

PUBLIC POLICY AND

Health

The Impact of the Built Environment on Physical Activity, Diet, and Body Weight: Summary



Context

This edition of the Public policy and Health series is a summary of a report written by Pascale Bergeron and Stefan Reyburn¹ from the Direction du développement des individus et des communautés of the Institut national de santé publique du Québec (INSPQ), under the scientific coordination of Johanne Laguë. It was produced at the request of the Ministère de la Santé et des Services sociaux (MSSS) to advise the Ministère des Affaires municipales, des Régions et de l'Occupation du territoire (MAMROT) on the health impacts of the *Act Respecting Land Use Planning and Development*, which is currently under review. The report is primarily intended for public health managers and professionals at the MSSS, but also for all decision makers and professionals whose work has an impact on the built environment in Québec. This summary was produced by the INSPQ's public policy team (Roseline Lambert, Geneviève Lapointe, and Maude Chapados) and seeks to facilitate knowledge transfer to a broad audience.

1) Readers interested in obtaining more details on the contents of the report or the complete list of bibliographic references are invited to consult the document in its entirety at: www.inspq.qc.ca/publications/default.asp?NumPublication=1108.

Highlights

The built environment has an influence on lifestyle and body weight

Physical activity is promoted through:

- More walkable neighbourhoods
- The presence of sidewalks, walking paths, and bike paths
- A substantial presence of recreational and sports infrastructure including parks, pools, playgrounds, and sports clubs.

Healthy eating is promoted through:

- Having easy access to food retailers that are located close to homes and that offer healthy foods at affordable prices.

The environment as the target of healthy public policy

Several health organizations, including the World Health Organization (WHO), the National Institute for Health and Clinical Excellence (NICE), and Kino-Québec have identified the built environment as one of the targets for significant action to address weight-related problems in our societies and recommend:

- Promoting active transportation
- Promoting density and mixed land use
- Improving access to sports facilities and infrastructure
- Increasing the availability of quality foods offered in under-served neighbourhoods.

The obesity epidemic affects Québec

Québec is not immune to the current obesity epidemic that is taking place all around the world. According to 2004 data, 56% of Quebecers weigh more than they should, with 34.3% overweight (BMI² between 25 and 30) and 21.5% obese (BMI > 30). This situation is all the more worrisome in that it increased recently; the prevalence of overweight rose from 43% to 56% between 1990 and 2004.

Weight-related health issues are a public health priority given their scope and impact on many physical and psychological diseases. Obesity is a major risk factor for many diseases and is to blame for 67% of chronic diseases, including cardiovascular disease, high blood pressure, type 2 diabetes, many types of cancer, and psychological problems.

Features of the built environment associated with lifestyle and body weight

Reducing weight-related health issues is a priority for the Québec government as illustrated in the *Plan d'action gouvernemental de promotion des saines habitudes de vie et de prévention des problèmes reliés au poids 2006-2012* (2006-2012 government action plan to promote healthy lifestyles and prevent weight-related health problems). This plan seeks to reduce obesity and overweight prevalence rates by 2012.

Although lifestyles, including physical activity and diet, are not the only cause, they are a significant determinant in whether someone is overweight. Lifestyles are influenced by different individual factors, including attitudes, beliefs, and knowledge, as well as by environmental factors including the physical, social, political, economic, and media environment.

The built environment is one of these environmental factors that influence lifestyles. The built environment is defined as **any element in the physical environment that has been built by humans**, for example roads, buildings, infrastructure, and parks. Scientific literature demonstrates that the built environment in various settings (schools, daycare centres, workplaces, neighbourhoods, etc.) can **facilitate**, but can also **impede** regular physical activity and the adoption of healthy eating by citizens.

The built environment has three major dimensions: the transportation system, land use (i.e. different activities within a given geographical area), and urban design. Features of the built environment associated with healthy lifestyles and weight are listed in Table 1.

2) BMI refers to body mass index, a calculation that uses weight and height to evaluate the risks associated with being overweight among adults.

TABLE 1 FEATURES OF THE BUILT ENVIRONMENT ASSOCIATED WITH PHYSICAL ACTIVITY, DIET, AND WEIGHT

Dimensions	Sub-dimensions	Elements
Transportation system	Configuration of the street network	Continuous street network Street network connectivity (ex.: in a grid pattern)
	Non-motorized transportation infrastructure	Bike paths Sidewalks
	Public transportation infrastructure	Bus stops Train stations
Land use	Mixed land use	Mix of industrial, commercial, recreational, civic, and residential uses within a geographical area
	Density	Business density Employment density Population density
Urban design	Urban design (streets)	Sidewalk width and surface Lighting Benches, garbage cans, greenery along streets Traffic calming measures
	Urban design (sites)	Parking Pedestrian crossings Building height and width, architecture

The built environment exerts its influence on lifestyles and body weight through three main factors: **accessibility** (economic, social, and geographic), the **attractiveness** of this environment, and **safety** (in terms of road traffic and crime). A built environment that is safe, attractive, and that promotes access to healthy food and provides citizens with a variety of opportunities to be physically active in their daily lives is considered conducive to the adoption of healthy lifestyles. Table 2 (page 4) presents the statistically significant associations between built environment characteristics, weight, and lifestyles.

TABLE 2 ASSOCIATIONS BETWEEN VARIOUS DIMENSIONS OF THE BUILT ENVIRONMENT, PHYSICAL ACTIVITY, DIET, AND BODY WEIGHT (BODY MASS INDEX – BMI)

Built environment	Physical activity	Diet	BMI
Urban form (density, mixed land use, street connectivity)	•		•
Urban sprawl	▣		•
Urban design (lighting, upkeep, aesthetics, etc.)	▣		▣
Presence of non-motorized transportation infrastructure	•		▣
Access to recreational and sports infrastructure	•		▣
Access to restaurants		▣	▣
Access to food stores		•	•
Food stores design		○	○

• = Demonstrated association

○ = Lack of association or relationship not studied

▣ = Mixed observations or relationship not well studied

The built environment, physical activity, and body weight

The scientific studies reviewed in the report *Impact of the Built Environment on Physical Activity, Diet, and Body Weight* show associations between elements of a community's built environment and the physical activity of its citizens during their leisure time as well as for transportation purposes. However, the majority of these studies come from the United States, the United Kingdom, and Australia; very few studies have been conducted in Québec.

More walkable neighbourhoods are associated with active transportation

A more walkable neighbourhood is one that is densely populated, where several businesses and services are present, and where the streets are connected so that pedestrians can circulate more easily. This type of neighbourhood is positively correlated with active transportation including walking, biking, and with the use of public transit by residents, in addition to a lower prevalence of overweight. High urban sprawl, as exists in some residential suburbs for example, is characterized by low land use diversity, low residential density, the absence of a downtown, and less street connectivity. This type of built environment is associated with a greater prevalence of overweight.

Non-motorized transportation infrastructure makes a difference

The presence of sidewalks, and pedestrian and bike paths in residential neighbourhoods is associated with physical activity by its citizens, and this is especially true during their travel. Thus, people are using active transportation more when several destinations (businesses, schools, etc.) are located close to their homes and when they are linked to them by routes that encourage biking, walking, and public transit.

More recreational and sports infrastructure offer more opportunities to be on the move

A greater presence of recreational and sports infrastructure such as parks, pools, playgrounds, and sports clubs in residential neighbourhoods is associated with more physical activity among residents. This is the case for adults and particularly so among young people.

In Québec, the preliminary results of a major study demonstrate that young people living close to parks and green spaces walk more than those who do not.

The built environment, diet, and body weight

Some elements of the built environment are associated with certain dietary habits among citizens.

Easy access to food stores offering healthy, diverse, affordable foods is associated with healthy eating

An environment that promotes ready access to food retailers, like supermarkets, that are located near residents' homes and offer healthy, affordable foods has been associated with a greater consumption of fruits and vegetables by the residents who live there and a reduced prevalence of overweight. This is particularly true of underprivileged neighbourhoods. Conversely, greater access to convenience stores has been associated with a lower consumption of fruits and vegetables.

An environment with several supermarkets located close to homes, offering access beyond that limited to cars, can thus promote the adoption of healthy eating and maintenance of healthy weight. The only data from Québec focuses on Montréal and concludes that there are no food deserts on the island; however, close to 40% of Montréal's population cannot get an adequate supply of fresh fruits and vegetables within walking distance of their homes.

Aside from the proximity of homes, other characteristics of the built environment, particularly those associated with urban design, can also have an impact on access to various food retailers. The location of parking spaces near businesses, the location of crosswalks, and the presence of traffic calming measures are all examples. When all of these characteristics are taken into account, in North America, ready access to various food retailers would not always exist. In fact, especially outside of large urban centres, the transportation network does not always provide access to food retailers by means other than motorized vehicle, since sidewalks or bike paths leading directly to these establishments are non-existent. This may prove problematic to some segments of the population. Indeed, some people are viewed as being trapped in their neighbourhoods due to reduced mobility (seniors, parents of young children, people without access to a motorized vehicle, etc.). Access to quality businesses in the neighbourhood by means other than by car is of critical importance to these individuals.

Furthermore, the impact of accessibility to different types of restaurant (for example, fast-food restaurants) on the quality of residents' diets and weights is an expanding field of research. Once again, studies addressing this issue have been carried out, particularly in North America, but no clear pattern has emerged.

A SPECIFIC CONTEXT: THE BUILT ENVIRONMENT AROUND SCHOOLS

Given the high prevalence of overweight young people (close to one in five young Quebecers) and the high consumption of junk food among this age group, researchers are raising questions about the built environment around schools. The attraction of fast food is very real among young people and they are significant consumers of it. In the seven days preceding a major dietary survey of young Quebecers, no less than 54% of those surveyed (ages 9 to 11) had consumed food from a fast-food restaurant. Furthermore, the same study revealed that 34% of children between the ages of 6 and 8 consume snack foods, candy, or soft drinks on a daily basis, and this proportion increases to 44% among youth ages 15 and 16.

A disturbing concentration of fast-food restaurants was found around schools in North America. In Québec as a whole, an estimated 37% of public schools have fast-food restaurants available within a 15-minute walk. Further research is required to determine the impact of the concentration of these restaurants on the diet and weight of young people.

A SPECIFIC CONTEXT: THE BUILT ENVIRONMENT IN DISADVANTAGED NEIGHBOURHOODS

Socio-economic status is recognized as an important determinant of an individual's weight. Moreover, the socio-economic status of a neighbourhood is also associated with weight, regardless of the individual's socio-economic status.

For example, a longitudinal study carried out among 2152 Canadian children between 1994 and 2002 revealed that living in a disadvantaged neighbourhood was associated with an increase in BMI over time. After individual and family risk factors (age, sex, income, education, single-parent family) are taken into account, the BMI of children living in neighbourhoods with low average incomes was shown to increase over time more than those of children in affluent neighbourhoods.

A lack of sports and recreational infrastructure in disadvantaged areas may in part explain this surplus risk. Disadvantaged areas in North America have specific built environment characteristics. Recreational and sports infrastructure are rarer, as are supermarkets. On the other hand, it has been observed that these neighbourhoods have a high concentration of fast-food restaurants. Further research is required to get a better understanding of the characteristics of disadvantaged neighbourhoods in Québec.

Yet, a study in Montréal revealed that disadvantaged areas and the downtown area are well-served and sometimes even better served than some more affluent outlying neighbourhoods. Nonetheless, 17.18% of the individuals studied, living mainly in the disadvantaged neighbourhoods of St-Henri and Hochelaga-Maisonneuve, could be considered less well-served by supermarkets. Another study of economic access to healthy food in Montréal did not find a correlation between access to fresh fruits and vegetables in a neighbourhood and the neighbourhood's socio-economic status.

There is no data on the food landscape outside Montréal, especially in disadvantaged areas. Food deserts may exist elsewhere in Québec; this should be investigated.

A promising strategy recommended by experts: Action on the built environment

Several health organizations including the WHO and the NICE have identified the built environment as one of the targets for major action to address the weight-related problems in our societies. Although there is little evidence pertaining to the impact of preventive action on weight, there is a broad consensus among these experts on promising avenues for action.

Scientists and public health experts are of the opinion that to effectively address weight-related issues, a strategy directed at both the individual and the environment in which he or she is living must be employed. It is therefore desirable that environmental action and public policy seek to make the built environment more amenable to the adoption of healthy eating and physical activity. Several recognized health organizations including the WHO, the NICE, the Centers for Disease Control and Prevention (CDC), the Institute of Medicine, and, in Québec, Kino-Québec, have proposed these types of action.

Promoting active transportation

Experts agree on the importance of promoting active transportation to encourage physical activity. Thus, it's important to ensure that the development and maintenance of **street networks take cyclists and pedestrians into consideration** through the establishment of sidewalks, cycling paths, and traffic calming measures. Public areas and parks must also be accessible using **active transportation** and must be safe, well-maintained, and of high quality. The same goes for businesses and services, which should be accessible by foot, bike, or other methods of active transportation. The CDC and WHO also believe it is important to facilitate access to **public transit**.

Promoting land use diversity

These experts are also urging the authorities concerned to promote density and mixed land use as way to increase the accessibility and proximity of services and businesses. The Centers for Disease Control and Prevention place particular importance on taking action during the construction of new residential developments or the revitalization of old neighbourhoods by using tools such as zoning by-laws to increase the density of real-estate developments, promoting land use diversity, increasing the connectivity of streets, and building sidewalks, as well as maintaining or creating green spaces.

Examples of action taken in other countries

Improving access to sports facilities and infrastructure

These experts recommend enhancing year-round access to safe and attractive sports and recreational infrastructure as a way of expanding opportunities to be physically active during leisure time. The NICE also recommends that this infrastructure be accessible by foot and on bike and proposes adapting non-traditional urban areas (e.g. public parking lots outside of normal business hours) for physical activity. The Centers for Disease Control and Prevention support this strategy particularly for communities that lack sports facilities. Here at home, Kino-Québec recommends designing buildings that encourage physical activity with bicycle racks, suitable urban furniture, proper lighting, accessible and attractive staircases, for example.

Increase the availability of quality food in under-served areas

These organizations advocate working on the food environment in communities to make it more conducive to adopting healthy eating. The WHO recognizes that the location of food retailers may have an impact on citizens' diets and that poorer neighbourhoods may be under-served. It also maintains that it is important to involve local business associations and urban planners in decisions regarding the establishment of new food retailers in different neighbourhoods. The Centers for Disease Control and Prevention and the Institute of Medicine in the US urge the establishment of public policy, including financial incentives and technical assistance in particular, to attract supermarkets into neighbourhoods that lack them. Moreover, they recommend promoting the availability of healthy, affordable foods in small stores and the establishment of public markets and community gardens, also with the help of these public policies. They also call for changes to zoning by-laws to limit the presence of fast-food restaurants around schools.

- In Australia, the government's policy on urban development (1998) seeks to develop residential neighbourhoods that promote active transportation (greater street connectivity, greater residential density, mixed land use, and increased public transit).
- In 1999, the State of Wisconsin adopted *Wisconsin's 1999 Comprehensive Planning Law*, which states that by 2010, all cities and towns must have zoning by-laws that encourage greater density in their developments and diversity of land use, and a built environment that focuses on the specific needs of pedestrians.
- In Oregon, transportation (*Metro's Regional Transportation*, 1991) and residential (*Metropolitan Housing Rule*, 1981) regulations stipulate that a minimum of 50% of new residential buildings must be townhouses, row houses, or multi-lodging units. Recently a new community of 68 000 people near Portland was created and is a tangible example of the results of these regulations.
- In the United Kingdom, a government policy to reduce social health inequalities (*Food Poverty Eradication Act*, 2001) sought to eradicate food deserts by increasing access to quality food in some underprivileged neighbourhoods. Two supermarkets opened their doors in areas targeted as being underprivileged. An impact assessment of this measure, which suffered from some methodological shortcomings, concluded that there was a perceptible improvement in the diets of residents in these areas.
- The City of Los Angeles, California voted in favour of a moratorium on establishing new fast-food restaurants in some disadvantaged areas, specifically to address problems associated with obesity. More impact assessments are required to determine the effectiveness of this action.
- The City of Detroit, Michigan banned the establishment of fast-food restaurants within a 500-metre perimeter of schools. Other examples of this type of action exist in Massachusetts and California.

The Québec context

Government action plan to promote healthy lifestyles

In Québec, the *Government Action Plan to Promote Healthy Lifestyles and Prevent Weight-Related Problems*, made public in 2006, stipulates that sustainable improvement to the dietary habits of citizens requires the adaptation of various environments to better support healthy food choices. This plan proposes actions to increase the availability of and accessibility to healthy foods among economically disadvantaged populations. Municipalities are identified as important partners in creating supportive food environments and assisting with several actions, specifically by promoting the development of public markets and community gardens.

Healthy lifestyles and land use planning

In Québec, the *Act Respecting Land Use Planning and Development* is currently being reviewed and this provides a unique opportunity to establish healthy public policy linked to the built environment. Experts have suggested expanding the health references included in the Act. For example, the impact of the built environment on lifestyle and weight could be explicitly mentioned. These concerns could also be written into the new version of the orientations of the Ministère des Affaires municipales, des Régions et de l'Occupation du territoire (MAMROT) pertaining to land use. More systematic use of health impact assessments during the construction or renovation of various types of infrastructure has been identified as another promising avenue. Finally, a broader participation of public health professionals in reviewing land use development plans is another way of incorporating the promotion of healthy lifestyles into decisions associated with land use planning.

Recently, Québec lawyers examined the issue of restricting fast-food restaurants around Québec schools. The authors of this opinion believe that, although health concerns are not under municipal jurisdiction but are the responsibility of provincial and federal governments, zoning by-laws could be changed to regulate fast-food restaurants around schools with the goal of reducing the prevalence of overweight.

Initiatives seeking to promote healthy lifestyles and the built environment

In Québec, some initiatives to promote healthy lifestyles by improving the built environment are already underway. For example, the Réseau québécois de Villes et Villages en santé (Québec network of healthy cities) is supporting several regional initiatives to improve the built environment. The Fund for the Promotion of a Healthy Lifestyle, a joint initiative of the Québec government and the Lucie and André Chagnon Foundation, is currently providing financial support to several interesting initiatives. Among them are those of the Montréal Urban Ecology Centre, working to revitalize urban neighbourhoods to make them more active transportation-friendly, and of Vélo-Québec, striving to extend and improve Québec's cycling network. Also financed by the Fund, the Association pour la santé publique du Québec has launched a project to evaluate the possibility of using zoning by-laws to improve the food landscape around schools.

Orientations proposed by the INSPQ

The Institute proposes the following orientations to guide actions on the built environment at local, regional, and national levels:

To support the development and consolidation of a built environment that promotes a physically active lifestyle and the prevention of weight-related health problems, the INSPQ recommends:

- Promoting greater residential density and developing neighbourhoods by encouraging street connectivity and access to local businesses and services, as a way of maximizing **walkability**;
- Promoting access to **safe, recreational and sport infrastructure** that is attractive and located near residential areas;
- Promoting access to **active transportation infrastructure**, such as sidewalks and biking paths. This infrastructure should be attractive and safe, while linking homes, businesses, parks, and various services;
- Encouraging businesses, whenever possible, to design their facilities **to encourage safe pedestrian and bicycle access** (underground parking, appropriate lighting, pedestrian crosswalks, measures to alleviate traffic, etc.).

To support the development and consolidation of a food environment that promotes healthy eating and the prevention of weight-related health problems, the INSPQ recommends:

- **Ensuring safe access to businesses that offer a broad range of healthy, affordable foods** (i.e. **supermarkets**), especially in less well-served areas.

To support the development and consolidation of public policy and measures that specifically affect land use and urban development, the INSPQ recommends:

- Strengthening **collaboration between public health and regional county municipalities (MRCs)** in reviewing land use development plans and broadening the concept of health impact to take into account dimensions associated with lifestyles and body weight.

- Whenever possible, consulting health impact assessments that take into account repercussions on lifestyle and weight when **creating land use and development plans** and during the **construction or renovation of various types of infrastructure**. Exploring the feasibility of including this type of measure in legislation such as the *Act Respecting Land Use Planning and Development*.
- Making explicit reference in the *Act Respecting Land Use Planning and Development* to the possible impact of **land use planning** on health, lifestyle, and weight. Including these concerns in a new version of the Ministère des Affaires municipales, des Régions et de l'Occupation du territoire's (MAMROT) land use planning orientations for Québec, as an example of best practices.

Finally, the INSPQ recommends encouraging research on the built environment in Québec.

Bibliographic references are available in the complete report at the following Web address: www.inspq.qc.ca/publications/default.asp?NumPublication=1108.

SUMMARY

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