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# FOOD DESERTS AND FOOD SWAMPS: A PRIMER

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## INTRODUCTION

Our food environments, which include the food that is available to us in our day-to-day environments, is a determinant of what we eat as individuals.

This document is intended for environmental public health professionals, including medical health officers and public health inspectors, as well as other public health professionals such as public health dietitians and health promoters, whose work may include healthy built environments or healthy communities. The document introduces food environments such as food deserts and food swamps, discusses the related health implications, provides the rationale for consideration by non-nutrition professionals, and highlights some opportunities for action and collaboration with provincial and municipal governments, as well as business operators. For more information about healthy food environments, please see the NCCEH document *Food Environments: An Introduction for Public Health Practice*.

## What are food deserts and food swamps?

There are two types of community food environments commonly cited in the literature: food deserts and food swamps. A third type of food environment has also been referenced, known as a food mirage.

**Food deserts** are geographic areas that have limited access to healthy food. Food deserts are common in the United States, especially in neighbourhoods that are economically or socially disadvantaged.<sup>1</sup> Neighbourhood residents may lack economic resources or transportation required to overcome geographical barriers to access affordable healthier food. Residents in food deserts may be dependent on convenience stores or fast-food restaurants to access food, leading to lower quality diets. In Canada, these food deserts are less common, although they have been identified in some cities.<sup>1-3</sup> Canadians living in rural areas may experience food desert conditions, requiring long

distance travel to access healthy food.<sup>3</sup> Lack of access to healthy food in the community impedes people's ability to maintain a healthy diet.

In contrast, the more common type of community food environment in Canadian urban settings is the food swamp.<sup>3</sup> A **food swamp** is a geographical area with adequate access to healthy food retail, but that also features an overabundance of exposure to less healthy food and beverages.<sup>2,3</sup>

Some researchers have identified **food mirages** as a barrier for individuals experiencing low-incomes to access healthy, affordable food in their neighbourhood.<sup>4</sup> For some residents, the local healthy food retail options may be available, but they are out of reach financially. The effect of a food mirage is the same as a food desert in which residents need to travel a distance away from home in order to obtain affordable, healthy food.<sup>4</sup>

## Current Diet Quality in Canada

Less than one per cent of Canadians follow nutrition recommendations, such as those in *Eating Well with Canada's Food Guide*.<sup>5</sup> In general, Canadians have low intakes of vegetables, fruit and whole grains and eat a relatively large amount of ultra-processed food and beverages.<sup>5</sup> Over time, diet quality has decreased as diet patterns have shifted to reduced amounts of whole and minimally processed food and larger intakes of ultra-processed food and beverages.<sup>6-8</sup> The more ultra-processed food consumed, the poorer the diet quality and the higher risk of developing nutrition-related chronic conditions.<sup>8,9</sup>

Our long-term diet patterns are a determinant of health outcomes such as the development of nutrition-related chronic conditions, e.g., excess weight gain, cardiovascular disease, type 2 diabetes and some types of cancer.<sup>10</sup> Some symptoms of poor mental health such as depression and anxiety have also been linked to suboptimal diet patterns.<sup>11-13</sup>

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## Societal Burden of Poor Diet Quality

Suboptimal eating habits pose a significant societal financial burden.<sup>14,15</sup> The economic burden of chronic diseases can be measured by reductions in productivity and life expectancy, as well as an unsustainable increase in healthcare expenditures. In Canada, chronic diseases represent 89% of all deaths.<sup>16</sup> A significant proportion of those deaths are a result of suboptimal diet quality.<sup>17,18</sup> Direct healthcare costs of treating diabetes, cardiovascular disease and cancer in Canada were \$19.8 billion in 2015.<sup>16</sup> Inadequate vegetable and fruit consumption alone costs 3.3 billion per year through a mix of direct healthcare costs and losses in productivity.<sup>16</sup>

## What Factors Influence Food Choices?

Income is a primary determinant of diet quality. In 2012, almost 13% of Canadian households experienced food insecurity,<sup>19</sup> defined as “inadequate or insecure access to food because of financial constraints.”<sup>20</sup> Not having enough money makes it difficult, if not impossible, to maintain an adequate intake of healthy food and beverages.<sup>19</sup>

Using a solely educational approach to promote healthy eating can be considered elitist, as the strategy relies on individual agency to overcome systematic environmental barriers to a healthy diet.<sup>17</sup> Food literacy, defined as the “knowledge, skills, and behaviours needed to feed yourself” can be considered necessary for individuals to be able to select and prepare healthy food.<sup>19</sup> However, nutrition knowledge and food skills are not necessarily sufficient to ensure a consistent healthy eating pattern, as there are many other factors that influence individual food choice.

Food swamps introduce an environmental barrier to healthy eating by exposing individuals to food cues for tempting food and beverages.<sup>21</sup> Seeing food images or having opportunities to eat tempting food stimulates the brain’s reward centre, creating a craving or desire to eat.<sup>21,22</sup> Resisting tempting food requires mental energy. However, the part of the brain responsible for resisting tempting food is also used to process stress or deal with negative moods.<sup>23</sup> Therefore, in certain mental states people may not have enough mental energy to overcome temptation. Using mental energy to make choices may also impair the ability to use willpower to make subsequent choices, also known as decision fatigue.<sup>24,25</sup> For example, people may be vulnerable to purchasing less healthy food at the end of a grocery shopping trip.

There is also some evidence to suggest that people have reduced willpower when they are hungry.<sup>26-28</sup> This research

suggests that people are more likely to make impulsive or indulgent food decisions when they are hungry, such as when grocery shopping on an empty stomach.

Personal beliefs may also prevent individuals from following through with their intentions to follow a healthy eating pattern. Seventy-seven percent of Canadians rate their diet as good, very good or excellent.<sup>6</sup> However, only 0.5% of Canadians eat a diet that is rated “good,” using an objective measurement of diet quality.<sup>5</sup> Being over-optimistic about personal eating habits can make people falsely believe that they do not need to make diet improvements.<sup>5</sup> Similarly, self-licensing allows people to indulge in less healthy eating habits by providing a reason that they should not feel guilty when they indulge.<sup>29-32</sup> For example, “I deserve a treat because I went to the gym.” Lastly, guidance to help individuals enjoy certain foods without negatively influencing health, using ambiguous terms such as moderation, can actually cause overconsumption as people falsely assume whatever they are eating meets the definition of moderation.<sup>33</sup>

Humans also have a tendency to focus on short-term rewards, for example, eating something tasty, even though it does not support long-term health goals.<sup>34,35</sup>

These factors reinforce the importance of health-supporting food environments in which healthy food choices are the easier choices, thereby removing the need to use individual agency to overcome these systematic barriers to healthy eating.



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## Rationale for Collaborating with Environmental Health in Healthy Food Environments

There has been a historical tendency for public health initiatives to be developed in “silos.” Public health can be optimized by identifying opportunities for collaboration between different teams. Without cross-topic consultation, improvements in one area may lead to unintentional consequences in another area.<sup>36</sup> Although the core of the work of public health inspectors remains focused on reduction of risks and hazards for infectious diseases in food, water, wastewater disposal, and personal services settings and practices, public health inspectors are familiar with the concept of health promotion in the context of their work.<sup>37</sup> This often involves educating operators to enable them to reduce or contain environmental health hazards such as unsafe or impure food and water or pathogens in their facilities.<sup>37</sup>

Historically, health and the built environment were strongly linked. Public health inspectors and medical doctors were at the forefront of the movement to improve sanitation and hygiene to reduce the prevalence of infectious diseases, using zoning and urban planning as tools.<sup>38</sup> As the prevalence and burden of chronic diseases increase, environmental health professionals can play a role in influencing and advocating for changes to the built environment in order to target upstream determinants of health.

Environmental health professionals may be the first point of contact in a regional or provincial health agency for municipal officials, land-use planners or food service operators. As PHIs conduct routine inspections in various settings, provide consultations to operators, and engage in intersectoral collaborations with community partners, they are well situated to raise awareness about the importance of healthy food environments. They are also well placed to advocate for collaborations with municipalities, operators and other public-health staff, such as dietitians and health promoters, to improve community and consumer food environments.<sup>39</sup>



## How Can Municipalities and Public Health Work Together to Improve Community Food Environments?

There are several initiatives and interventions that can be undertaken, some through collaborations within public health, others through joint collaborations between public health, provincial ministries and governments, municipalities, and private industry. These initiatives and interventions differ depending on whether the community is a food desert or a food swamp. In food deserts, interventions aim to increase access to healthy foods, whereas in food swamps, the goal is to reduce the availability of or exposure to less healthy foods.

### POTENTIAL INTERVENTIONS AND INITIATIVES

#### Food Deserts

##### POLICIES AND LEGISLATION

- Permit temporary farmers' markets in areas known to be food deserts.
- Permit mobile healthy food vending (*i.e., vegetables and fruit*).

##### FINANCIAL INCENTIVES

- Reduce licensing fees for food outlets that carry a higher proportion of healthier foods.<sup>40</sup>
- Create tax incentives to draw greengrocers or full-service grocery stores in areas that lack access to healthy food.

##### ADVOCACY

- Advocate for changes to land-use zoning to allow for community and school gardens.
- Promote public transit improvements to improve access to full-service grocery stores, especially for those with low income or mobility limitations.
- Educate local government officials about the need for equitable access to healthy food.

##### SUPPORT RETAIL FOOD ENVIRONMENTS

- Provide staff support to implement healthy corner stores programs.
- Provide staff support to start and maintain community and school gardens.

## Food Swamps

### POLICIES AND LEGISLATION

- Support minimum distance by-laws for food trucks and other unhealthy mobile food outlets from schools and other venues where children spend their time.
- Support minimum distance by-laws for fast food outlets and convenience stores from schools and other venues where children spend their time.
- Provide guidance to local government officials on implementation of new zoning regulations or by-laws for minimum distances of fast food and unhealthy food outlets from schools and other places frequented by children.
- Consult with public health nutrition professionals and food safety professionals on official community plans.

### SUPPORT RETAIL FOOD ENVIRONMENTS

- Provide nutrition support to help restaurant operators and food retail settings create and promote healthier choices, for example, altering in-store marketing, point-of-sale product promotions and pricing to promote healthy food and beverages.
- Encourage healthy grocery and convenience store check-out lanes in retail food settings.
- Encourage restaurants to make the healthier options the default option, for example, offering a salad with meals with the option to request fries.
- Support restaurant menu calorie labeling legislation.

### ADVOCACY

- Educate local government officials about the need for consideration about the density and location of less healthy food retail within communities.
- Provide recommendations to provincial and local governments to support healthy food environment interventions.

### CONSUMER EDUCATION

- Provide food literacy education and resources to enable consumers to make healthier choices in retail food settings.

## Knowledge Gaps

Food environment research continues to evolve, providing opportunities for interventions that can have a positive effect on the diet quality of the population. However, several inconsistencies exist in traditional food environments research methods, which affect the applicability and translatability of research evidence to practice.

### INFLUENCE OF DENSITY VERSUS PROXIMITY

Research related to food environments and population health has historically relied on finding associations between the density of certain types of food retail outlets and health outcomes.<sup>41</sup> However, it is unknown whether density of or proximity to less healthy food retail has a greater influence on people's food purchases and consumption decisions.<sup>41</sup> It has been suggested that for some populations, such as adolescents who have limited access to transportation, the community food environment is a significant determinant of food purchases.<sup>42</sup> Therefore, density and proximity may not be universal in their influence on individual food decisions.<sup>43</sup>

### CAPTURING WITHIN-STORE INFLUENCES ON FOOD CHOICES

Food environment research typically dichotomizes food retail settings into healthy or unhealthy categories, without capturing within-store features such as the proportion of healthy versus unhealthy foods, pricing, promotion, and convenience.<sup>41</sup> Within each type of food retail setting, there are opportunities to purchase healthy and less healthy food and beverage options. Grocery stores, for example, are labeled as healthy food retail in the literature even though a significant proportion of food and beverages available for sale are not considered to be healthy choices.

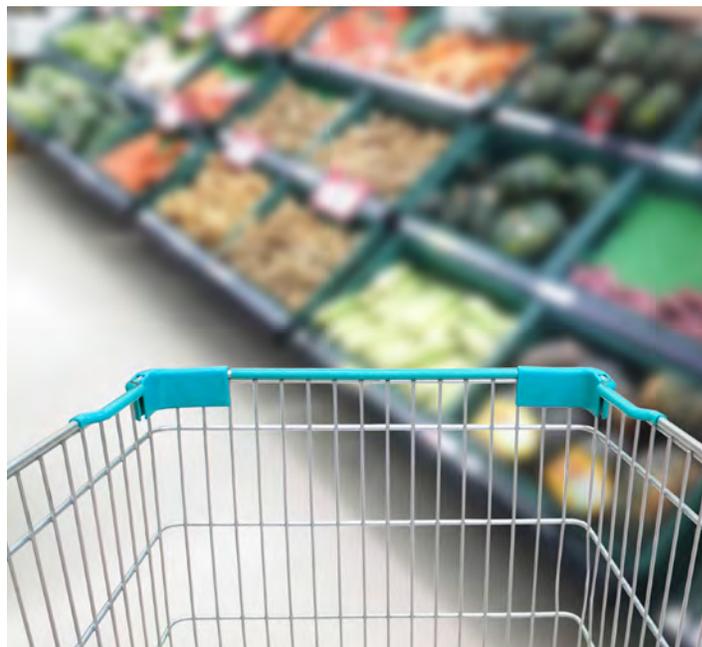


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## INTERACTIONS WITH FOOD RETAIL OUTLETS

Traditional food environments research methods may miss individual factors that influence where and when people interact with food retail outlets, such as time constraints, financial constraints, social influence, cultural appropriateness, proximity to work, proximity to recreation or entertainment, as well as proximity to the homes of friends or family members.

## USING SALES DATA TO MEASURE CONSUMER HABITS

Typically, outcome variables such as self-reported Body Mass Index (BMI), waist circumference (WC), or diet quality are used to determine the effects of the food environment on individuals.<sup>3</sup> However, self-reported data is prone to several errors, leading to a lack of consistency in the literature.<sup>41</sup> Similarly, diet quality is not consistently assessed across studies and there is variability in the definition of a high-quality diet.<sup>44</sup> To improve on this aspect of food environment research, it has been suggested that objective outcome variables such as sales data be used to accurately capture consumer purchases in different food retail settings, rather than relying on self-reported diet quality or long-term health outcomes such as BMI or WC.<sup>41</sup>

## Practice Gaps

In recognition of the population health impacts that built environment decisions may have, there is a need for public health to be part of the stakeholder group for municipal planning and decision-making. In Canada, municipalities are not required to consult with public health for new developments, city or community plans, or zoning changes, among other changes to the built environment. Public health involvement in municipal planning decisions goes beyond healthy food environments to many other public health areas of interest. While environmental health practitioners in some regions and provinces have been increasingly involved in built environment decisions, continued advocacy for a health-in-all-policies approach across the country is needed.

## Conclusion

Making changes to communities to create supportive retail food environments is challenging. It will require collaboration across several food- and nutrition-related professions to ensure that nutrition, food safety, environmental sustainability, agricultural production, land use, and zoning, promote positive community health outcomes.<sup>45</sup> Municipal decisions will need to consider local community development, economic development, and the culture of the community.<sup>45</sup> However, political decisions that add services tend to be more palatable to the population than decisions that appear to constrain personal choice. An example of this is changing zoning to allow a community garden compared to altering zoning to restrict convenience stores or fast food restaurants.<sup>41</sup> Because of this, it can be challenging for decision makers to enact legislation to effectively reduce the impacts of food swamps. Cooperation between private and public sectors is required to build a food system that supports population health; however, the interests and values of the public and private sectors may not align.<sup>45</sup>

Education on healthy eating habits is unlikely on its own to result in adequate diet quality and healthy eating habits. This is especially true in food swamps, due to both personal physiological and psychological limitations, as well as the reliance on constant use of willpower in a food environment with plentiful opportunities to indulge.

The most practical way to improve Canadian eating habits is to ensure adequate access to healthy, affordable food, while reducing exposure to tempting food in our communities. However, this requires multi-sectoral collaboration between public health, municipalities, business operators, food distributors and suppliers, as well as within public health between health promoters, public health dietitians, healthy community teams, and public health inspectors, among many. Public health can lead the efforts by acting as the catalyst for dialogue and action. Public health can also work with municipal and city planners and business operators to raise awareness about the linkage between suboptimal diets and chronic disease outcomes.



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