



# The Canadian Medical Association

## Policy on the Built Environment and Health

December 7, 2013

## Table of Contents

<b>CMA – Policy on the Built Environment and Health</b>	<b>2</b>
Background.....	2
<b>What the Research Is Telling Us</b>	<b>3</b>
Physical Activity.....	3
Increased prevalence of obesity.....	4
Increased prevalence of asthma and other respiratory diseases.....	5
Injuries and unintentional fatalities.....	5
Increased prevalence of illness and death related to heat exposure.....	5
Noise Exposure.....	6
Vulnerable populations.....	6
<b>Recommendations</b>	<b>7</b>
Health Care Associations can:.....	7
Health Care Professionals can:.....	8
Federal, Provincial and Local Governments can:.....	8
The Public can:.....	8
Further Research.....	8
<b>Conclusion</b>	<b>9</b>
<b>Definitions</b>	<b>10</b>
<b>Bibliography</b>	<b>12</b>

## CMA – Policy on the Built Environment and Health

### The Built Environment:

*“... [Is] part of the overall ecosystem of our earth. It encompasses all the buildings, spaces and products that are created, or at least significantly modified by people. It includes our homes, schools and workplaces, parks, business areas and roads. It extends overhead in the form of electric transmission lines, underground in the form of waste disposal sites and subway trains and across the country in the form of highways (Health Canada, 1997).”*

The built environment affects every one of us every day, and mounting evidence suggests that it can play a significant role in our state of health and well-being. This policy statement provides the perspective of the Canadian Medical Association on how the built environment can influence health, and what all sectors in society might do to ensure that community design and development takes the health of residents into consideration.

### Background

In the 19<sup>th</sup> century, the industrial revolution attracted hordes of people into cities. Congestion, squalid living conditions, and lack of clean water, clean air, and proper sewage systems led to outbreaks of diseases such as cholera and tuberculosis. These events, coupled with the development of the germ theory, served as a catalyst for public and professional awareness of how the built environment has direct health impacts; clean water, fresh air, uncongested living conditions, and proper housing were all recognized as constituents of good health.

During the past three decades, the ‘Healthy Cities’ movement has brought a renewed interest to the health implications of the built environment by focusing on disease prevention through community design. Over the years this idea has proliferated, and a body of literature has grown revealing the large scope of health risk factors that may be influenced by the built environment. The literature indicates that the following connections between the built environment and public health are possible:

- Decreased physical activity
- Increased prevalence of obesity
- Increased prevalence of asthma and other respiratory diseases
- Injuries and unintended fatalities

- Heat exposure. (Frank , Kavage S, & Devlin A, 2012) (Franks, Kavage & Devlin, 2012; Health Canada 2013)

There is also mounting evidence that these factors may be compounded for vulnerable populations such as children, the elderly, and those living in poverty.

Smart Growth is an urban planning and transportation theory that became popular almost two decades ago. Though different organizations may differ slightly in their view of what smart growth means, its general aims are to build compact accessible cities that avoid urban sprawl and mitigate auto-dependence. The 'Smart Growth' movement contains tenets that research supports in creating healthy built environments such as mixed land uses, providing transportation alternatives like walking and bicycle infrastructure and public transit, and creating walkable neighbourhoods. (Smart Growth BC, 2012)(See definitions)

## What the Research Is Telling Us

### Physical Activity

Canada's physical activity guidelines recommend that children from 5 to 11 should be active for at least 60 minutes a day; those 18 and over should be active for at least 150 minutes per week. (Canadian Society of Exercise Physiology, 2011). Participation in regular physical activity bestows substantial health benefits; it can lengthen and improve quality of life and reduce the risk for many physical and mental health conditions. Physical activity can improve overall fitness, lower risk for heart disease, stroke, and high blood pressure, lower risk for non-insulin dependent diabetes and the risk of overweight. (Dannenberg, Frumkin, & Jackson, 2011) Physical activity includes more than exercise and leisure time activity, it also includes active transportation such as walking to school, work or errands as part of daily living.

One of the most important determinants of physical activity is a person's neighbourhood. (Jackson & Kochtitzky) Research shows that urban sprawl, access to parks and recreation/fitness facilities, and neighbourhood walkability all may have an impact on physical activity levels (Cutts, Darby, Boone, & Brewis, 2009; Ewing, Schmid, Killingsworth, Zlot, & Raudenbush, 2003).

Individuals living in walkable neighbourhood with a mix of land uses and interconnected street networks were found to be 2-4 times more likely to achieve 30 minutes moderate physical activity a day. Urban design characteristics associated with higher physical activity rates include pedestrian-oriented street and site design, parks, trails, playgrounds and other recreational facilities within walking distance and sidewalks. (Frank , Kavage S, & Devlin A, 2012)

A barrier to physical activity can be the perception of the lack of a safe place to be active. Safety concerns keep 1 in 5 Canadians from walking or bicycling. Urban design that encourages walking and cycling can improve perceived neighbourhood safety. (Heart and Stroke Foundation of Canada, 2011)

There are unique barriers to active modes of transportation in rural communities. Rural environments often lack pedestrian facilities and bike lanes; stores, schools, jobs, and services are sometimes located far apart from homes; and parks and recreation facilities are rare. Understanding these barriers is the first step towards finding opportunities to remove them. (Active Living Research and the Public Health Institute, 2013)

CMA' policy on [Active Transportation](#) recommends that all sectors (government, business and the public) work together, as a matter of priority, to create a culture in their communities that supports and encourages active transportation and physical activity.

### Increased prevalence of obesity

Obesity has almost doubled in the past 3 decades; in 1978 the measured obesity rate was 13.8% and in 2008 the measured obesity rate was 25.4% (PHAC/CIHI, 2011). Obesity is associated with high blood pressure, stroke, and heart disease, which are among the leading causes of disability and death (Statistics Canada, 2008). Mental health conditions, type II diabetes, several types of cancer, among many other diseases, are also linked to obesity (Guh, Zhang, Bansback, Amarsi, Birmingham, & Anis, 2009). The combined cost of obesity and these related conditions was estimated to be \$4.3 billion dollars in 2005 (Public Health Agency of Canada, 2012).

There are many factors involved in this increase, but a causal indicator is the decline in physical activity among Canadians: In 2005, 47% of Canadians were reported as being 'inactive' (Human Resources and Skills Development Canada, 2006).

Urban design that encourages sedentary living habits such as work, home, school and shopping separated by distances that discourage walking, parking lots built as close as possible to final destinations not only discourage walking but encourage automobile usage. (Jackson, Kochtitzky, CDC) Less walkable, auto dependent built environments have been correlated with higher body weights and obesity. (Frank , Kavage S, & Devlin A, 2012)

Furthermore, research indicates that the food environment that we live in, and the amount of healthy food choices we have access to, can affect the chance of becoming obese as well. For example, neighbourhoods with a high density of fast food restaurants or neighbourhoods with poor access to grocery stores (food

deserts) have both been correlated with obesity (Larsen & Gilliland, 2008; Cummins & Macintyre, 2006; Frank L. D., 2009).

### Increased prevalence of asthma and other respiratory diseases

In August 2008, the CMA released a report estimating that the effects of air pollution would result in 11,000 hospital admissions and 21,000 deaths Canada wide, totaling a financial cost of close to \$8.1 billion dollar (Canadian Medical Association, 2008). Carbon monoxide, sulfur and nitrogen oxides, volatile organic compounds, ozone, and lead, among other toxins, are emitted into the air every day from industrial processes and car exhaust. These air-borne chemicals are associated with heart disease, cancer, acute respiratory illness, and the aggravation of other respiratory illnesses such as asthma (Frank L. D., 2009). While the built environment does not directly produce these chemicals, it has a role to play in where those chemicals are emitted, where they are concentrated, and, in the case of vehicles, how much of them are produced.

Urban sprawl has been tied to longer commute times and higher total vehicle miles traveled per person. Neighbourhood design and walkability have been identified as factors that can affect number of vehicle trips taken and transportation mode choice, and increased mixed land use has been identified as a factor that could further decrease emission rates (Newman & Kenworthy, 1989; Frank, Sallis, Conway, Chapman, Saelens, & Bachman, 2006).

### Injuries and unintentional fatalities

Transport-related injuries accounted for a total of \$3.7 billion dollars in healthcare costs in Canada in 2009 (SmartRisk, 2009). The majority of this financial burden was related to motor vehicle, pedestrian, and cycling accidents. Death and injuries from these types of incidents typically happen at a younger age which both increases the years of life lost due to death or disability and the financial burden of continuing care (SmartRisk, 2009).

The built environment perhaps has the most identifiable and direct correlation to this category of impacts. Designs of auto-oriented environments that promote high traffic volume, high traffic speed, and low accessibility for pedestrians and cyclists lead to increased incidence of injuries and fatalities (Surface Transportation Policy Partnership, 2002).

### Increased prevalence of illness and death related to heat exposure

The 'urban heat island effect' is a phenomenon correlated with urban environments that are primarily asphalt and concrete and lack vegetation and

green space. Such environments have been estimated to have anywhere from 1°C to 12°C higher surface level temperatures in comparison to rural areas (United States Environmental Protection Agency, 2012). This can be especially dangerous for elderly individuals in the summertime and studies have demonstrated increased mortality amongst these populations during hot summers (Centers for Disease Control and Prevention, 2009). This is not only an issue of building materials and the balance of green space but has to do with isolation as well: If elderly residents have poor access to public transportation they may not be able to reach air-conditioned facilities.

## Noise Exposure

Noise – be it from transport, industry, neighbours, or construction – is a prominent feature of the urban environment. Prolonged exposure to environmental noise has been directly linked to physical and psychosocial health outcomes, including hypertension, high blood pressure and heart disease, hearing impairment, stress levels, and sleep. There is some evidence linking noise to reduced ability to concentrate and more aggressive behavior. (Stansfeld SA, 2003)

In general, denser neighbourhoods have higher levels of ambient noise through the concentration of more people, traffic, and activities. However, as with air pollution, noise exposure is extremely site-specific and not necessarily exclusive to walkable or auto-oriented neighbourhoods. (Frank , Kavage S, & Devlin A, 2012) Canadian noise mapping data would assist researchers in assessing how environmental noise affects health and assist communities to proactively manage noise pollution.

## Vulnerable populations

The research shows that certain built environment characteristics may affect specific populations such as children, the elderly, low-income populations.

**Children:** Overweight and obesity is an issue for Canadians nationwide, but particularly so for children. Between 1978 to 2004 there was a 70% increase in overweight and obese children aged 12-17 (Statistics Canada, 2006). Obesity in children can lead to health issues such as hypertension, glucose intolerance, and orthopedic complications (Statistics Canada, 2006). Furthermore obesity in childhood has a high likelihood of carrying over into adulthood and may result in further health problems such as diabetes and heart disease (Statistics Canada, 2006). With this in mind, environments that promote physical activity are especially important for this segment of the population. Living in mixed use communities with walkable destinations, parks and recreational facilities is related to greater physical activity. (Dannenburg, Frumkin & Jackson, 2011)

**Elderly:** The elderly population is generally less physically robust and more prone to chronic illnesses, which make them especially vulnerable to air pollution and heat exposure. Physical activity is an important aspect of daily life for this age group as it has been shown to reduce the negative health impacts of aging (Vogel, Brechat, Lepetre, Kaltenbach, Berthel, & Lonsdorfer, 2009). Being physically active however, requires accessible and safe streets that cater to the needs of individuals with mobility issues. Special consideration is required when constructing the built environment to ensure the needs of this growing population.

CMA's policy on Health and Health Care Principles for an Aging Population recommends that communities take the needs and potential limitations of older Canadians into account when designing buildings, walkways, transportation systems or other aspects of the built environment.

**Low Income Populations:** Low income populations are at higher risk for chronic illnesses such as high blood pressure and diabetes, and have a lower overall survivability for major heart attacks (Centre for Chronic Disease Prevention and Control, 2002; Statistics Canada, 1996-97). They are also more likely to smoke, be overweight or obese, and are less likely to be physically active (Creatore, Gozdyra, Booth, & Glazier, 2007). Many of these factors may be due to limited access to stable housing, housing location (normally close to highways or industrial zones with high pollution exposure), neighbourhood safety, and lack of access to or affordability of healthy food options.

## Recommendations

Planning and public health combined efforts in the 19<sup>th</sup> century to improve living conditions. Today there is a need for health care practitioners, particularly those in the public health field, and community planners to work together, to share their expertise and efforts, to improve the health and well-being of Canadians. By designing communities that encourage and support healthy living – physical activity, healthy weights, access to healthy foods – we can address some of the risk factors for many chronic diseases and create supportive, active communities.

### Health Care Associations can:

- Advocate for health supportive environments by increasing the public and policy makers' understanding of the impact of the built environment on health.
- Advocate for the contribution that public health professionals can make to urban planning and development to ensure that population health impacts are recognized and mitigated.



- Provide community planners with strong public health arguments and health data to support healthy communities.

#### Health Care Professionals can:

- Incorporate an awareness of a patient's built environment (such as housing, access to transportation and healthy foods) into treatment programs and health counseling.
- Encourage your community to adopt policies and design principles that build healthy supportive environments.

#### Federal, Provincial and Local Governments can:

- Integrate concepts of population health into urban planning.
- Promote multidisciplinary planning teams, including professionals in medicine, public health and community design to ensure that all stakeholders take health impacts into account.
- Incorporate health impact assessments into community planning and development initiatives in the public sector.
- Encourage the private sector to provide infrastructure and amenities in developments that promote healthy living.

#### The Public can:

- Learn more about the connection between the built environment and health and advocate for positive change.
- Become involved in public consultations regarding local community planning and development.

#### Further Research

- Develop research projects at the Federal level on the impact of the built environment on health to inform and help coordinate programs and initiatives at the provincial and local levels.

- Focus on creating a standardized set of health indicators that can be uniformly applied to assess the status of a community's built environment.
- Research into the effectiveness of policy options on various communities (urban, suburban, rural).

## Conclusion

It is important that we acknowledge how our surroundings can affect our lives and health, and work together to create positive change. The CMA is willing to work with other people and organizations to ensure that the influence of the built environment on health receives the attention that it warrants with the ultimate goal of building or re-inventing healthy communities for all Canadians.

## Definitions

In order of appearance

Inactive: “Respondents are classified as active, moderately active or inactive based on an index of average daily physical activity over the past 3 months. For each leisure time physical activity engaged in by the respondent, an average daily energy expenditure is calculated by multiplying the number of times the activity was performed by the average duration of the activity by the energy cost (kilocalories per kilogram of body weight per hour) of the activity. The index is calculated as the sum of the average daily energy expenditures of all activities. Respondents are classified as follows: 3.0 kcal/kg/day or more = physically active; 1.5 to 2.9 kcal/kg/day = moderately active; less than 1.5 kcal/kg/day = inactive”. (Human Resources and Skills Development Canada, 2006).

Urban Sprawl: “A particular type of suburban development characterized by very low-density settlements, both residential and non-residential; dominance of movement by use of private automobiles, unlimited outward expansion of new subdivisions and leap-frog developments of these subdivisions; and segregation of land uses by activity.” (United States Department of Housing and Urban Development, 1999)

Walkability: Walkability refers to the ease with which pedestrians can move within and between environments. The literature gives varied definitions but the main variable to consider are the following: mixed land use (defined below), proximity to destinations (accessibility and convenience), pedestrian facilities (sidewalks, urban furniture etc...), street connectivity (short block lengths, availability of multiple alternate routes etc...), aesthetics (landscape, vegetation, architecture), presences of public spaces (parks, plazas, etc...), presence of traffic calming measures (lower speed limits, street narrowing, speed bumps etc...), and access to transit. (Shay, Spoon, & Khattak, 2003)

Transportation Mode Choice: Transportation mode choice refers to an individuals decision regarding how to get from one destination to another. The theory behind mode choice is complex and involves characteristics of the built environment, socio-demographic and socioeconomic variables, benefit-cost analysis, and personal preference. (Cervero, Built Environments and Mode Choice: Toward a Normative Framework, 2002)

Mixed Land Use: “Land use mix is the composition of uses within a given geographic area.” (Cervero, Land Use Mixing and Suburban Mobility, 1998) The uses referred to can be restaurants, offices, studios, shops, or any variety of business, institution, natural space, or recreation site. In the literature there are various indices and equations used to measure the degree of ‘mixed land use’ in an area.

Urban Heat Island Effect: The urban heat island effect occurs when the sun significantly heats urban surfaces (concrete, asphalt, etc...) to significantly higher temperatures than the surrounding air (can be upwards of 27-50°C). Comparatively shaded or more moist regions (such as rural areas with lots of vegetation) stay much closer to the surrounding air temperature. This heat imbalance between urban surfaces and surrounding air causes heat to transfer from those surfaces to the air, elevated the temperature above what it normally would be. This happens both at a surface and an atmospheric level. (United States Environmental Protection Agency, 2012)

Smart Growth: Smart Growth is an urban planning and transportation theory that became popular almost two decades ago. Though different organization's may differ slightly in their view of what smart growth means, it's general aims are to build compact accessible cities that avoid urban sprawl and mitigate auto-dependence. Some of the principles of this movement are as follows:

- 1). Incorporate mixed land uses into community designs
- 2). Build compact, accessible neighbourhoods close to jobs and amenities
- 3). Provide alternative modes of public transportation
- 4). Diversify housing to meet the needs of people from all socioeconomic classes
- 5). Maintain and protect natural open spaces
- 6). Build within existing communities instead of developing beyond community boundaries
- 7). Preserve agricultural land
- 8). Use new, sustainable technology in infrastructure and buildings
- 9). Develop community identity
- 10). Encourage active citizens to remain engaged in their communities

(Smart Growth BC, 2012)

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