,15,17,18,34</sup> It was also mentioned as part of healthy eating by children and adolescents.<sup>21,23,26</sup> However, the role of meat in healthy eating is not clear. In most cases the perceptions of healthy eating included avoiding or limiting meat consumption.<sup>13,15</sup> Indeed, a Canadian study reported that participants perceived healthy eating as trying to limit meat intake, specifically red meat, and replacing it with chicken or fish.<sup>18</sup> On the other hand, some studies have reported that people perceive eating more meat as part of healthy eating.<sup>18,19,35</sup> One of these studies<sup>18</sup> reported the confusion surrounding the quantities of meat to eat, several partici-

pants believing that eating a lot of meat is important to healthy eating. Older and recent studies also support the notion that meat is an essential component of “traditional” meals.<sup>29,30,36</sup> Finally, a few studies<sup>19,34</sup> suggested that SES may influence perceptions regarding meat. In one study,<sup>34</sup> red meat was more frequently mentioned as healthy by women of lower SES. Part of the inconsistency in perceptions of meat may be attributable to the term itself, which can encompass many varieties of meat and meat cuts.

#### *Low levels of fat, salt and sugar*

Fat, salt and sugar were the three most frequently mentioned components of food to be avoided for a diet to be perceived as healthy in all age groups.<sup>6,7,16,19,20,22-24,26,27,31,37</sup> A telephone survey<sup>35</sup> representative of the Canadian population reported that people avoided foods with cholesterol (60%), salt (56%) and sugar (48%) to make their diets healthier. Another Canadian study<sup>18</sup> found that when asked what advice they would give on healthy eating, participants recommended avoiding fat and high-fat foods, sugar and fried foods. Similar findings were found in studies conducted in the UK<sup>17</sup> and European Union (EU).<sup>15</sup>

The latter also reported that women were more likely than men to mention eating less fat in their definition of healthy eating.<sup>15</sup> However, the influence of SES on the perceptions of fat, salt and sugar is not clear. While the results of a UK study<sup>34</sup> suggested that women of higher SES were more concerned than women of lower SES about eating low-fat foods, both social classes perceived sweet foods and fatty/fried foods to be unhealthy.

Studies also suggested a heightened awareness of fat, sugar and salt among older respondents.<sup>6,13,38</sup> A Canadian telephone survey<sup>16</sup> suggested that restricting fat, sugar and salt was more common in adults over age 55 than in younger age groups. Older adults' heightened apprehension of the fat, sugar and salt content of food, found in these studies, is understandable in light of the link with chronic diseases.

#### *Qualities: Fresh, unprocessed and homemade foods*

Other characteristics of food not associated with food composition, such as freshness, were influential on people's perceptions of

healthy eating.<sup>6,8,14,15,28,34,37</sup> In many studies, fresh foods and the freshness of food was considered in opposition to canned, frozen and processed foods. For the latter there was a perception that such foods were unhealthy or not as healthy as fresh foods.<sup>17,18,30</sup>

Fresh foods may also be important to some older respondents. In a pan-EU study,<sup>13</sup> 10% of seniors included natural foods and no processed foods in their description of healthy eating. Some studies<sup>28,34,39</sup> described not only the importance of freshness but also the freshness of specific categories of foods, such as vegetables and fruits, and meat products.

Studies have also suggested that the way food is prepared influences perceptions of healthiness. A Canadian opinion survey<sup>40</sup> found that meals considered to be the most healthy were home-cooked meals. In addition, studies in children and adolescents<sup>20,21,41</sup> have suggested that the situation, location and context surrounding eating influence perceptions. Foods eaten at home were viewed as healthy compared with foods eaten outside the home or with friends. This distinction was not clearly reported in studies of adults' perceptions.

#### *Concepts of balance, variety and moderation*

In all age groups, the concepts of balance, variety and moderation were often reported as part of the perceptions of healthy eating.<sup>14-18,21-23,26,33,34,40,42,43</sup>

A Canadian study<sup>18</sup> showed that about half of the respondents spontaneously mentioned eating a balanced diet or a variety of foods as part of healthy eating. Balance was discussed in terms of eating more one day to balance eating less the next day and varying the emphasis on different food groups from day to day. Another Canadian study<sup>33</sup> found balance to be a polysemous concept, expressing variety in meal composition, balancing healthy foods with less healthy ones, balancing a healthier diet with occasional lapses, and balancing enjoyment with nutritional or health concerns.

A UK study<sup>39</sup> supports these findings and reports that participants had difficulty in explaining the meaning of the term balance. It was associated with notions of right and good, and was often contrasted with the concept of “excess”. Confusion in

the meaning of the term “balance” was also suggested in a study of children,<sup>22</sup> in which one child described healthy eating as “to have a balanced diet such as pasta, chocolate and eggs.”

The concept of balance was often mentioned by study participants in combination with the concepts of variety and moderation.<sup>15,18,39</sup> An Australian study<sup>7</sup> reported that the concept of moderation was used as a response to confusion and inconsistencies perceived about healthy eating. By using the concept of moderation, people could justify any food choices. Confusion and polysemy were also reported in a lay journal article<sup>44</sup> in which both lay people and health professionals “struggle with the definition of a ‘moderate’ diet”<sup>44</sup> and question the usefulness of the concept. Some health professionals were also quite critical of the term, believing that it contributed to weakening dietary recommendations. Moderation was also mentioned in a qualitative study of British seniors.<sup>36</sup> These respondents believed it was important to eat with moderation to avoid weight gain but also to avoid overindulgence as a moral value. Finally, a study of women<sup>34</sup> reported that middle-class women placed greater importance on balance and moderation in their perceptions of healthy foods than working-class women.

The studies reviewed in this section reveal the numerous meanings associated with the terms “balance” and “moderation”. Findings also suggest that while there exists wide diversity of meanings for the term “balance”, nutrition messages and health professionals may not be aware of or take into account this diversity of meanings; rather, they tend to assume a more specific, single definition.

#### **Overlap in perceptions of healthy eating and of weight loss dieting**

A few studies included in this review have suggested that overlap between perceptions of healthy eating and perceptions of dieting for weight loss exists.<sup>25,28,36,39,42,45,46</sup> A qualitative study in the UK<sup>39</sup> suggested that participants consciously used concepts of moderation and healthy eating to conceal and make more socially acceptable their weight loss attempts. In their study of older adults, McKie et al.<sup>36</sup> also reported that participants' conceptualization of healthy eating included concerns about

weight gain that emerged under the theme of moderation. One study<sup>42</sup> of children reported that for some the concepts of thinness and fatness were spontaneously associated with concepts of healthy eating. Finally, a study conducted with boys and girls<sup>45</sup> also reported that dieting for weight loss was described as healthful eating behaviours, such as “eating more salads or fruits or vegetables”, “I think it has more to do with healthy eating.”

The consequences of the overlap between healthy eating and weight loss dieting are not known. While some authors propose that these findings suggest we need not be so concerned about dieting for weight loss in adolescents, as it may actually reflect healthy eating behaviour,<sup>45</sup> others caution that healthy eating messages could reinforce unhealthy eating practices and excessive weight preoccupation.<sup>47</sup> More research needs to be conducted on the origins and effects of the overlap between people’s perceptions of healthy eating and dieting for weight loss.

The public’s perceptions of healthy eating are most often conceptualized through food choice; fruits, vegetables and meat were the most mentioned. Food characteristics and components were also important elements in people’s perceptions of healthy eating. The concepts of balance, variety and moderation were often part of respondents’ perceptions of healthy eating. However, few studies examined the meaning of these terms for respondents, and most did not describe the researcher’s interpretations and coding scheme for recognizing these notions in participants’ narratives. When coding schemes were reported, meanings were numerous rather than uniform.

The public’s perceptions of healthy eating seem to be heavily influenced by dietary guidance, (which is relatively similar across the countries of studies discussed in this review), which also recommends vegetables and fruits,<sup>11,12</sup> meat,<sup>11,12</sup> limitations of fat and salt,<sup>11</sup> variety<sup>11,12</sup> and moderation.<sup>12</sup> However, other elements that seem central to people’s perceptions of healthy eating, such as the importance of freshness, unprocessed and home-made foods, limiting sugar intake and the concept of balance, are not found in current dietary guidance.

Other important elements of dietary guidance, such as the grain products and

milk products groups, were not included in people’s perceptions of healthy eating to any major extent. A few studies reported that carbohydrate-rich foods such as breads, grains, pastas, pulses and potatoes were part of healthy eating definitions.<sup>15,17,18,20,21,23,27,31,39</sup> Canadian data also suggested that the grain products group is rarely mentioned.<sup>18</sup> The milk products group is even more rarely mentioned as part of healthy eating. Except in one study,<sup>21</sup> in which adolescents rarely mentioned dairy products, studies focussing on children and adolescents found that milk was more often included in their definition of healthy eating than it was in adults’ definitions.<sup>20,23</sup> In adults, milk products were mentioned most often within the context of decreasing fat intake by consuming low-fat dairy products.<sup>15,38</sup>

In addition, most studies did not assess more precise aspects of perceptions, such as quantities, serving sizes and portion sizes. While people perceive vegetables and fruits to be important to healthy eating, they may not know how much they need to eat to be healthy. Such notions themselves could be the subject of multiple meanings and interpretations, and should constitute future research avenues. More research also needs to be initiated into how people put their definitions of moderation, variety and balance into effect in their lives.

### Health professionals’ perceptions of healthy eating

Only one study was found that briefly discussed health professionals’ perceptions of healthy eating, conducted in London, UK.<sup>39</sup> The findings suggested that health professionals recommend that clients opt for healthy eating rather than for dieting. They also alluded to notions of “good” and “bad” foods, but the way in which “bad” foods were part of a healthy diet was not clear. The authors concluded that even health professionals seemed to have a difficult time communicating the message that healthy eating is not the same as dieting for weight loss.

## KNOWLEDGE GAPS AND DISCUSSION

The perceptions of healthy eating remain a relatively unexplored issue, as suggested by the small number of studies (38) included in this review. This may be because the

polysemy of “healthy eating” has not been recognized in the past and because of the complexity of the issue. Even if perceptions were found to be relatively homogenous across studies in different developed countries, age groups, sexes and SES, more research needs to be conducted to validate this finding.

This review has identified many gaps in knowledge. Overall, three aspects of perceptions need to be further investigated: most importantly, the influence of the perceptions of healthy eating on food choice and eating behaviour; how messages from information sources (e.g., media, health professionals, food industry) shape perceptions of healthy eating, and the need for research on perceptions themselves.

Indeed, while the link between perceptions and behaviour can be inferred, it is not clearly supported in the literature. This aspect of perceptions could be studied within the context of research into the different factors that influence food choice or as an exploration of the two-way relation between perceptions and behaviour. Such studies are central to asserting that the perceptions of healthy eating are truly a determinant of healthy eating.

The process by which information sources shape people’s perceptions of healthy eating by contributing meaning to nutritional messages also needs to be better understood. Such research is essential information to direct the development and wording of future dietary guidance and health promotion efforts for healthy eating. These findings could also potentially contribute to developing regulations aimed at controlling food advertising and claims, as well as critical appraisal techniques of media literacy.

Perceptions of healthy eating themselves also need to be further explored. Indeed, no study was found that specifically explored health professionals’ perceptions of healthy eating. Research is first needed on dietitians’ perceptions of healthy eating, as they are considered the nutrition experts and are often called upon to inform and educate about healthy eating. Variations in the perceptions of healthy eating also need to be investigated in other health professionals, such as physicians, nurses and public health professionals.

In order to better tailor interventions, to make them more salient and successful for

specific groups, research on perceptions should explore variations in perceptions by individual or group characteristics, such as gender, age, SES, cultural heritage and geographic area of residence. These research initiatives would also provide much needed Canadian data.

Finally, more detailed research is needed on the perceptions of healthy eating such as quantities and serving sizes of food and food groups, on the meat group and its part in healthy eating, on largely ignored groups such as grain and dairy products, and on the way people's perceptions determine their daily food choices.

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# Determinants of Healthy Eating in Children and Youth

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## ABSTRACT

This review outlines the state of knowledge and research gaps in the area of determinants of healthy eating among children and youth. The article is structured around individual and collective determinants that affect healthy eating in children and youth. We defined healthy eating as “eating practices and behaviours that are consistent with improving, maintaining and/or enhancing health.” Relevant databases were searched for papers published between January 1992 and March 2003 that focussed on children or youth and reported at least one factor relevant to healthy eating. Among collective factors, familial factors and the nature of foods available in the physical environment, including at home, schools and in fast-food establishments, stand out as significant influences on healthy eating in children and youth. The media, particularly television, also have an enormous potential influence and can overshadow familial influences. Individual factors identified include knowledge, attitudes and food preferences; only the latter have been identified as a strong determinant of healthy eating in both children and adolescents. The results of the review identified a significant body of literature in the area of determinants of healthy eating in children and youth; however, very little of this research has taken place in Canada. Only a few determinants, such as economic factors and food security, the content of media nutritional messages, and the issue of flavours, neophobia and food preferences, have undergone some examination by Canadian researchers. Research priorities for Canada in the area of determinants of healthy eating and surveillance of eating behaviours are identified.

**MeSH terms:** Eating; child; adolescent; factors

There is mounting evidence that Canadian children may be making unhealthy food choices, leading to both dietary excesses and inadequacies. Most information comes from nutritional surveillance in the United States (US), which suggests that few children meet dietary recommendations. They have low intakes of fruits, vegetables and milk products; high intakes of less healthy choices, such as soft drinks and high-fat, high-sugar snack foods; and consumption of too much fat and saturated fat, and too little folate and calcium.<sup>1-7</sup> Overall dietary quality declines with age, and the rate of breakfast skipping increases. Although there are no comparable national data available on children’s eating behaviours in Canada, limited information from a national study,<sup>8</sup> and some provincial data,<sup>9,10</sup> suggest that similar concerns exist about Canadian children, including low fruit and vegetable consumption and high consumption of candy, chocolate bars and soft drinks.

Unhealthy eating habits during childhood may interfere with optimal growth and development while setting the stage for poor eating habits during adolescence and adulthood.<sup>11,12</sup> Moreover, poor diet and inactivity during childhood have been implicated in the worrisome increase in childhood overweight,<sup>13</sup> which is considered to be at epidemic proportions in Canada and in other developed nations.<sup>14-16</sup> Increases in other nutrition-related risk factors for chronic disease in children such as hypertension, hypercholesterolemia and Type 2 diabetes have also been observed.<sup>17,18</sup>

A range of health promotion strategies are required in order to support healthy eating during childhood and adolescence and promote optimal growth and development while reducing risk for obesity as well as chronic disease rates in the adult population.<sup>11,19</sup> However, in order to design effective interventions, an understanding of the complexity of factors that influence the eating behaviours of children and adolescents is needed.

This review outlines the state of knowledge and research gaps in the area of determinants of healthy eating among children and youth. The paper is structured around *individual* and *collective* determinants, as described in the Framework for Population Health,<sup>20</sup> that affect healthy eating in chil-

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dren and youth. *Individual* determinants include biological factors (sex, age), food preferences, knowledge and attitudes pertaining to health and food, and skill level or capacities. *Collective* determinants include the economic, social and physical environments. We defined **healthy eating**, as “eating practices and behaviours that are consistent with improving maintaining and/or enhancing health.”

## METHODS AND LITERATURE SEARCH

All primary data-based papers and review papers published between January 1992 and March 2003 that focussed on children and/or youth (age 2-18 years) and reported at least one behaviour or determinant relevant to healthy eating were included. Databases searched included MEDLINE, CINAHL, PsycINFO, ERIC and Social Science Index, and the key words used were: *children, toddlers, youth, adolescents, school children, factors/influences, eating, diet, food, eating behaviours* and *nutrition*. Six journals were also hand searched from 1997 to 2003 inclusive (*Appetite, Canadian Journal of Dietetic Practice and Research, Canadian Journal of Public Health, Journal of the American Dietetic Association, Journal of Nutrition Education and Behaviour* and *Obesity Research*). Key sources in French were also identified and translated.

## RESULTS

### Individual determinants

These include *biological factors* (age, sex), *food preferences, nutrition knowledge* and *attitudes*. Most studies focussed on differences in eating behaviours, such as snacking or breakfast consumption, rather than differences in determinants of eating behaviours such as *age and sex*.

American surveys indicate that there is a decline in diet quality and breakfast consumption with age and an increase in snacking from elementary to higher grades.<sup>1,3,7</sup> Smaller Canadian studies confirm these trends.<sup>9,10</sup> This is a concern, since children who eat breakfast regularly are more likely to have more nutritious diets than those who do not.<sup>9,21</sup> Females, particularly adolescents, tend to be at greater nutritional risk than males.<sup>7</sup>

Children's *food preferences* are often guided by taste or liking alone.<sup>22,23</sup> Preference for specific food items (e.g., fruits and vegetables) is a strong positive indicator of the consumption of that food in both children and adolescents.<sup>24-30</sup> Taste can lead to poor choices: for example, “dislike for vegetables” is one of the three most important predictors of fruit and vegetable intake in children.<sup>30,31</sup> Personal preferences for eating fast food<sup>32</sup> or vending machine snacks<sup>33</sup> have also been identified as a barrier to healthy eating in adolescents.

*Nutrition knowledge* levels are generally low among children and adolescents, who have a weak understanding of the connection between food choice, physical activity, and health.<sup>23,34-36</sup> While knowledge does not consistently influence dietary behaviour,<sup>37-44</sup> inconsistent findings may reflect past methodological problems<sup>45</sup> or the inter-relation between knowledge and other determinants, which may make independent effects difficult to assess. Relatively few studies have described *attitudes* toward food and the role of food in health.<sup>28,45,46</sup> Intervention<sup>47,48</sup> studies utilizing models such as Social Cognitive Theory<sup>49-53</sup> have been unable to explain a large variation in children's eating behaviours. Those using a qualitative approach to examine attitudes and meanings associated with foods suggest that determinants vary by sex and age.<sup>30,37,54,55</sup> Even fewer studies have examined the effect of food preparation *skill level* (perceived or actual) among children and adolescents.<sup>30,31</sup>

### Collective determinants

#### Economic Determinants

These include *income/socio-economic status, food pricing, education* and *employment*. Income and socio-economic factors are discussed more thoroughly elsewhere in this supplement. *Food price* becomes the most important consideration in food choice when income is restricted,<sup>56</sup> often leading to the selection of foods that are higher in sugar and fat because they are among the least expensive sources of dietary energy.<sup>57</sup> Further, reducing the price of foods and beverages that are high in sugar and/or fat increases the consumption of these foods.<sup>58,59</sup> Lower *educational status* of parents has been associated with lower dietary quality, including higher fat and lower micronutrient

intakes in children.<sup>60-63</sup> Finally, *maternal employment* has been found to be negatively associated with the frequency of family meals, which are, in turn, positively associated with diet quality.<sup>64</sup>

#### Social Determinants

These include *cultural factors, familial factors, peers* and *product marketing/mass media*. Although *culture* is considered one of the most important influences on healthy eating, increasing “globalization” of food habits<sup>65</sup> has led to a reduction in inter-cultural differences in food practices within society.<sup>66</sup> In Canada, there has been clear evidence of nutritional concerns about Aboriginal children.<sup>67-70</sup> However, there is a paucity of data comparing dietary behaviours of Canadian children and youth with those from other countries and cultures.

Children's dietary patterns evolve within the context of the *family*.<sup>71</sup> The intakes of parents and children are correlated for most nutrients,<sup>72</sup> with stronger correlations between mothers and children than fathers and children. According to Nicklas and coworkers,<sup>11,73</sup> *familial* factors include food exposure and availability, parental modelling, meal structure and family meals, parenting style, and food socialization practices. A strong positive association between the *availability* of fruits and vegetables in the home and consumption has been reported.<sup>27,30,31,45,73-75</sup> While the availability of healthy foods is necessary, it is not always a sufficient enabler of healthy eating: qualitative research indicates that although parents provide youth with healthy homemade foods, the youth do not always like them.<sup>32</sup> Few studies have examined the role of *parental modelling* as a predictor of healthy eating in children and youth.<sup>45,50,75,76</sup> *Family meals* have a positive influence on diet quality of children and youth,<sup>77-79</sup> with higher consumption of vegetables and fruit, milk products and improved nutrient intakes.

An authoritarian *parenting style*, characterized by controlling child feeding practices (using high-fat/high-sugar foods as rewards, restriction of “junk foods”) increases children's preferences for and intake of restricted foods once the restriction is removed.<sup>73,80-85</sup> Further, encouraging the consumption of a healthy food on the basis of its health benefits decreases children's preference for the food.<sup>86,87</sup>

Permissive parenting can lead to inappropriate snacking and consumption of inappropriate portions of energy-dense foods.<sup>88</sup> Parental attitudes and knowledge about nutrition, termed “*food socialization practices*”<sup>73,89</sup>, have also been correlated with nutrient intakes of children.<sup>90</sup> Parents’ nutritional *knowledge* may affect the nutritional quality of foods purchased, and therefore their availability, as well as the size of portions served to the child.<sup>71,90-92</sup> Positive nutritional *attitudes* in parents of pre-schoolers have been found to be associated with more pleasant mealtime experiences, fewer suboptimal mealtime practices and fewer eating problems.<sup>93</sup> Some early research<sup>94</sup> suggested that *peers* are an important and lasting influence on the food preferences of pre-schoolers (age 2-5). Enthusiastic peer modelling has been found to be the strongest predictor of younger children’s willingness to try new foods.<sup>95</sup>

The effects of *product marketing and mass media* on dietary behaviour are inter-related and include influences on food preferences, food purchases and children’s food requests, or they may affect knowledge and attitudes, and the development of dieting behaviours and body image problems. The *media*, particularly television, have an enormous potential influence on healthy eating in children and youth, and, in many instances, can overshadow familial influences. Food advertising promotes more frequent consumption of less healthy foods, including higher-fat, energy-dense snacks<sup>96,97</sup> and rarely features healthy choices such as fruits and vegetables.<sup>98-100</sup> This is a concern, since children are more likely to request, purchase and consume foods that they have seen advertised on television.<sup>96,101</sup> In addition to their effects on food consumption, food or beverage advertisements are persuasive and have been shown to often contain misleading information or incomplete disclosure, which can contribute to confusion among children.<sup>39</sup> Finally, mass media have been identified as important factors in the development of both overweight<sup>102,103</sup> and dieting behaviours,<sup>104</sup> particularly in young women.

#### *Physical Environment*

This includes *foods available/portion sizes* and the *school environment*. The negative influence of increased *availability* and

effective mass marketing of fast food, convenience foods and expanding portion sizes on healthy eating in children and youth has received considerable attention in recent years.<sup>105</sup> This is a concern, since children as young as five years eat more when they are served large portions.<sup>106</sup> Further, changes have been associated with a decline in dietary quality, including a reduction in the consumption of nutrient-dense foods and a concomitant increase in foods that are low in nutrients yet high in energy, fat, sugar and sodium.<sup>59,86,89,106,107</sup>

The *school environment* may influence healthy eating in children and youth through the foods that are available, nutritional policies, school nutrition and health curricula, and teacher and peer modelling. Schools are the ideal settings to establish and promote healthy eating practices in children and adolescents.<sup>108,109</sup> Recent surveys of food programs in Canadian schools have identified a number of concerns regarding the nutritional quality of foods in schools, including the ready availability of high-fat, high-sugar, low nutrient-dense foods and beverages, particularly in vending machines.<sup>110-114</sup> A national scan indicated that there are very few school nutritional policies in Canada,<sup>115</sup> which are critical in order to provide guidelines for the planning, development and implementation of comprehensive nutrition programs,<sup>12</sup> and which are associated with changes in students’ nutritional knowledge and behaviours.<sup>41,43,116</sup>

#### **KNOWLEDGE GAPS**

Although there is now a significant body of literature in the area of determinants of healthy eating in children and youth, very little of this research has taken place in Canada. Only a few determinants, such as economic factors and food security,<sup>117-121</sup> the issue of flavours, neophobia and food preferences<sup>122,123</sup> and the content of media nutritional messages<sup>96,99,100</sup> have undergone some examination by Canadian researchers. It may seem reasonable to build on research conducted elsewhere, given the common exposure to powerful forces such as the mass media and technology, an increasingly globally homogenous food supply, and common health problems, such as overweight. This is not appropriate, however, where there are significant national differ-

ences, for example, the role of the school environment or the effect of national dietary guidelines on healthy eating in children and youth. The following key research priorities have been identified:

#### *1. Research examining the nature of familial influences on healthy eating in children and youth, including family food practices, the frequency of family meals and the relative influence of peers and siblings on healthy eating.*

Among *collective* factors, familial factors and the nature of foods available in the physical environment, including at home, schools and in fast-food establishments, stand out as particularly significant influences on healthy eating in children and youth. Given the positive association between family meals and diet quality, future research should attempt to increase our understanding of how families with working parents living in a time crunch *do* manage to have family meals.<sup>64</sup> Because children have, in turn, influenced family food habits by pressuring food preparers to purchase and prepare food they like, research on the interaction between children and parents, which examines the complexity of this relationship, is needed. Although mothers are more motivated to change their children’s eating behaviours than fathers and are more knowledgeable about the nutrient content of foods, they are relatively unsuccessful in changing their children’s food habits on their own.<sup>124</sup> The reported incongruence between reported maternal motivations and the foods they select for their children<sup>125</sup> reflects the complex context in which eating takes place and the influence of other cognitions relating to mothers’ concerns about their own weight. The observed inter-relations among cultural, familial and societal influences in the formation of children’s eating habits serve to decrease the impact of family culture on food behaviours in children and youth. This, in addition to the clear decline in familial influences with age, including a decline in the frequency of family meals, underscores the importance of supporting healthy food socialization practices in parents. Since it is food use, portion sizes and food preparation methods that are often targeted in interventions, it would be useful to examine the influence of familial factors on these food-related

practices more closely and whether they predict eating behaviours and body weight.<sup>61,126</sup> Although the problem of escalating portion sizes in the fast-food industry and the grocery retail sector (muffins, bagels, soft drinks and confections) is well known, there has been little research on this phenomenon in the home environment. Research to clarify and confirm the potential influence of peers and siblings on dietary behaviour is needed.

## 2. *Research regarding the impact of the school environment on healthy eating, particularly nutritional policy and modelling.*

Evidence suggests that, while school environmental change is occurring in Canada, many schools are failing to provide adequate environments to support healthy eating.<sup>110-114</sup> Thus, while students may be receiving some nutritional education in the classroom, confusing and counterproductive messages appear to be provided in cafeterias and other school settings.<sup>12,109</sup> It is encouraging that enthusiastic teacher and peer modelling has been found to increase acceptance of healthy food choices in pre-schoolers; this suggests important opportunities for day care centres and kindergarten settings to promote healthy eating. The characteristics of modelling activities, environments and children for whom modelling is effective<sup>89</sup> need to be documented. This would facilitate the design of effective interventions in both school and home settings. Recent findings that changing the economics of food choice in schools and other environments, such as grocery stores, can have positive effects on healthy eating<sup>58</sup> must be confirmed in a broader range of foods, settings and age groups. Finally, it is important to monitor the impact of school nutritional policies on improving the school food environment and eating behaviours. The possible effects of such policies on time allotted for physical activity in school should be assessed as part of this monitoring.

## 3. *Effects of mass media on healthy eating.*

Much of the evidence of the effectiveness of television food commercials in changing dietary behaviour comes from marketing research, which is not accessible to researchers or the public. Although the amount of money invested in food com-

mercials seems to provide clear testimony to the perceived effectiveness of influencing behaviours,<sup>98,127</sup> the effects of television on nutritional knowledge, children's perceptions and views, and, most important, food intake in children and youth, after exposure to food commercials<sup>128</sup> needs to be further investigated.

## 4. *Research regarding food preferences and nutritional knowledge/skills in children and youth and their impact on behaviour change.*

Among individual determinants, only food preferences or liking was consistently identified in both young children and adolescents as an important predictor of healthy eating.<sup>22-30</sup> Since food preferences are often not consistent with children's knowledge, educators should go beyond teaching children *what* to eat, and assist them in choosing healthy foods that are also seen as good tasting.<sup>129</sup> While there is evidence of an association between knowledge and behaviour, particularly in older children,<sup>32,34,35,44</sup> the ability of children to identify appropriate foods needed to meet dietary recommendations should be assessed. It is not sufficient to be able to "parrot" nutritional recommendations; children need to be able to identify and request healthy choices (e.g., lower-fat foods).<sup>129</sup> Longitudinal studies of the effects of knowledge on dietary behaviour and studies of children from diverse cultures and socio-economic backgrounds are necessary. Qualitative methods appear to have promise in terms of studies examining the effect of knowledge on healthy eating.<sup>129</sup> The relation between food-related skills (including food selection and preparation) and healthy eating in both children and their parents should also be examined. Given the decrease in emphasis on the development of food-related skills in school systems across Canada, changes in courses offering Home Economics/Family Studies,<sup>130</sup> and the increase in prepared and convenience foods in the home, it is important to identify means by which children will consistently acquire food-related skills and use them to make healthy choices.

## 5. *Methodological issues in the examination of multiple determinants of healthy eating in children and youth, and their interactions.*

Much of the research has been limited to an examination of bivariate relations<sup>71</sup> and the use of non-experimental designs, precluding the identification of causal relations between determinants and eating behaviours of children and youth. Many interventions have focussed on fruit and vegetable intake.<sup>131-133</sup> Although determinants of healthy eating appear to vary by food, it is impractical to develop predictive models for individual foods.<sup>45</sup> Examining groups of foods that are homogenous in terms of determinants of consumption is suggested as a possible approach.

The low predictability of psychosocial models to predict food intake in children and youth may be improved by considering the relatively stronger influence of factors such as food availability and accessibility, and their interactions.<sup>133</sup>

Quantitative methods predominate in the literature, and there is a paucity of Canadian studies exploring the determinants of healthy eating in children using a qualitative approach. The latter approach could help identify the reasons why children and youth make positive choices, so that supports for healthy eating can be strengthened.

## 6. *Monitoring eating behaviours and weight in children and youth.*

Canada must have its own nutritional monitoring system to identify unique national and regional dietary behaviours and nutritional concerns. Clearly, in order to choose interventions wisely and tailor them to specific regions, to evaluate them effectively and make sound dietary recommendations, accurate and current data on the eating behaviours of Canadian children and youth are essential. To date, Canadian nutritionists have not had adequate data upon which to base any of these important activities. Although smaller studies have identified some dietary concerns, this review confirms the lack of national nutritional assessment data on dietary behaviours in Canadian children. This was also identified as a gap in knowledge in a recent Health Canada report.<sup>134</sup>

Difficulties in assessing dietary behaviours in children and youth contribute to the challenge of identifying key determinants and in assessing the impact of interventions targeting them. It is encouraging that Canada is currently gathering dietary

intake data through the Canada Community Health Survey (CCHS), Cycle 2.2, Nutrition Focus.<sup>135</sup> Pre-school and school-age children and adolescents are included in the sample.<sup>135</sup> It is hoped that the collection of nutritional indicators will continue as part of the CCHS or other national surveys. Since there is increasing recognition that food intake and eating patterns, rather than specific nutrients, play important roles in health and in disease prevention, monitoring systems should focus more on foods and overall eating patterns and develop further diet quality measures in children<sup>136</sup> in order to develop appropriate dietary guidelines for them.

## CONCLUSIONS

Currently, the lack of Canadian data on both the determinants of healthy eating and dietary behaviours in children and youth are significant barriers to the development of effective policies and programs in Canada. Recognition of the importance of research into the determinants of healthy eating in children and youth, through sustained significant research funding and identification of mentoring opportunities for researchers, are two means by which we can ensure that there are sufficient Canadian researchers in applied nutrition to conduct this important work.

It is intended that this review will become part of the foundation for further examination of the determinants of healthy eating, and inform a broader dialogue among researchers, practitioners and policy makers on research-related priorities in Canada.

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# Determinants of Healthy Eating in Community-dwelling Elderly People

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## ABSTRACT

Among seniors, food choice and related activities are affected by health status, biological changes wrought by aging and functional abilities, which are mediated in the larger arena by familial, social and economic factors. Determinants of healthy eating stem from individual and collective factors. Individual components include age, sex, education, physiological and health issues, psychological attributes, lifestyle practices, and knowledge, attitudes, beliefs and behaviours, in addition to other universal dietary determinants such as income, social status and culture. Collective determinants of healthy eating, such as accessible food labels, an appropriate food shopping environment, the marketing of the "healthy eating" message, adequate social support and provision of effective, community-based meal delivery services have the potential to mediate dietary habits and thus foster healthy eating. However, there is a startling paucity of research in this area, and this is particularly so in Canada. Using search and inclusion criteria and key search strings to guide the research, this article outlines the state of knowledge and research gaps in the area of determinants of healthy eating among Canadian seniors. In conclusion, dietary self-management persists in well, independent seniors without financial constraints, whatever their living arrangements, whereas nutritional risk is high among those in poor health and lacking in resources. Further study is necessary to clarify contributors to healthy eating in order to permit the development and evaluation of programs and services designed to encourage and facilitate healthy eating in older Canadians.

**MeSH terms:** Elderly; nutrition; determinants; eating habits; healthy eating

People aged 65 or over account for 13% of the nation's population.<sup>1</sup> Those aged 80 or over are increasing at the fastest pace, and this segment is expected to increase by 43% in the next 10 years. Most seniors aged 65 or over live at home (93%) and report that their health is generally good.<sup>1</sup> However, 41% of Canadian seniors report having disabilities. These include problems with vision, memory, hearing, speech, mobility and agility, as well as pain and learning, developmental, and psychological difficulties.<sup>2</sup> Those who age successfully live independently and show little or almost no loss in functioning. Those aging in a typical fashion live independently and have a variety of medical conditions. Finally, those in whom the aging process is accelerated carry a heavy burden of chronic disease and disabilities, which generally obliges them to live in institutions.<sup>3,4</sup>

Aging is generally believed to alter nutrient requirements for energy, protein and other nutrients because of changes in lean body mass, physical activity and intestinal absorption. Energy needs decline with age because of decreased basal metabolism,<sup>5</sup> reduction in lean body mass or sarcopenia<sup>6</sup> and a more sedentary lifestyle.<sup>7,8</sup> Energy needs could be even higher than levels set out in the current recommendations<sup>9-11</sup> considering that regulation of food intake is impaired in old age.<sup>12</sup> However, total energy intake generally decreases with age and results in concomitant declines in most nutrients, the distribution of many micronutrients indicating intakes below recommended levels.<sup>13-18</sup>

Among elderly persons, food-related activities are greatly affected by health status and functional abilities.<sup>19-21</sup> For instance, the ability to procure and prepare nutritious food and eat independently, the availability of dietary assistance when needed, and appropriate meal environment and food presentation will contribute to an adequate diet.<sup>22-24</sup> On the other hand, a poor diet can contribute to frailty, complicating functional limitations<sup>25,26</sup> and leading to loss of muscle mass, metabolic abnormalities and diminished immunity. Malnutrition occurs on a continuum and is most often characterized as poor appetite, insufficient dietary intake, faulty or inadequate nutritional status, weight loss and muscle wasting.<sup>27</sup>

However, these results should be interpreted with caution, since many con-

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foundings factors, such as the cohort or period effect and selective mortality, cannot be clearly separated from the aging effect *per se*, particularly in cross-sectional studies. The few nutritional surveys of free-living elderly subjects with functional disabilities or in poor health suggest dietary intakes leading to insufficient levels of energy, protein and most micronutrients.<sup>28-35</sup>

This paper was written to outline the state of knowledge and research gaps in the area of determinants of healthy eating among Canadian seniors.

## METHODS AND LITERATURE SEARCH

Search and inclusion criteria and key search strings were established and used to guide the research. Published literature from 1990 to 2003 was examined as well as several older, classic sources. The search strategy targeted sources of information on the determinants of healthy eating among seniors, using web-based search engines such as MEDLINE, Ageline, PsycINFO and others, along with position papers and websites of numerous national and international governmental, public health- and nutrition-oriented organizations, as well as electronic newsletters. Search tools available through universal web browsers such as Google and Alta Vista were also used, and the relevant “grey literature” was accessed through a bilingual (French, English) catalogue developed by the Bibliothèque de gériatrie et de gérontologie of the Institut universitaire de gériatrie de Montréal. Key words included healthy eating in seniors, determinants of diet in elderly, factors influencing diet in elderly, determinants of nutrition status in elderly, determinants of food choice (intake/consumption/habits/practices) in older people, nutritional health promotion in the elderly, and targeted specific issues, such as social support and healthy eating.

Peer-reviewed scientific journals were the main sources of publications of recent research, and the proceedings of scientific conferences were also used to keep track of ongoing research in Canada, the US and internationally. Specific searches were carried out to locate and access research conducted by Canadian researchers, and an attempt was made to query gerontological nutritionists on their work. Studies were

included in the review if they met the following criteria: study subjects were 65+ years of age, the dependent variable was “healthy eating”, or the study was cross-sectional or longitudinal. Studies were excluded from the review if the language of publication was other than English or French, or the methodology was not described or was unreliable. Decisions on the relevance of the material were made by both authors on the basis of the abstracts and, where necessary, the complete articles. Papers reporting on very specific population subgroups were discussed and put into context at the discretion of the authors.

### Determinants of healthy eating in older people

#### *Individual Determinants of Healthy Eating*

Individual components motivating dietary practices include age, sex, education, other socio-economic factors, physiological and health issues, psychological attributes, lifestyle practices, and knowledge, attitudes, beliefs and behaviours. As people age, these factors often lead to alterations in food selection and decreases in food intake.<sup>25,36-39</sup> Such modifications may be mediated by marital status, smoking, health status and physical activity level, physiological and functional attributes, and diverse biological changes wrought by aging, in addition to universal dietary determinants such as sex, education, income, social status and culture. While higher education and income levels are frequently strongly associated with better nutrition, disease prevention knowledge and behaviour in US, European<sup>40-48</sup> and Canadian studies,<sup>21</sup> this is not a universal finding.<sup>49,50</sup> These conflicting results may reflect not only the great heterogeneity in older populations but also the impact of confounding factors. For instance, food access is more difficult and health problems are more frequent in disadvantaged elderly subjects.<sup>51</sup> This controversy is further highlighted when comparing cross-sectional and longitudinal survey findings. Indeed, over a six-year period, age emerged as a positive predictor of diet quality, particularly among women.<sup>52</sup>

Food intake and appetite can also be negatively influenced by impaired visual<sup>13</sup>

auditory and olfactory stimuli.<sup>53-56</sup> Many drugs can also alter taste.<sup>57</sup> A decline in salivary flow and masticatory impairment due to poor dentition (loss of teeth, inadequate dental and gingival care) contribute to insufficient mechanical crushing and initial enzymatic digestion in the mouth.<sup>58-60</sup> These processes, along with mechanisms governing satiation and energy metabolism,<sup>61,62</sup> have been shown to be disrupted in older adults, leading to the development of a physiological “anorexia of aging”.<sup>63,64</sup>

Loneliness can contribute to inadequate nutrient intakes.<sup>40,65</sup> Indeed, it has been shown that simply having the Meals-on-Wheels delivery volunteer stay with the meal recipient can improve dietary intakes.<sup>66</sup> Food and nutrient intakes may be better among those with high nutrition and health awareness<sup>40,67-70</sup> and poorer among those with a negative self-perception of physical health.<sup>21,65</sup> In secondary analyses of dietary data collected from Quebecers aged 65 to 74 years,<sup>71</sup> regression analyses showed that the strongest correlates of diet quality were the degree of attention paid to keeping a healthy diet, along with higher education, being a city-dweller, being a non-smoker and regular exercise.<sup>70</sup> The issue of supplement use is also of interest in older individuals, as this may signal a healthier lifestyle and higher nutrient intake<sup>72</sup> or, on the other hand, provide evidence that supplements are used to compensate for a poor diet.<sup>70</sup> Finally, alcohol intake in seniors tends to be moderate,<sup>73</sup> and light to moderate drinking is associated with a better nutrient profile in older people.<sup>47,73</sup>

#### *Collective Determinants of Healthy Eating*

Food choice in seniors is motivated by individual attributes that are mediated in the larger arena by familial, social and economic factors. In older people, collective determinants of healthy eating, such as accessible food labels, an appropriate food shopping environment,<sup>74,75</sup> the marketing of the “healthy eating” message,<sup>75,76</sup> adequate social support<sup>70</sup> and provision of effective community-based meal delivery services,<sup>31,77</sup> have the potential to mediate dietary habits and thus foster healthy eating. However, there is a startling paucity of research in this area, and this is particularly evident in Canada.

In community-dwelling elders, the relation between dietary quality, social support and living arrangements is controversial. Some studies have found positive relations,<sup>21,65,68,70,78-80</sup> whereas others have found diet quality to be unaffected by a poor social network.<sup>81</sup> It has been suggested that geographical isolation has an adverse effect on nutritional status among the elderly.<sup>82</sup> For instance, an urban-rural difference in meal structure was observed in Poland,<sup>83</sup> with lower consumption of certain food groups (meat, fish and eggs, fruit and their products, and fats and oils) in rural-dwelling seniors. It was suggested that food distribution systems and decreased buying power among rural inhabitants profoundly affect food habits. In contrast, other comparative studies of urban and rural-dwelling seniors in the US<sup>84,85</sup> showed that nutrient intakes were not related to geographical setting. These observations demonstrate the difficulties inherent in drawing conclusions from age, sex, socio-economic and health factors when comparing urban and rural seniors, but they could also be due to specific characteristics within the populations studied. The local food environment has an impact on food choice beyond the urban-rural issue.

Food consumption research suggests that widowhood confers potentially negative effects on food intake through weight change, increased adverse health outcomes, including depression, and diminished “nutritional self-management”, leading to changes in dietary behaviour and food intakes.<sup>86,87</sup> This is particularly evident among men over the age of 75<sup>40,65,78,88</sup> with low incomes.<sup>89</sup> Indeed, there is a strong relation between living alone and dietary intakes among men,<sup>80,88-90</sup> but these findings have not been consistent<sup>91,92</sup> and are even less so among women.<sup>88</sup> Information on the influence of living arrangements on dietary intake in seniors appears to be inconclusive and may depend on cultural or other differences in the samples studied.

In conclusion, research in this area has clearly identified two poles: widowed individuals (men or women) in good health and without financial constraints who continued to drive and remained independent in their dietary self-management; and those in poor health with no informal support, who experienced difficulties obtain-

ing formal support services, had few social contacts and were at great nutritional risk, since their food preparation abilities and dietary intakes could become extremely limited. These qualitative observations are supported by secondary analyses of Quebec nutrition survey data.<sup>70</sup>

The heterogeneity and interaction between needs and adaptive dietary strategies often cloud the issue, and only longitudinal studies will permit clarification of these differential influences on healthy eating. Given the complexity of these interactions and the fact that most research to date has been cross-sectional, it is virtually impossible to tease apart the specific influence of individual or collective determinants.

### KNOWLEDGE GAPS AND DIRECTIONS FOR FURTHER RESEARCH

Gaps in knowledge were detected in the course of this review. These are summarized in the following section, which also suggests directions for further investigation. Further study and regular dietary monitoring are needed in order to know more about food consumption habits in seniors. These investigations must be adapted to the reality of targeted aging populations using precise measurements, diverse approaches, appropriate methods and accurate dietary assessment tools to reflect the great heterogeneity typical of older populations.

The research agenda should be focussed on interactions between individual and collective determinants of healthy eating that are unique to the elderly in Canada. To achieve this goal, longitudinal studies should be conducted to examine the epidemiological and social aspects of aging; describe the chronology of events and the direction of causal relations; determine and track seniors' food intakes, their food-related needs, variability over time in dietary needs and resources; the interactions that exist between age- and gender-related changes in socio-demographic factors and eating; and how healthy eating could interface with disease prevention and health maintenance.

Further study is necessary in order to understand which foods favour healthy aging. Patterns of use, long-term effective-

ness and the safety of dietary supplements, probiotics and functional foods in aging populations must be further investigated. Indeed, more needs to be known about what constitutes “healthy eating” in seniors to permit the modification of our food guidance system and provide Canadian seniors with targeted dietary guidance.

More specifically, we must further examine health beliefs, and food beliefs and practices that have symbolic or traditional importance to determine how knowledge, beliefs and attitudes translate into eating behaviour in older adults, especially at advanced ages. More research is needed to clarify the relative contribution of income, ethnic background and other personal predictors of healthy eating – self-control, emotions, resistance to change, time constraints, lack of knowledge – and environmental factors governing food availability and cost. Information is needed linking nutritional services, health, psychological, cognitive and social characteristics, as well as financial constraints to procuring healthy foods. More information is needed on barriers, both real and perceived, that discourage healthy eating. For instance, the impact of therapeutic or self-imposed restrictive diets on dietary adequacy is not known. Investigations must simultaneously address interdependent attributes, such as biological parameters, clinical factors and the psychosocial dimension, together with dietary and psychosocial variables.

To encourage and facilitate healthy eating in older people, a broad range of improved and expanded services must be offered to seniors as an adjunct to the healthy eating message. The availability, acceptability, utilization and effectiveness of nutritional interventions and community programs should be rigorously examined, evaluated and refined in order to foster independence in community-dwelling seniors living in urban or rural communities.

Other issues that require further study to facilitate healthy eating in older Canadians should be clarified by academics, clinicians, public health authorities, the food industry and decision-makers at both the regional and national level. These may include evaluation of the effectiveness of provision and marketing of appropriate, affordable nutrient-dense foods and upgrading the food market and transporta-

tion (food products, packaging, shelf presentation, supermarket organization and location, delivery). These efforts must involve concerted action by dietitians, manufacturers, retailers and foodservice providers to offer a nutritious and accessible food supply for the seniors' market. It is essential that healthy nutritional messages be coupled with adequate physical activity to produce a broad-based health promoting lifestyle in older Canadians, and that the effectiveness of these population-based programs be documented.

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# Determinants of Healthy Eating in Aboriginal Peoples in Canada

## The Current State of Knowledge and Research Gaps

Noreen D. Willows, PhD

### ABSTRACT

Aboriginal peoples are the original inhabitants of Canada. These many diverse peoples have distinct languages, cultures, religious beliefs and political systems. The current dietary practices of Aboriginal peoples pose significant health risks. Interventions to improve the nutritional status of Aboriginal peoples must reflect the realities of how people make food choices and therefore should be informed by an understanding of contemporary patterns of food procurement, preparation and distribution. Most of the literature documenting the health of Aboriginal peoples is primarily epidemiologic, and there is limited discussion of the determinants that contribute to health status. The majority of studies examining dietary intake in Aboriginal communities do not aim to study the determinants of food intake per se even though many describe differences in food intake across sex, age groups, seasons and sometimes communities, and may describe factors that could have an effect on food consumption (e.g., employment status, level of education, household size, presence of a hunter/trapper/fisher, occupation, main source of income). For these reasons, there are many gaps in knowledge pertaining to the determinants of healthy eating in Aboriginal peoples that must be filled. Given the diversity of Aboriginal peoples, research to address the gaps should take place at both the national level and at a more local level. Research would be important for each of Inuit, Métis and First Nations.

**MeSH terms:** Canada; diet; food habits; Indians, North American; Inuit; nutrition

Aboriginal peoples occupied the area now called Canada before the arrival of Europeans, and they have cultures and histories that make them distinctive within Canadian society. In the past, they subsisted by extracting and processing foods from the land and water using hunting, trapping, fishing, gathering and agriculture in different combinations. The tremendously diverse diet was, in general, high in animal protein and low in fat and carbohydrates, and provided adequate amounts of energy and micronutrients for health.<sup>1-3</sup> The contemporary diet has, to varying degrees, replaced traditional foods with market foods, many of which are of low nutritional quality. Traditional foods are those culturally accepted foods available from local natural resources that constitute the food systems of Aboriginal peoples. The concept of food system includes sociocultural meanings, acquisition and processing techniques, use, composition and nutritional consequences for the people using the food. Positive nutritional status might be possible to maintain when traditional food use is diminished if economic circumstances are favourable, a variety of high-quality, non-traditional foods is available, and education in the use of good-quality traditional food alternatives is on hand.<sup>4,5</sup>

The three groups of Aboriginal peoples defined in the Canadian Constitution are Indian, Métis and Inuit (the term First Nation now commonly replaces the word Indian).<sup>6</sup> Inuit live predominantly in Nunavut, the coastline areas of the Northwest Territories, Northern Quebec (Nunavik) and Labrador. They are culturally and linguistically distinct from First Nations and Métis. Métis is used broadly to describe people with mixed First Nations and European ancestry.<sup>6</sup>

The health of Aboriginal peoples is worse than that of Canadians, in general, for almost every health status measure and condition.<sup>7</sup> There is considerable evidence that many health problems experienced by Aboriginal peoples are related to diet; they include anemia, dental caries, obesity, heart disease and diabetes.<sup>2-4</sup> Although many health issues appear related to poor diet, dietary intake data in Aboriginal populations are limited in scope, with a narrow geographic and subject focus and including only a few Aboriginal communities. Most of the literature documenting

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the health of Aboriginal peoples is primarily epidemiologic, and there is limited discussion of the determinants that contribute to health status. Urban-living Aboriginal people are under-represented in many studies, as are First Nations living off-reserve, Métis, and women and children.<sup>8,9</sup>

To effectively promote and support healthy eating in Aboriginal peoples, there is a need for a more comprehensive understanding of the many factors that influence eating behaviour, including deeper understanding of their interactions. This article is intended to provide an overview of the state of knowledge and research gaps in the determinants of healthy eating, including consumption of traditional food as related to Aboriginal peoples. For many Aboriginal groups, healthy eating is based on the premise of the consumption of traditional food, which, in addition to contributing to nutrition, is an important indicator of cultural expression, an anchor to culture and personal well-being, an essential agent to promote holistic health and culture, and the direct link between the environment and human health.<sup>10</sup> The focus of the article will be predominantly Inuit and First Nations living on-reserve and in remote or northern communities, although the literature pertaining to other groups will also be included.

## METHODS AND LITERATURE SEARCH

A literature search was completed using the term “aboriginal” and MeSH synonyms for that term (Inuit, Indians North American) combined with the term “Canada” and with “food” or “nutrition”. The strategy was repeated in medical and sociological databases (PubMed, MEDLINE, HealthSTAR, CINAHL, Sociological Abstracts; Bibliography of Native North Americans; International Bibliography of the Social Sciences; Proquest Digital Dissertations). For international comparisons, the same strategy and search engines were used but the terms United States, Australia and New Zealand were used in place of Canada. The search strategy was restricted to literature written in the English language and published from January 1990 to December 2003, and key publications published January to April 2004, although pertinent older material

was included. Website searches (e.g., National Aboriginal Health Organization, Indian and Northern Affairs Canada) provided grey literature, as did citations in articles, grey literature and books. The most salient information relating to understanding the determinants of healthy eating and gaps in knowledge are presented herein.

### Summary of the literature on the determinants of healthy eating

Partly because of the substitution of traditional foods with market foods, the current diet of Aboriginal peoples is often low in iron, folacin, calcium, vitamin D, vitamin A, fibre, fruit and vegetables; high fat and sugar intakes are commonly reported.<sup>11-18</sup> A better understanding of the determinants of traditional food use in relation to market food use is required to know how to modify the determinants in a way that would result in better dietary patterns for Aboriginal peoples. The transition from traditional to market food has been a multidimensional, dynamic and complex course, and the decision-making process about consuming traditional or market food, as discussed later, is made at multiple levels of influence: societal, individual, socio-economic (food insecurity) and environmental, all which may overlap and interact. In the discussion that follows, environmental influence refers to the physical environment.

#### *Societal Level Influence*

Culture is broadly defined as the values, beliefs, attitudes and practices accepted by members of a group or community. It determines, in part, what foods are acceptable and preferable, the amount and combinations of foods to eat, when and how to eat, and the foods considered ideal or improper.<sup>19</sup> Aboriginal people may describe their traditional food quite specifically, for example, as Inuit or Dene food, as the case may be, demonstrating its strong link to cultural identity.<sup>20</sup> Of importance to understanding the role that culture plays in determining food choice in Aboriginal communities is that the activities required to procure traditional food are not merely a way of obtaining food but, rather, a mode of production that sustains social relationships and distinctive cultural characteristics. This is because the consumption of traditional foods is more than

just about eating; it is the endpoint of a series of culturally meaningful processes involved in the harvesting, processing, distribution and preparation of these foods. For many Aboriginal peoples, these processes require the continued enactment of culturally important ways of behaving, which emphasize cooperation, sharing and generosity.<sup>20-25</sup>

In some Aboriginal communities, the cultural preference for body size may influence eating behaviour and food choice. A study in Ojibway-Cree in northern Ontario showed a preference for large body size, particularly among older adults who perhaps had memories of the association between thinness and infectious diseases, such as tuberculosis.<sup>26</sup> In Cree communities in northern Quebec, having extra weight is considered a sign of robustness and strength.<sup>27</sup> In contrast, First Nations and Métis girls and women living in or near to urban centres in Manitoba prefer thin body sizes and may use dieting to lose weight.<sup>28</sup> Urban American Indian women in the United States engage in unhealthy weight-control practices, such as binge eating, skipping meals, fasting and purging.<sup>29</sup> Many American Indian children have body dissatisfaction, concerns about high weight, unhealthy weight control practices and eating disorders.<sup>30-33</sup> The varying preferences for body size among Aboriginal peoples may be based in traditional cultural values; alternatively, as culture is not static but changes over time in response to social dynamics, one cannot ignore the adoption of non-Aboriginal perspectives of body size.

#### *Individual*

Food selection is often governed by sensory characteristics.<sup>34</sup> Although taste preference is personal, it is influenced by the cultural group to which one belongs. Taste preference for traditional food has been documented for Aboriginal peoples. Inuit consume *igunaaq* (fermented seal meat), which has a distinctive and strong flavour; appreciation of *igunaaq* is considered an important and sophisticated feature of Inuit taste.<sup>35</sup> Inuvialuit, Inuit who live in the Western Arctic, mention the good taste and texture of traditional foods, such as caribou, as reasons for eating it.<sup>36</sup> Among the Nuxalk First Nation, the frequency of consumption of many traditional foods is

associated with taste appreciation; however, the relation between taste preference and food choice is not always evident. Lack of species availability and time for harvesting may explain why not all traditional foods with highly desired tastes are consumed frequently.<sup>37</sup> In Mohawk children, food preference ratings do not always translate into consumption of those preferred foods: although children may prefer certain traditional foods, they seldom eat them.<sup>38</sup> A study of the eating habits of Cree children found that even though children consumed a preponderance of store-bought food, the majority expressed a preference for traditional food.<sup>39</sup>

For many Aboriginal peoples, cultural identity will inform personal knowledge, attitudes and beliefs about food and food choice. The eating of traditional food is often associated with feelings of good health, whereas the eating of “non-traditional food” is considered by some Aboriginal peoples as polluting or weakening.<sup>21,24,25,40</sup> Food choices based on Aboriginal cultural values may not be congruent with Western scientific constructs regarding the nutritional value of food.<sup>24,25</sup> The cultural worldview held by some Aboriginal peoples that traditional food by its very nature is health-promoting makes it difficult for them to understand why they must avoid certain store-bought foods to maintain health. Among the Inuit of northern Labrador, for example, all traditional foods are considered “good”, and “nutritional balance” is perceived as consuming different parts of an animal, and alternating the diet between fish, land mammals, seal and birds. Perhaps because of this ideology it is puzzling to these Inuit that store food may not contribute to health.<sup>25</sup> The Cree of northern Quebec also find the categories of healthy and unhealthy as related to store-bought food to be confusing because Cree food, by its very nature, is good to eat.<sup>24</sup>

In northern and remote communities, age and sex differences in food consumption have been noted.<sup>15,17,37,41-45</sup> Sex differences in the amount of traditional food consumed may be due, in part, to differences in body size and energy expenditure between men and women. Children tend to consume less traditional food than adults, and young adults consume less traditional food than middle-aged adults, who

in turn consume less traditional food than elders. The age disparity in traditional food consumption implies inter-generational differences in taste preference and suggests that younger generations are losing the knowledge of harvesting and preparing their traditional foods.

#### *Food Insecurity*

Aboriginal families are over-represented among those experiencing hunger in Canada.<sup>46</sup> As a result of the pervasiveness of poverty in many Aboriginal communities, income and food costs may be more potent determinants of food selection than considerations of the healthfulness, social desirability and taste of food.<sup>34</sup> Food insecurity is commonplace, meaning that the availability of nutritionally adequate and safe foods or the ability to acquire acceptable foods in socially acceptable ways is limited or uncertain.<sup>47</sup> In the 1998/1999 National Population Health Survey, the prevalence of food insecurity among Aboriginal respondents living off reserve was 27.0%, and 24.1% had a compromised diet, meaning that they did not have enough food to eat or that they could not eat the quality or variety of foods they wanted to because of lack of money.<sup>48</sup> It has been documented that low-income First Nations women in Winnipeg are not able to choose food on the basis of its health attributes because of the constraints of food insecurity.<sup>49</sup> Differing degrees of food insecurity, from anxiety to hunger, exist among Inuit, including hunger in children.<sup>18</sup>

Some Aboriginal communities use food-sharing networks as a strategy against food insecurity. Community freezers and other forms of community sharing enable food-insecure individuals living on reserves or in remote regions to consume traditional foods.<sup>50,51</sup> These systems of food reciprocity and obligation do not always buffer against food insecurity in urban centres.<sup>49</sup>

In remote and northern communities, the high cost, poor quality, lack of variety and lack of availability of perishable foods are barriers to the purchase of fresh fruits and vegetables.<sup>18,52</sup> The cost of market food is high as a result of transport costs, and the limited availability of nutritious foods is due, in part, to spoilage.<sup>52,53</sup> In remote regions, where a single store may serve the community, the individual store manager's

stock management practices, and personal beliefs and attitudes about stocking healthful foods may be major determinants of the availability of nutritious foods.<sup>54</sup>

#### *Physical Environmental*

Modification of the physical environment (e.g., hydroelectric dams, deforestation, climate change) and contamination of the physical environment have resulted in reduced availability of traditional animal and plant species.<sup>40,55,56</sup> When species decline or become contaminated, recommendations are often made to limit or cease their consumption. In response to advisories, Aboriginal peoples may switch to hunting or fishing different species, reduce intake or maintain the status quo.<sup>57</sup> Concern over food contamination or species diminishment may be insufficient, in and of itself, to cause reduced intake of a food species given the pragmatic consideration that market food, in many cases, is an expensive or unpalatable substitute for traditional food. Identifiable local sources of contamination may cause greater disruption of normal dietary patterns than contamination from distant sources. The communication style for conveying risk information about contaminants and the cultural context within which risk is interpreted may also be decisive factors in how community members respond to advisories.<sup>20,58</sup>

### KNOWLEDGE GAPS IN THE LITERATURE

To effectively promote and support healthy eating, there is a need for a more comprehensive understanding of the many factors influencing eating behaviours, and their complexity and interactions. Some important gaps in understanding are described below.

#### **Beliefs about food**

More study is required of the relation between individual beliefs about food and food intake. Most studies in Aboriginal communities that examine the health ratings of traditional and store-bought food do not evaluate whether the health rating of a food corresponds to its frequency in the diet.

#### **Hedonic qualities**

The sensory properties of food consumed by Aboriginal peoples have seldom been

studied as a determinant of food intake, despite evidence that sensory properties are important reasons why traditional food is culturally palatable and why market food is consumed. The hedonic quality of traditional and market food as it relates to food choice needs further investigation.

### Food insecurity

There are many issues relating to food insecurity that have not been studied. Scales for measuring food insecurity have not been validated in Aboriginal populations in Canada, therefore, commonly used food insecurity questions may need to be adapted to accommodate First Nations, Métis and Inuit languages, cultural perceptions and unique life experiences.<sup>47</sup> In small communities, it is not clear how much influence store policies or store managers have in determining the types of food available for sale, or how food pricing influences food choice. Information is required about how food insecurity affects food selection, given traditions of obligation, sharing and reciprocity that are inherent to many Aboriginal peoples' cultures.

### Body image

Considering that there are few studies about body image, weight concerns and dieting practices in Aboriginal adults and children, community-based studies of body image concepts would be valuable for developing dietary interventions. This information is relevant because initiatives to prevent obesity may not be effective if obesity is viewed as a positive physical attribute. On the other hand, if thinness is desired, care must be taken to avoid increasing concerns about weight, body dissatisfaction and the adoption of unhealthy eating patterns. For a given community, it would be important to know whether obesity is viewed as a positive or negative physical attribute, self-perception of body size, and whether dieting or food intake behaviours are related to body size perception.<sup>59</sup>

### Physical environment health discourse

Concern about the safety of traditional food or the diminishment of food species may result in a change in diet; however, little has been reported about how knowledge of the existence of contaminants in local food or discourse about species

decline alters dietary intake. To ensure that dietary modifications are counterbalanced by selection of healthy food alternatives, a better understanding of how environmental health discourse influences food choice is required, as well as quantification of any resulting dietary changes. The health impacts of such dietary changes could be significant, given that traditional foods contribute to both nutritional benefits and contaminant exposure.<sup>4</sup>

### Interactions among determinants

Individual, social, physical environmental and socio-economic factors interact in complex and changing ways to influence food choice. For example, individuals may use knowledge about the health properties of foods when they make choices, but knowledge alone is insufficient to affect food choices unless it can overcome counteracting psychosocial, behavioral and environmental barriers.<sup>60,61</sup> The issue of the interaction of the determinants of healthy eating at different levels of influence should be examined to see how that interaction modifies food access and choice.

### CONCLUSION

Current dietary practices of some Aboriginal peoples pose significant health risks and diminish the quality of life. It is therefore critical to obtain information on the factors that relate to determinants of food choice and food access. There are few comprehensive studies documenting the determinants of healthy eating in Aboriginal communities; therefore, there are many gaps in knowledge pertaining to them. In view of the enormous diversity of Aboriginal peoples, research to address the gaps should take place at both the national level and a more local level. Research would be important for each of Inuit, Métis and First Nations.

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# Determinants of Healthy Eating Among Low-income Canadians

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## ABSTRACT

This paper draws on four bodies of literature to consider the determinants of healthy eating for low-income Canadians: a) the social determinants of health; b) socio-economic gradients in diet; c) food security; and d) the sociology of food. Though there is a paucity of data for Canada, it is very likely that, as in other industrialized countries, there are socio-economic gradients in diet such that those who are better off consume healthier diets than those less well-to-do. The available evidence suggests that income affects food intake both directly and indirectly through the dispositions associated with particular social class locations. Thus, there may be both economic and cultural thresholds for some food groups or particular foods in food groups. Understanding these thresholds is especially important in addressing the issues facing those who are the most vulnerable among Canadians with low incomes: the food insecure. The literature reviewed suggests that improved nutrition for low-income Canadians may be difficult to achieve a) in isolation from other changes to improve their lives; b) without improvement in the nutrition of the general population of Canadians; and c) without some combination of these two changes. Four major areas of research need were identified: a) national data on socio-economic gradients in diet; b) sociological research on the interaction of income and class with other factors affecting food practices; c) sociological research on Canadian food norms and cultures; and d) research on the costs of healthy eating.

**MeSH terms:** Diet; public health; poverty; medical sociology; social class

The purpose of this article is to outline the state of knowledge regarding the determinants of healthy eating\* among low-income Canadians,† as well as the gaps in that knowledge. The focus is *income*, the first of 12 determinants of health identified in Health Canada's model of population health,<sup>1</sup> as a key determinant of healthy eating. Income has direct effects on healthy eating as well as indirect effects, mediated through social class. Income affects and interacts with other important individual and collective factors affecting healthy eating practices. These include individual factors, such as food skills and preferences; social factors, such as gender and social support; cultural factors, such as traditions, norms and values; physical factors, such as housing and access to healthy food; and policy factors, such as food labeling, and school and workplace food policies.<sup>2,3</sup>

A further factor is the type and strength of dominant political discourse (e.g., neoliberalism, welfare liberalism, democratic socialism), which affects the role the state plays *vis-à-vis* the private sector, civil society and the family in providing goods and services, as well as the ability of the state to develop healthy public policy and create the conditions that facilitate population health.<sup>4-7</sup> The dominant political discourse in a society has effects on factors influencing healthy eating that range from the amount of time working parents have available to feed their families, to the ability of a society to regulate food advertising to children, to the breadth and adequacy of income support programs.

Low-income Canadians are considered to be nutritionally vulnerable for a number of reasons. First, analysis from the 2000-01 Canadian Community Health Survey (CCHS)<sup>8</sup> suggests that 14.7% of Canadian households are food insecure. Food insecurity refers to "limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways."<sup>9</sup> There is a growing body of literature on the extent, nature and manage-

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\* "Healthy eating" refers to eating practices and behaviours that are consistent with improving, maintaining and/or enhancing health.

† "Low income" is defined according to Statistics Canada's low income cut-offs, i.e., it refers to those for whom spending on food, clothing and shelter takes up 20% more of their income than the relative amount spent by the average Canadian family for those necessities.

ment of food insecurity among Canadians,<sup>9-30</sup> showing that inadequate income plays a pivotal role.

Second, there is evidence from Western, industrialized countries that those in higher socio-economic groups have healthier diets (eating more fruit, vegetables and low-fat or skimmed milk, as well as fewer fats and oils, and less meat) than those in lower socio-economic groups.<sup>31-52</sup>

Third, there is considerable evidence that early life circumstances, including nutrition, have a significant impact on health in adulthood.<sup>53-58</sup> As a result, there is great interest in improving the nourishment of infants and children, starting *in utero* and continuing throughout childhood, particularly those living in poverty, in order to offset potential future health problems.

Fourth, there is at least the perception of a socio-economic gradient in obesity among Canadians. There is evidence that rates of obesity follow a socio-economic gradient in the US, at least among women,<sup>59-61</sup> however, until data from the 2004 CCHS (Cycle 2.2) are analyzed, we will not have strong Canadian data on obesity rates in relation to socio-economic position.

Finally, it is well established that there are social inequalities in health, such that as economic and social circumstances decline, people have shorter, sicker lives.<sup>62-64</sup> It has been hypothesized that healthier eating and improvements in other lifestyle factors could reduce morbidity and premature mortality in low-income groups.<sup>39,65-75</sup> However, the evidence suggests that the role of nutrition and other lifestyle risk factors, including smoking, in social inequalities in health are less important than the social determinants of health, particularly poverty itself.<sup>47,56,76-83</sup>

## METHODS AND LITERATURE SEARCH

Searches were conducted on the electronic computerized databases CINAHL, MEDLINE, and Sociological Abstracts over the time period of December 2002 to March 2003. ERIC was searched in July 2003. Citations from 1975 onward were included. The following key words were used: food insecurity; inequalities and nutrition; hunger; poverty and food; poverty and

diet; food poverty; health inequalities and diet; healthy eating and low-income; food behaviour; food choice; dietary patterns; lay knowledge and health; health behaviour; health beliefs.

The search strategy included careful reading of references for materials not indexed in the databases, such as books, book chapters and "grey" literature. Books were also identified by a search of the University of Toronto library system, and additional grey literature was identified through Google searches. References suggested by the reviewers of the original scoping paper were also included. Relevant key articles published in French were identified using similar search strategies and summarized by a bilingual research assistant.

The minimum methodological criteria for inclusion were as follows:

- a clear statement of methods, including study population and selection of sample; identification of data collection methods; a discussion of data collection biases;
- elaboration of the details of data analysis; appropriate statistical tests or analytical approach used;
- interpretation of the findings that was appropriate for the data collected and the analytical framework.

## Summary of the literature

### *Socio-economic Gradients in Eating Patterns*

European studies have consistently shown that those of higher social class (generally defined using education as an indicator, rather than income or occupation) have healthier diets (eating more fruit, vegetables and low-fat or skimmed milk, as well as fewer fats and oils, and less meat).<sup>32-40</sup> Socio-economic gradients have also been noted in studies in the US<sup>31,41-46</sup> and Australia,<sup>47-49</sup> with higher socio-economic groups consuming diets that are closer to the dietary recommendations than lower socio-economic groups. However, studies that have measured nutrient intake, rather than food consumption,<sup>33,47,84,85</sup> have found the differences among socio-economic groups to be small and "appear to be of limited importance when considering the relatively low degree of compliance of all social groups with dietary guidelines."<sup>47</sup>

In Canada, there is some historical evidence of socio-economic gradients in diet.<sup>86-89</sup> More recent studies have also suggested the existence of socio-economic gradients<sup>51,52,90-92</sup> and the likelihood of income thresholds for some food groups, including fruit, vegetables and dairy products.<sup>51,52,93</sup> An income threshold refers to the likelihood that, beneath the threshold, income is the most important determinant of consumption; a socio-economic gradient suggests that other determinants, especially education, are also likely to be important. Thus it seems very likely that socio-economic gradients in diet exist in this country, as well as income thresholds for some food groups. Nationally representative data, collected on an ongoing basis, are fundamental to understanding nutritional inequalities in this country and to formulating strategies to address them.

### *Food Insecurity and Inequalities in Diet*

There is considerably more research on a particularly vulnerable component of the Canadian low-income population: those who are food insecure. Income is the most important determinant of food insecurity and hunger, but there is not a linear relation between income and measures of food security.<sup>94,95</sup> Analysis of available Canadian data shows that the odds of reporting food insecurity or food insufficiency\* increases with declining income,<sup>10,11,22,97</sup> one nationally representative survey showing that households in the lowest third of standardized household incomes were 10.2 times more likely to be food insecure than those in the highest third.<sup>26</sup> Analysis of the 1998-1999 National Population Health Survey (NPHS) shows that 10.2% of Canadian households, or approximately 3 million people, reported food insecurity in the previous year.<sup>10,26</sup> More recent analysis suggests that the number of food insecure Canadians has increased dramatically, to 14.7% in 2000-2001.<sup>8</sup>

While food insecurity is measured at the household level, dietary intakes are measured at the individual level,<sup>95</sup> and individuals in food insecure households show differing patterns of intake. Research on the

\* Food insufficiency is a narrower, simpler construct than food insecurity. Food insufficiency is measured by a single survey question about the quantity and quality of food eaten in the household, and is seen as a measure of fairly severe household food insecurity.<sup>96</sup>

nutrient intakes of children in food insecure households,<sup>15,95,98-101</sup> the management of household food insecurity<sup>12-15,18,20,27,28,99,102-112</sup> and the gender aspects of feeding the family<sup>113-116</sup> suggests that food is not evenly distributed among family members. This research shows that mothers protect their children as much as possible from overt food deprivation or hunger (though the *quality* of food fed to children suffers during times of constraint). Mothers employ numerous management strategies, including the reduction of their own food quality and quantity, to avoid the catastrophe of having their children go hungry. Two recent studies of the diets of high-risk Canadian households<sup>14,15,18</sup> have focussed on mothers' intakes, the most sensitive indicators of potential nutritional risk. These have demonstrated estimated prevalences of inadequacy for several nutrients.

The research on food insecure Canadians demonstrates that, for the populations studied to date, the most important barrier to healthy eating is inadequate income. This conclusion is supported by the fact that mothers do protect their children's energy and nutrient intakes,<sup>15</sup> and that energy and nutrient intakes decline systematically as food security status deteriorates.<sup>18</sup> It is also supported by research establishing that incomes for those receiving welfare and those working at minimum wage jobs are inadequate to purchase the food for a healthy diet.<sup>21,117</sup> Higher levels of education do not protect households from food insecurity,<sup>14,19,26,97,118</sup> nor does education appear to mitigate the dietary effects of inadequate income.<sup>51,93</sup> Neither nutritional knowledge<sup>27,66,119-122</sup> nor food skills<sup>25,123</sup> appear to be significant factors affecting healthy eating in these populations. Those in low-income households have been shown to buy more nutrients for their food dollar than higher income households.<sup>124,125</sup> Indeed, it can be concluded that those who live in poverty are particularly adept and creative in juggling and managing their financial and food resources to ensure that their most important needs are met first.<sup>9,12,13,23,69,102-105,108-110,112,115,120,126-135</sup>

### *Using Sociology to Understand Food Practices*

Sociological research on health and food practices that compares different classes<sup>136-140</sup> suggests that there are two opposing, class-

based relations to food: substance (food as material reality, sustaining the body and giving strength) and form (food as self-discipline to an aesthetic idea). These different relations to food are divided by the "distance from necessity",<sup>136</sup> which is an indirect way in which income and class position affect eating practices. This research suggests that apart from income thresholds for the consumption of different food groups, there may also be cultural thresholds related to class (including educational attainment) and class trajectory over time.

Social science research also suggests that the concept of "belonging" may be important for understanding food practices. As political scientist Deborah Stone has put it,<sup>141</sup> what we eat is "a sign of membership, social status and spiritual worth. Eating the same food as others is a basic mark of belonging" (p. 71). The practice of feeding the family involves, in part, meeting what Stone<sup>141</sup> calls "communal needs", which include "community, solidarity, a sense of belonging; dignity, respect, self-esteem, and honor; friendship and love" (p. 77). The desire of low-income people to belong to the dominant culture through food has been well documented by those examining the social aspects of food insecurity.<sup>13,108,142,143</sup>

This body of research highlights the important social, cultural and symbolic functions of food, eating and "feeding the family",<sup>115</sup> and suggests that there are different cultural "logics" underlying these everyday practices for different social classes.

## KNOWLEDGE GAPS IN THE LITERATURE

### **National data on socio-economic gradients in diet**

A robust research program on the determinants of healthy eating among low-income Canadians must be founded on quantitative data examining dietary intakes and patterns in Canadians; therefore, the lack of national data on socio-economic gradients in diet is perhaps the most significant gap in the Canadian research literature. Fortunately, that gap will begin to be filled in the near future, with the results of the CCHS, Cycle 2.2, Nutrition Focus, which was scheduled to conclude data collection in December 2004.

Ideally, a nutrition monitoring and surveillance system would provide data over

time. To provide data that would help us understand socio-economic gradients in diet and the determinants of healthy eating among low-income Canadians, the design of a nutrition survey would have to incorporate multiple measures of class, including income, level of education, occupation and the social trajectory of both the respondent and spouse/partner (if applicable).<sup>144</sup> Other known influences on eating habits should also be included in the survey, such as family structure, family roles and responsibilities, ethnicity, length of time in Canada, hours of employment, food availability at work and so on. Ideally, such a survey would also include measurement of individual food insecurity<sup>96</sup> and food costs.<sup>145</sup> A longitudinal study design could provide data on how changes in cultural capital, income and food security status, as well as in factors such as age, family composition and children's ages, affect food practices.

National nutrition data, provided over time, could help us fill the gaps about how significant the dietary differences are among socio-economic groups; how the gradients are different using different measures of socio-economic position; the relation between socio-economic gradients and income thresholds for different food groups; whether the relation is different for different food groups or for food groups rather than nutrient intake; how socio-economic differences in diet are distributed among rural, rural remote, suburban and urban localities, between the sexes, across age groups, and among different ethnic groups; the relation between the expected gradients in food groups and adherence to the dietary guidelines and other measures of dietary quality; and how these relations change over time.

### **Sociological research on the interaction of income and class with other factors affecting food practices**

There is little research on the interaction of income with other factors affecting food practices, such as housing status, social support, family roles and responsibilities, time constraints, the stage of the life course, ethnicity, length of time in Canada, etc. Sociologically informed, qualitative research could help develop additional indicators of food insecurity that assess qualitative and social dimensions of

food insecurity, as well as measures of individual (rather than household) food security status, as suggested by Tarasuk.<sup>96</sup> Such research could, for example, help elucidate the dynamics of intra-familial food distribution in low-income two-parent heterosexual families, and how the desire to belong, when there is social exclusion, affects food practices. A longitudinal study design could help us understand how changes in individual and household factors affect food practices.

### Sociological research on Canadian food norms and cultures

There is little written about Canadian food norms and cultures. If, as suggested by this review of the literature, one of the conditions for improving the food practices of low-income Canadians is an improvement in the dominant food culture and food norms, then it will be important to characterize food cultures and food norms in this country, plus the most effective means of shifting them. This has become particularly salient with the awareness of increases in the prevalence of obesity and a growing sense of urgency to undertake interventions to combat the problem.

For example, one important influence on the ways in which food norms are shaped and developed in contemporary North America is the food industry and its marketing practices. The food industry has its own logic, that of making profit, which is often in conflict with the promotion of healthy eating.<sup>146,147</sup> It is important to explore how the food industry shapes social norms around eating in Canada; how those in different positions in social space (e.g., class, sex, ethnicity, age, etc.) are targeted by food marketers; and how people take up and act on those marketing messages and thus produce and reproduce food norms and culture. Such research could be useful, for example, in understanding how social marketing campaigns to promote healthier diets can be more effective.

### Research on the costs of healthy diets

Ideally, food costs would be included in a national nutrition survey, so that dietary and economic variables can be linked. In the meantime, smaller research projects could begin to fill the gap, with studies comparing prices of healthier options within food groups (e.g., lower-fat products),

comparing food baskets,<sup>148</sup> and comparing food prices and energy density.<sup>145</sup> If it is the case that healthier diets are more expensive than less healthy diets, this has important implications for public policy. At the individual level, changes in pricing have a strong effect on food choices,<sup>149-152</sup> and pricing strategies have been suggested as potentially effective population-based strategies to improve eating practices.<sup>146</sup> Understanding the costs of healthier diets would be a first step towards assessing the potential of community-based food pricing interventions to affect food practices in Canada.

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# Mental Health and Eating Behaviours

## A Bi-directional Relation

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### ABSTRACT

**Background:** Variations in mental health may contribute to or impair healthy eating. The relation between eating and mental health is bi-directional: one's mood or psychological state can affect what and how much one eats, and eating affects one's mood and psychological well-being. Thus, if we want to promote and develop strategies to encourage healthy eating, it is important to understand the connections between mental health and healthy eating.

**Methods:** To contribute to this understanding, we examine the research on individual differences in how people respond to food, as well as mood, and emotional, social and collective influences on what and how much is eaten; we then examine the implications of these connections for mental health, with a focus on adolescents and adults. Looking at the relation between eating and mental health from the other direction, we review research investigating whether the amount that one eats or particular foods one ingests can make one feel good or bad about oneself.

**Conclusions:** Overeating and undereating have complex effects, sometimes contributing to improved feelings of well-being and at other times leaving the individual feeling guilty, deprived, depressed and anxious. We attempt to identify both what we know and the gaps in our knowledge.

**MeSH terms:** Mental health; eating behaviour; overeating; mood; undereating

**W**hy do we need to know about the connections between eating behaviour and mental health?

Variations in mental health may contribute to or impair healthy eating. For instance, disturbances in mental health, such as depression, unhappiness or anxiety, may cause people to eat unhealthy amounts or types of food.<sup>1,2</sup> Conversely, eating behaviour influences mental health. When we eat too much, we feel uncomfortable (socially, we do not want to look "piggish" to others, and, even alone, we prefer not to feel that we are eating "too much" or "more than normal"), and if we happen to be dieting to lose weight we may also feel guilty and anxious.<sup>3</sup> Negative emotions, in their turn, can make us overeat in an attempt to feel better. Certain foods may be comforting or help to alleviate negative moods.<sup>4</sup> If, on the other hand, we eat too little, we may feel irritable, tired or deprived, especially if others around us are eating more and seem to be enjoying their food. This may be partly a physiological reaction to hunger, but it may also reflect a psychological resentment that one is not having what others have. The resentment may be caused by a self-imposed diet or by living in a society in which food is so abundant for most, but some have too little. The relation between eating and mental health is thus bi-directional: one's psychological state can affect what and how much one eats, and eating affects one's mood and psychological well-being.

The consequences of eating on mental health may reinforce healthy or unhealthy eating patterns (i.e., it is possible that eating in a healthy manner makes people feel better psychologically, but it is also possible that eating in an unhealthy way makes people feel better emotionally). If we want to promote healthy eating and develop strategies to encourage it, we need to understand the connections between mental health and healthy eating. At the same time, we must remain alert to the possibility that healthy eating may occasionally exact a mental-health cost. Indeed, we might even be forced to the conclusion that in some rare circumstances a strict adherence to healthy eating might be excessively costly in term of psychological well-being.<sup>5</sup>

In this article, we will use "healthy eating" to refer to eating practices and behav-

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hours that are consistent with improving, maintaining and/or enhancing health, both physical and psychological. Mental health will be used in the context of the normal (as opposed to clinical) population, and will thus refer to mood, mental state, feelings about the self, and general psychological well-being. The focus of this article is the psychological or mental health-related determinants of healthy eating in adolescents and adults, and the impact of healthy and unhealthy eating on mental health, as defined. It should be recognized that mental health issues may often interfere with healthy eating, rather than promote it. In addition, what is healthy eating may be different in a person who is overweight from one who is of normal weight or underweight. Thus, an overweight person who eats less than his or her body needs and loses excess weight may be engaged in healthy eating, whereas a normal or underweight person doing the same thing may be eating in an unhealthy manner, particularly if that person is a teenager who has not yet reached full growth and needs more energy to do so healthily. These distinctions must be borne in mind when reading about research on the influence of eating on mental health and of mental health on eating.

## METHODS

The present article is based on a review that encompassed searches of the literature through PsycINFO and MEDLINE for the last 10 years (1994-2004). Relevant words, such as obesity, mental health, depression, self-esteem, overweight, food intake, restraint, restrained eating, meal size, carbohydrate, protein, fat, meal composition, diet, food, eating patterns and eating habits were searched and examined to determine whether they were relevant to the topic of "eating and mental health." The term "eat" was also paired with relevant terms (affect, emotion, anxiety, depression, stress, alcohol, intoxication, drink, social influence, social norms, matching, insecurity, self-awareness, feedback) and searched. Finally, reference lists in the most relevant articles were examined for citations that did not appear in the literature searches. We could not possibly review all of the relevant studies identified in this manner, so we chose methodologi-

cally sound studies that represent the findings in the area. We thus included representative studies that had control groups, reasonable sample sizes and, when possible, were theoretically based or even experimentally manipulated. In addition, we concentrated our investigation on adolescents and adults, in order to keep the scope manageable.

## Summary of the literature

Simply focussing on what is eaten or how much is consumed sidesteps the important question of *why* people eat the amounts and types of food that they do. Healthy and unhealthy eating are both influenced by a variety of individual and collective (social and environmental) factors, many of which interact with each other in complex fashions. We must understand these factors and their interactions to understand how to promote and support healthy eating, and how to maximize the physical and mental/emotional benefits of healthy eating. Individual psychological factors that affect eating include personality traits such as self-esteem, body image and restrained eating (chronic dieting), as well as mood and focus of attention.

Self-esteem seems to be strongly connected to eating both directly (as shown by experimental demonstrations that lowering self-esteem produces excessive eating)<sup>1,6</sup> and indirectly, through the association of low self-esteem with body or weight dissatisfaction and a corresponding tendency to binge eat or diet in an unhealthy manner.<sup>7</sup> Negative body image predicts excessive food restriction followed by bouts of overeating and even binge eating in adolescent and adult women.<sup>8</sup> Some programs to improve body image have been successful at teaching adolescents to resist media pressure to attain an unrealistic body, preventing the development of less healthy attitudes and behaviours, and helping to promote healthy eating and body weight maintenance.<sup>9-11</sup>

Chronic on-again, off-again dieting (often called "restrained eating" in the literature) can reflect a constellation of behaviours and attitudes that represent a personality trait and have a strong influence on eating. Restrained eaters are characterized not only by concern about their eating, weight and appearance but also by a variety of cognitive and affective attribut-

es, including low self-esteem and negative body image.<sup>12,13</sup> Successful dieting (i.e., avoiding weight gain or maintaining one's current weight) and weight loss, while apparently much less common than unsuccessful attempts, produce improved psychosocial functioning and mood.<sup>14</sup> Furthermore, restrained eating that is not accompanied by disinhibited eating or bingeing is less likely to be related to pathological eating and eating disorders.<sup>15</sup> Conversely, however, for the many dieters who are prone to disinhibition of their eating and who seem to be unable to lose weight, and especially for females, restrained eating or chronic dieting is correlated with negative mood and psychological functioning, overeating or even eating binges in many situations, weight gain or failure to lose weight over time, and a tendency to overeat when stressed or upset in any way.<sup>3,5,16-18</sup>

More transient factors, such as mood and focus of attention, also affect eating. Celebratory feasts often entail overeating, which is unhealthy if it represents frequent behaviour. Stress and negative affect can adversely influence the kinds of foods eaten, either through suppressing eating, as with grief or loneliness, or increasing not only eating but consumption of unhealthy "comfort" foods.<sup>2,4</sup> Restrained eaters often binge eat when they experience negative affect.<sup>1</sup> Negative affect seems to promote ingestion of high-fat and/or high-sugar foods.<sup>1,4</sup> A shift in temporal focus from a long-term desire for good health to a focus on the immediate pleasures of the unhealthy but good-tasting food impairs one's ability to continue striving for the distant goal of being healthy.<sup>19</sup> Conversely, being aware of one's eating or self-monitoring intake can prevent overeating and help to change intake of specific nutrients (i.e., reducing fat or increasing fibre), but may also lead to perceptions that "reduced fat" foods are less tasty.<sup>20-22</sup>

It is evident that everyone is influenced dramatically by physical environmental cues concerning eating. For example, increased portion sizes and marketing of high-fat, high-sugar foods have both been identified as contributors to the increasing prevalence of overweight and obesity in North America.<sup>23</sup> Similarly, the eating situation affects what and how much gets eaten: people who eat while distracted by

television or movies may eat more food, and the food they select is less likely to be low energy or low fat.<sup>24</sup> Moreover, people recognize the influence of environmental factors on other people, but do not acknowledge a similar influence on themselves, even though those effects may be profound.<sup>25</sup> If the role of the environment in the development of unhealthy eating is to be diminished, we must a) explore and systematically articulate these influences, b) make people more aware of the impact that such influences are having on them, and c) create helpful social and physical environments. Many environmental influences gain power from the fact that they operate below the level of the individual's awareness.<sup>25</sup> If we remain oblivious to the influence of collective factors, those factors will continue to exert their pernicious influence by allowing us to feel psychologically comfortable with intakes that are actually physically excessive.<sup>26</sup>

The presence of other people during an eating episode is also a collective factor. Extensive research indicates that the presence of others has profound effects on food intake, often distorting intake away from what would be judged a healthy amount or healthy types of food.<sup>26</sup> The effect of the presence of others on eating may best be understood in terms of three separate social situations – modeling, social facilitation (increased eating with others) and impression management (using eating to make an impression on others) – although all of them probably operate through their influence on perceived consumption norms. People use social cues to decide how much they can eat without attracting negative social judgments from others.<sup>26</sup> The family may be regarded as a special source of social influence and has a strong impact on food selection and eating patterns. For example, studies show that one way to reduce dietary fat in people's diets is to change what other family members are eating.<sup>27</sup> The family also contributes to disturbed eating behaviours and eating disorders,<sup>28</sup> increased consumption in overweight children,<sup>29</sup> and amounts of fruit and vegetables consumed.<sup>30</sup>

The amount that one eats can make one feel good or bad about oneself (good for eating only a small amount of an unhealthy food or bad for eating a lot of the unhealthy food).<sup>4,31</sup> Similarly, people

are influenced in several ways by which particular foods they choose to eat (e.g., being pleased with oneself for eating healthier foods and avoiding unhealthy ones, or seeking relief from distress by eating a particular comfort food).<sup>4</sup> Restricting one's eating, commonly referred to as "dieting", actually causes overeating, even in animals.<sup>32</sup> Binge eating is a consequence of semi-starvation in victims of war and famine, and in volunteers in starvation experiments.<sup>33</sup> Starvation-induced behaviours, in addition to binge eating, include bizarre mixing of ingredients and adulteration of food; eating inappropriate, soiled or discarded food; secrecy, deception and defensiveness.<sup>33</sup> Even normal dieting can produce depression and anxiety of mild to severe proportions,<sup>34,35</sup> or happiness when dieting is successful and perceived excess weight is lost.<sup>31</sup> There is also a correlation between healthy eating and positive mood, though it is not clear which causes which.<sup>36</sup> For example, eating breakfast improves mood.<sup>37</sup> People often use eating specifically to alter their emotional state.<sup>38</sup> They also use their eating to influence how other people view them, and other people's eating can affect their own mood and self-image if they deviate from the behaviour of the group.<sup>36</sup>

### GAPS IN THE LITERATURE

Why does distress or negative emotion cause some people to overeat (especially to overeat unhealthy foods) and others to undereat? We know that distress increases consumption of high-sugar and high-fat foods and snacks, and unhealthy "comfort" foods (often consisting of sweet or salty-fat foods such as mashed potatoes, rich cakes or chocolate in any form), but we know little about why the connection between distress and unhealthy eating exists, or whether it holds for all types of negative affect. Conversely, severe depression or anxiety reduces some people's intake to a minimum, putting them at risk of caloric insufficiency. The question of how emotion and stress affect eating in different people at different times needs clarification. Healthy eating must be achieved as a sustainable lifestyle rather than as a short-term corrective that may dissipate in the face of negative affect.

What factors promote dysfunctional eating, particularly in young women? Eating disorders may not be as prevalent a problem as obesity is, but subclinical variants do affect large numbers of young women. From a population perspective, then, mental health issues that contribute to eating disorders also pose a serious health risk. Does focussing on healthy eating and weight help to prevent disordered eating and eating disorders, or does it exacerbate the problem? Although we have identified a connection between some factors, such as a negative body image, low self-esteem and chronic dieting, and the development of eating disorders, we do not yet know how these associations work or whether other factors are involved.

What impact do low self-esteem and poor body image have on food selection and eating behaviour? Higher self-esteem is associated with healthy eating and lower self-esteem with overconsumption and the development of disordered eating. The same seems to be true for body image, which is itself connected to self-esteem. Are these two factors independently related to eating, or do they interact? Given the frequency of problems with self-esteem and body image, could these be contributing to overeating and obesity, as well as eating disorders? To date, attention has been directed primarily at the eating disorders connection, ignoring the impact of negative self-image on overeating and weight.

To what extent do personality, mood and collective factors interact to control eating? Making sense of the information we have about what promotes or interferes with healthy eating is necessary before we can move forward on a large scale. Some studies have begun to explore the interactive effects of personality, mood and environmental influences, but more systematic investigation of these interactive effects is required before we can design programs appropriate for different people in different milieus.

We still do not understand what determines healthy eating or how to induce people to undertake these behaviours. The literature indicates that when people feel better about themselves, they eat in a healthier manner than when they feel bad about themselves. Conversely, eating well can help us to feel better, which should

encourage healthy eating. Paying attention to our own eating (self-monitoring) or changing our temporal focus seem to be ways to help us to achieve healthy eating, but what other sorts of behaviours promote healthy eating?

How do dieting and weight loss affect mental health and eating? The literature on the effects of restricting energy intake on mental health (and vice versa) is voluminous but full of contradictions. More work is needed to separate the effects of actual energy restriction and weight loss from those of psychological deprivation and resentment. Does restriction cause overeating, or does the psychological feeling of being deprived of desired foods result in overeating when those foods become available? Additional research is also needed in order to determine the extent to which dieting-induced weight loss versus unintentional weight loss is associated with differential (mental and physical) health outcomes.

How does portion size exert its effects on eating behaviour? Some phenomena appear to be well established, but a compelling explanation for them has not been provided or empirically supported. For instance, we know that portion size powerfully affects food intake, often in a detrimental way. It is not clear how portion size exerts its effects, however. Testing the proposal that portion size controls intake by defining the limit beyond which eating would be excessive requires disconnecting the linkage between portion size and judgments of appropriateness.

In conclusion, we are beginning to gain some understanding of the bi-directional relation between mental health and eating behaviours, but further knowledge is necessary to allow us to apply what we are learning in order to promote healthy eating while supporting psychological well-being.

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