Healthy Community Guidelines

Improving Our Environments for Physical Activity, Healthy Eating, and Social Connections


Diddy
Flatts
M-550
CHILDREN TEENS
West 32nd St
885 THE CONTINENT

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E-copies of the Healthy Community Guidelines can be accessed at:
www.uab.ca/hcg

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Introduction

Importance of the Built Environment

The built environment can be defined as the physical human-made space that can affect the health and wellbeing of people in a particular place.[1,2] Community health can be shaped by spaces and amenities, including schools, workplaces, housing, retail developments, streets, parks and open spaces, and other recreational facilities.[3,4–7] Important considerations for such spaces and amenities include their placement, design, and how they connect to one another and with transportation systems.[8]

Non-Communicable Diseases (NCDs) are now the leading causes of death, disability, and poor quality of life in Canada[9] and around the world.[10] Cardiovascular diseases such as heart disease and stroke, cancers, diabetes, and chronic lung diseases are now the leading causes of death globally.[11] Leading risk factors for these diseases include tobacco use, alcohol use, physical inactivity, and diets low in fruits/vegetables/fibre/water and high in sodium/added sugars/trans fats/animal fats or animal products (referred to as "unhealthy eating" in the remainder of the document).[12–14] Air pollution is also a contributor to mortality and morbidity from NCDs such as heart and lung diseases.[15] In addition to NCDs, injuries are currently the leading cause of death among younger populations.[16] There are also increasing burdens of mental health issues such as depression and anxiety.[17,18] Growing research has shown the importance of social isolation as a risk factor for both physical and mental health.[19,20,21] Although many jurisdictions in Canada and the U.S., as well as other high-income countries, have made great strides in tobacco and alcohol control,[22,23] much more needs to be done systematically to improve physical inactivity, unhealthy eating, and social isolation.[24] The recent COVID-19 pandemic has also taught us that NCDs and related risk conditions such as obesity impact risks of death and infection severity.[25] In Canada, where obesity rates have been on the rise across all provinces, this is especially important.[26] Thus, addressing NCD risk factors are also an important part of the planning for future pandemics.

Evidence is growing on the importance of the built environment for physical and mental health, including high-burden NCDs and their risk factors of physical inactivity, unhealthy eating, and social isolation.[27,28,29] In response, in 2017, Canada's Chief Public Health Officer released the Designing Healthy Living Report as a call to action for Canadian jurisdictions and stakeholders to support health and healthy living by improving the built environment.[30] Multi-sector policies and funding, along with planning, design, development, construction and built environment operational practice decisions can contribute to better community health.[31] Creating healthier built environments helps create healthy communities where people of all ages, backgrounds, and abilities can actively live, grow, learn, work, and play.[32]

Purpose of the Healthy Community Guidelines (HCG)

The Healthy Community Guidelines (HCG) serves as a guidance document of evidence-informed and practically feasible strategies for planning, designing, building, and maintaining communities, streets, buildings, and building sites through a health and wellbeing lens, particularly to impact the key risk factors of physical inactivity, unhealthy eating, and social isolation. The HCG also provides a mechanism to ensure health and wellbeing is considered as a part of the decision making in all projects impacting community, street, outdoor site, and building environments. Health and wellbeing considerations should be integrated into the policies and practices of multi-sectors at all levels including at the level of individual projects, as well as at municipal, regional, provincial, and national levels.

We recognize that there are many complementary frameworks and documents that should also be used to help guide progress for healthy built environments in Canada and globally. A list of these documents can be found in Appendix F. Many of these frameworks provide guidance on a general approach to integrating health considerations into the built environment. Complementing and supplementing these frameworks, the HCG provides a list of more specific evidence- and practice-informed strategies that have been deemed feasible by a considerable number (>100) of multi-sector partners from across Canadian provinces and the U.S.. Multi-sector professionals as well as community residents can use these strategies for improving their community built environments to protect, promote, and maintain health and wellbeing. The HCG can also supplement documents such as municipal/regional/area master plans and zoning bylaws, as well as assist in making improvements to such policies, plans, and bylaws over time.

The HCG has two primary goals:

1. Healthier Communities
The HCG helps communities make healthier choices easier choices and is responsive to emerging health issues.

2. Safer Communities
The HCG contains strategies that promote safety from a variety of perspectives, including traffic-related safety, crime-related safety, and building-related safety (e.g., safe streets for pedestrians and cyclists, safe parks and recreation spaces, safe stairwells).

The list of practical HCG strategies can be used to improve healthiness and safety of a variety of spaces, including neighbourhoods, streets, buildings, and campuses and their amenities such as housing, shops, parks, leisure facilities, transportation systems, and institutions such as schools, care facilities, etc.

In addition to primary goals, using the HCG can help promote additional co-beneficial outcomes for communities, including environmental sustainability, and economic revitalization and resilience.[33,34]

The sections of the guidelines are divided into three scales: Neighbourhood, Site, and Building. Each scale contains strategies that can be implemented to improve our environments for three priority health-protecting factors today: physical activity (including active transportation, active recreation, and active mobility), healthy eating and social connections/inclusion.

Target Audience

This document intends to support professionals and organizations in different sectors, as well as community members who have a role in improving, planning, developing, designing, constructing, maintaining, renovating and retrofitting the built environment or its amenities for health and wellbeing. Thus, key target audiences include but are not limited to:

- Urban planners
- Urban designers
- Housing and commercial developers
- Home builders
- Architects and landscape architects
- Interior designers
- Engineers
- Facility managers
- Health professionals
- Policymakers
- Residents involved in neighborhood planning and development

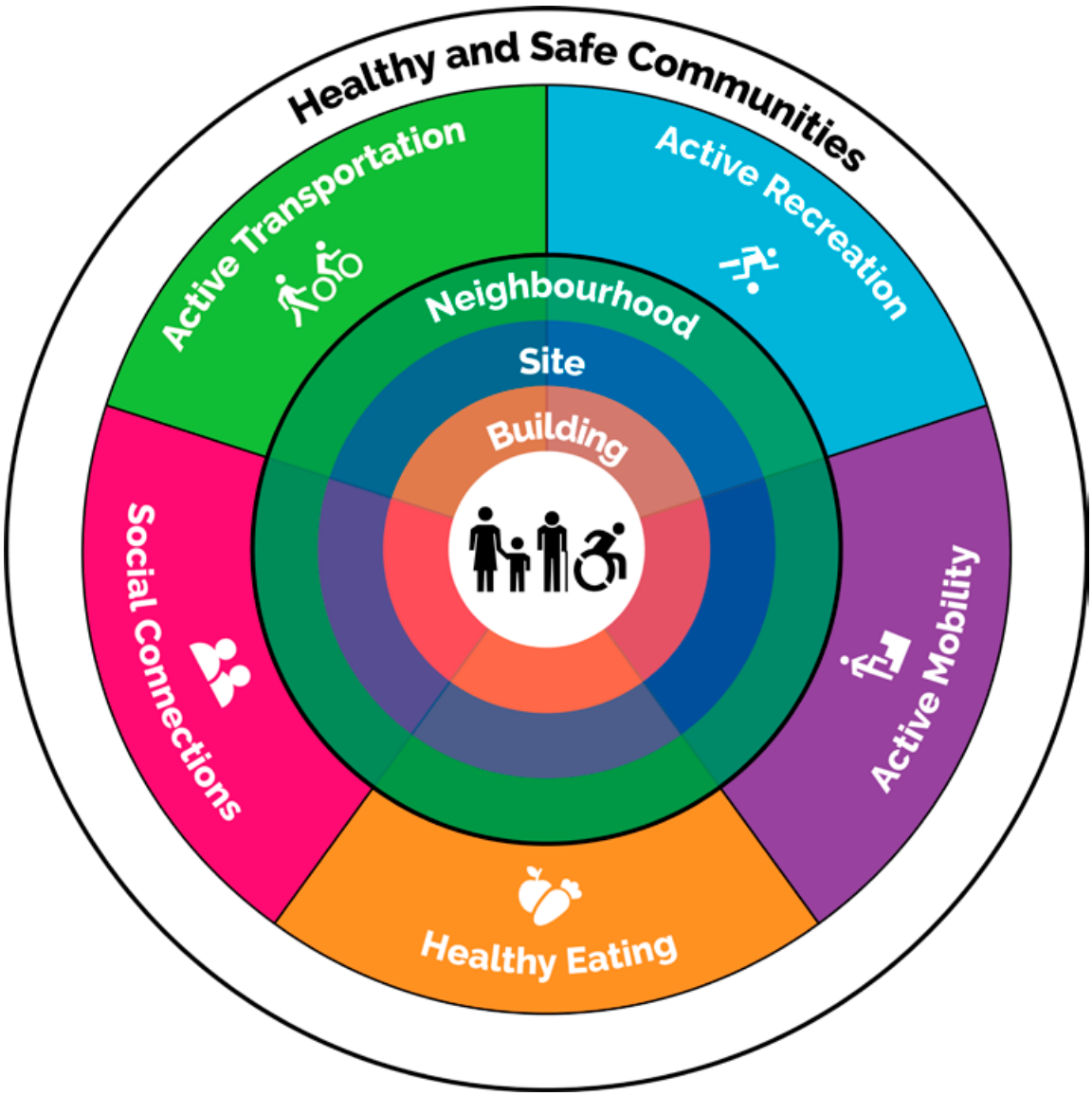
Professionals and policymakers whose primary work is to fund, plan, develop, design, retrofit, and maintain the built environment can use the HCG to guide and improve their policies and practices related to built environment projects over which they have control. By incorporating as many HCG strategies as possible – particularly core strategies and strategies with the highest levels of evidence – directly into their projects, these built environment professionals can immediately start to use their projects to impact health and wellbeing, often at little to no extra cost.[35] Additionally, these professionals and policymakers can play a role in shaping the policies to routinely integrate health and wellbeing considerations within their organizations, such as a policy to use and/or promote the HCG regularly in all their organization's projects. Government organizations at the municipal, regional, and provincial levels can integrate the HCG as a whole document by referencing it in their policy and regulatory updates (e.g., identifying HCG as a reference document for resident health and wellbeing goals in municipal or regional plans, and provincial government acts). They can also consider integrating specific HCG strategies, particularly core strategies and strategies with the highest levels of evidence, into other policy initiatives (e.g., consideration of pedestrian- and bicycling-related strategies from HCG in the transportation master plan and zoning bylaw renewals).

Professionals, organizations, and community members who do not directly fund, plan, develop, design, retrofit, or maintain the built environment often still have a role to play in partnering with built environment professionals and organizations in the built environment projects in their communities and jurisdictions. For example, there are an increasing number of health professionals whose work involves partnering with built environment professionals in their communities to improve community environments for health and wellbeing. A growing number of health promotion professionals and public health dieticians are working to improve neighbourhood environments for active living and healthy eating. Environmental health and public health inspection professionals assist their partner municipalities by providing input on development reviews to make these developments as healthy as possible.[36] Similarly, many communities engage their community groups and residents in giving feedback when there are planning or developing proposals for their communities. For such professionals, as well as community members and organizations, the HCG can be used to help guide their input.

The HCG can and should be used for improving new as well as existing buildings, sites, and neighbourhoods. And when planning, designing, and constructing new buildings, sites, and neighbourhoods, it should be used to guide activities from the start. Previous experience and studies suggest that many strategies can be incorporated feasibly with minimal to no extra cost when considered in planning and design of built environment projects from the beginning. Major renovations of buildings, landscaping, street, and other neighbourhood infrastructure are also key opportunities for integrating relevant HCG strategies feasibly for minimal or no extra cost. Based on experience with private and non-profit developers, facility managers, as well as municipalities, some strategies are also amenable to low-cost, easily feasible, non-renovation retrofits (e.g., add benches for aging populations, health promoting and wayfinding signage, art in stairwells and the public realm, gardening amenities in available parks, co-located adults' and children's physical activity equipment in available spaces indoors or outdoors). Municipalities can also consider improving specific area structure plans or zoning bylaws to enhance neighbourhoods lacking in healthy mixed-use and pedestrian-supporting safety features.

To integrate health and wellbeing considerations as successfully as possible, collaborations between multiple sectors are encouraged across all future built environment projects. History has shown us that multiple sectors working together to improve our building or community environments for health, works (e.g., sanitation and building ventilation). The HCG was co-created by multi-sectors working together and can also become a tool for working together to implement strategies for community health and wellbeing in future projects.

Overview of the Healthy Community Guidelines



Structure of the Healthy Community Guidelines Document

Guidelines/Strategies

Neighbourhood

3 Content Areas
- **Physical Activity**
- **Healthy Eating**
- **Social Connections**

Strategies
- a) Core Strategies
- b) Additional Options

Site

3 Content Areas
- **Physical Activity**
- **Healthy Eating**
- **Social Connections**

Strategies
- a) Core Strategies
- b) Additional Options

Building

3 Content Areas
- **Physical Activity**
- **Healthy Eating**
- **Social Connections**

Strategies
- a) Core Strategies
- b) Additional Options

The HCG is divided into three scales:

1. **Neighbourhood**
2. **Site**
3. **Building**

These three fundamental scales are impacted by a wide variety of built environment professionals using this document.

Each scale contains strategies to improve the following three content areas:

- Physical Activity (Active Transportation, Active Recreation, Active Mobility in Buildings)
- Healthy Eating
- Social Connections

These three content areas are key protective factors for chronic diseases, injuries, and mental health, the highest burden diseases today both in Canada and globally. Underlying chronic disease burdens today also impact burdens of severe illness and mortality from today's pandemic and yearly infectious diseases like COVID-19 and influenza.[25, 243]

Strategies are categorized into:

- **Core Strategies:** deemed feasible by most multi-sector partners for a wide array of contexts and should be incorporated, if possible, in every project.
- **Additional Options:** deemed by most multi-sector partners to more likely be feasible in a more specific context and can be chosen based on applicability to an individual development or project.

Bicycle Share
Toronto, Canada
Photo Credit: Karen Lee, Housing for Health

Key Definitions

A **Healthy City/Community** can be defined as one that is continuously creating and improving physical and social environments for optimizing the health and wellbeing of different groups of residents.[37] To build a healthy community, we must incorporate supports for the following health-protective factors:

Physical Activity: Movement that requires energy from the body. Physical activity has been linked to the reduction of NCDs, improved mental health, and improved quality of life.[38] There are three important realms of physical activity:

- Active transportation;[39]
- Active recreation;[40]
- Active mobility in buildings.

Our neighbourhood, site and building environments are important to help support our ability to meet physical activity recommendations in our everyday lives. The 24-Hour Movement Guidelines recommend that adults accumulate at least 150 minutes per week of at least moderate intensity physical activity, which is any activity that increases our heart rate and breathing (e.g., walking and cycling), in addition to other muscle-strengthening exercises at least twice a week. They should also avoid long periods of sitting. Seniors age 65+ should additionally undertake exercises to strengthen their balance. Children 5-17 years of age need at least 60 minutes of moderate to vigorous intensity activity daily and have less than 2 hours of recreational screen time. Children 1-4 years of age should have at least 180 minutes of active play spread throughout each day and have less than 1 hour of recreational screen time.[244]

Healthy Eating: The intake of healthy food and beverages in relation to the body's dietary needs.[41,42] Two realms of the food environment are important for healthy eating:

- Access to healthy foods and beverages;
- Decreased exposure to unhealthy foods and beverages.

Healthier food environments in our neighbourhoods, sites and buildings are important to help support people in achieving healthy eating recommendations. Canada's Food Guide recommends consumption of nutritious foods daily including: dark green vegetables daily, orange vegetables several times a week, whole grains daily, healthy proteins including beans/nuts/seeds daily, and foods that contain unsaturated fats, calcium and vitamin D daily. Foods and beverages should also minimize added sodium, saturated fat and sugar.[245]

Social Connections: Emerging and existing research shows that social isolation is associated with poorer physical and mental health outcomes, while a sense of community and belonging is associated with healthier and longer lives.[20] Important areas of social connection include:

- Increasing interactions among community residents who see each other on the streets and use community amenities;
- Creating spaces in communities and neighbourhoods that foster social connections and identities;
- Mixed-income neighbourhoods to help create diverse social networks within communities and reduce stigma;
- Racially and ethnically diverse neighbourhoods and communities fostering interactions and a sense of belonging among different socio-demographic groups; and
- Inclusive communities for people of all ages and abilities.

NOTE on COVID-19 Considerations

In addition to the strategies for active transportation, active recreation, active mobility, healthy eating, and social connections, the HCG provides a COVID-19 overlay to assist users in additional built environment considerations that could potentially be helpful during the COVID-19 or similar pandemics/epidemics. However, it is not the intended purpose of this document to guide infection control measures for COVID-19 nor other infectious diseases. Please use appropriate infection control standards and guidelines that are available for this purpose.

COVID-19 related considerations are added in text boxes below relevant main HCG strategies for active transportation, active recreation, active mobility, healthy eating, and social connections.

Overall Guiding Principles for Development and Use of the Guidelines

Each guiding principle has been applied in the process of developing the HCG and should guide the implementation and use of the HCG and its strategies. Each principle is important as both a goal and process in implementation.

Connectedness

More than 100 multi-sector partners worked together to create the HCG. Connectedness as a goal in neighbourhoods refers to environments that effectively link people to places, amenities, and services where they work, live, learn, and play. The HCG is intended to help improve neighbourhood amenity and resident connectedness by promoting a complete network of spaces, streets, routes, and transportation choices that protect and promote health.

Using the HCG as a common tool available for multi-sector groups and organizations connect these sectors, organizations, and community residents with each other to jointly create healthier communities.

Socially Inclusive

In the process of creating the HCG, specific working groups convened to provide representation from people of all abilities, Indigenous groups, and stakeholders from smaller and rural communities. The goal was to promote social inclusion. This means that integrating the HCG or its strategies when creating building, site, and neighbourhood environments can help enable all people in society to participate in healthy living, regardless of age, gender, sexual orientation, income, race, cultural background, religion, or physical/mental ability. In a socially inclusive community, all members should have access to essential services that help keep people physically and mentally healthy. This includes employment and access to healthy social, political, and physical spaces. Such inclusive spaces celebrate diversity and increase choice.

The process of implementing the HCG strategies should reflect inclusion of all the people who will use it. Barriers to inclusion of inputs from all groups who will be impacted must be considered when designing spaces. Community engagement and participation in place-based decision-making can use the HCG as a common tool among different groups to enhance social connections, channels of multi-way communications, transparency, informed decision-making, a culture of collaboration, a sense of local ownership, and community place attachment as a part of the process.

Equitable Access

Development of the HCG brought together different stakeholder groups that traditionally had different access to resources including guidance documents. Documents that built environment professionals use to guide their work may differ greatly from documents used by health professionals. Community residents frequently do not have access to any of these documents. By bringing these very different groups together to develop the HCG and by encouraging all groups to be aware of and to use the HCG in collaboration for community development, the HCG promotes more equitable access for healthy built environment development and inputs. Additionally, the HCG was developed with inputs from population groups who may experience segregation and whose unique needs may be missed, including people of all abilities, Indigenous peoples, and stakeholders who work and live in smaller and rural communities.

A key goal of HCG implementation is equitable access to healthy built environments and amenities for all population groups in society, including those experiencing health and access inequalities. Multiple settings should be considered for equitable access, including residential, commercial, institutional, educational, and recreational sites. Equitable access includes considerations such as availability, proximity, affordability, acceptability, and accommodation for members of different populations.

How built environments are designed can contribute to widening or narrowing equity of access to healthy amenities for all people. Considerations for the entire population means ensuring non-exclusion of groups by age, gender, sexual orientation, income, race, cultural background, religion, or physical/mental ability. It is important to ensure that spaces do not intentionally or unintentionally segregate people. Built environments should also facilitate use of amenities by different people through inclusive spaces. Following the principles of universal design – but designing for appropriate effort, not necessarily minimal physical effort – may prevent unintended barriers for active and healthy living for those with different abilities. People living with disabilities should be supported not only in access to spaces but in healthy living through inclusive amenities supportive of maximizing health (e.g., provision of ramps as well as elevators).

It is also hoped that use of the HCG for future implementation projects involving built environments to promote and protect health will help facilitate inclusion of underrepresented population groups. Some of these groups have been represented in the creation of the HCG and more can be represented and considered as the HCG is used.

Adaptive

The process of creating the HCG included considerations for adaptation to different contexts. For example, HCG strategies recognize and allow for needed adaptations in smaller and rural communities compared with urban settings. An implementation goal for the HCG includes the creation of spaces that show adaptability. HCG strategies frequently promote spaces that can be used for more than one purpose (e.g., a parking lot that can also provide space for regular farmers' markets or social events).

Implementing the HCG will require project teams to adapt it to their specific contexts. Strategies in the HCG are designed to be flexible and feasible for multiple communities and areas, including urban and rural ones. Core strategies are those identified by multi-sector partners from a variety of contexts to be applicable to different types of projects and contexts. On the other hand, additional options are deemed more likely to be feasible in specific contexts and thus should be chosen based on applicability to an individual development or project.

Sustainable

In creating the HCG, multi-sector partners identified the importance of strategies that can be sustained over the long term as well as the potential for the strategies to promote environmental, economic, and social sustainability in our communities. A key goal of HCG implementation is promotion of all three aspects of sustainability. The way we design our community environments can help support or hinder the longevity of diverse social relationships and activities. Social infrastructure (e.g., schools, retail amenities, parks/green spaces, local community groups, transit access) also needs to be integrated in the design of communities. HCG strategies also promote environmental sustainability[43] through active transportation (e.g., walking, cycling, and transit) that can reduce carbon and air pollution emissions,[44] generate less landfill waste through increased healthy food and beverage consumption (e.g., fresh fruit and vegetables, and tap water),[45] decrease building energy consumption through increased stair use rather than elevator or escalator use,[46] as well as through increased active recreation in place of electricity-consuming activities like television viewing.[47,48]

HCG implementation processes can also be made more sustainable through multi-sector partnerships and collaborations, and evaluations of co-beneficial outcomes inclusive of health, social, environmental, and economic outcomes.

Evidence and Practice-informed

The HCG has been developed in partnership with multi-sector practitioners for a practice-informed approach and to ensure strategies contained within are practically feasible. The HCG is also evidence-based, striving to provide practitioners and policymakers in different sectors with strategies that have the highest probability of making impacts on critical health outcomes. To that end, the HCG depends on scientific evidence reviews that have been conducted and incorporated into the document. The scientific reviews identify the best evidence currently available for promoting physical activity (PA), healthy eating (HE), and social connections (SC). The evidence also identifies medical conditions that could be impacted by the strategies. PA-related medical conditions found in the evidence reviews are primarily obesity, cardiovascular disease, and diabetes; HE-related medical conditions are primarily obesity; SC-related medical conditions are primarily mental health conditions such as depression and anxiety disorders. Practitioners and policymakers in different sectors should use the HCG to guide their work. Community residents can use the HCG to give their valuable feedback and inputs about their communities to policymakers and practitioners. Researchers can use the HCG to identify strategies in need of more research.

Neighbourhood

Scale 1

The HCG can and should be used for improving new as well as existing neighbourhoods. When planning, designing, and constructing new neighbourhoods and their amenities, there is opportunity to use the HCG to guide such activities from the start. Previous experience and studies suggest that many strategies can be incorporated feasibly with minimal to no extra cost when considered in planning and design of built environment projects from the beginning. Major renovations of neighbourhood infrastructure are also key opportunities for integrating relevant HCG strategies feasibly for minimal or no extra cost. Some strategies are also amenable to low cost, easily-feasible, non-renovation retrofits (e.g., addition of health-promoting and wayfinding signage as well as art in the public realm, gardening amenities in available parks, co-located adult and children physical activity equipment in available spaces indoors or outdoors). Municipalities can also consider improving specific area structure plans and/or zoning incentives or bylaws to enhance neighbourhoods lacking in healthy mixed-use, pedestrian-supporting safety features, adding benches for aging populations, among other retrofit considerations. Public sector development projects should routinely integrate relevant strategies to maximize benefits, including health and wellbeing benefits, from public sector funds. Developers as well as planning firms can routinely integrate relevant strategies into their neighbourhood development projects.

I. Healthy Mixed-Use

Ensuring a compact, connected, and complete community, the majority of dwellings should be located within 800 meters (m) (0.5 mi.) of healthy retail uses while unhealthy retail is avoided.[49]

Core Strategies for All

- *In urban municipalities with populations at or above 50,000, the following applies in all neighbourhoods.*
- *In smaller municipalities with populations between 1,000-50,000 and with one or more non-residential commercial areas, the following should occur in at least one core denser mixed-use area to ensure areas that can equitably accommodate populations who cannot or do not drive (such as seniors/older populations).*
- *In rural areas (towns, villages, hamlets) defined by Statistics Canada as areas with populations less than 1,000 people or population density less than 400 people per km^2,*[50] *if one or more non-residential commercial areas exists, strive for at least one core denser mixed-use area that can equitably accommodate populations who cannot or do not drive (such as seniors/older populations).*

★ Supported by ≥50% of Moderate-High Quality Systematic Reviews

☆ Supported by <50% of Moderate-High Quality Systematic Reviews, or Only One Moderate-High Quality Systematic Review

△ Supported By Some Primary Studies (Mixed / Inconclusive in Moderate-High Quality Systematic Reviews)

Note: Strategies without a symbol do not have moderate-high quality systematic reviews (2010+).

Neighbourhoods within 800 m of residential buildings, especially multi-family residential buildings, should:

→ Ensure healthy mixed-use that promotes physical activity and/or social connections, including:

- Have active transportation amenities including pedestrian, bicycling, and public transit infrastructure,[112] and emerging micro-mobility modes that can promote physical activity to connect residential areas with community amenities for people of all abilities.[27,51–57,58,250] ★★☆★
- Have buildings promote and protect health *(See Building Section).*
- Have premises promote active recreation in leisure time through:
  - One or more public parks.[54,59–64] ★★△★
  - Children's playground with adult exercise equipment.[54,65] ☆
  - One or more walking or multi-use trails.[27,51,54,56,57,250] ★☆☆
  - Ideally, two or more of the above.[27,54,56,57] ★★

Total Physical Activity
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Active Mobility
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Healthy Eating
Medical Conditions

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→ Offer access to healthy food retail:[28,66]

- Food retail achieves *one or more* of the following three:
  - It carries produce (fresh, frozen, and/or canned) as well as other healthy foods and beverages (e.g., whole grain products, nuts and seeds, dairy foods, eggs, non-processed lean proteins such as fish, poultry, plant-based proteins) covering the vast majority of retail space, with display in highly visible areas (e.g., at or near the entrance of the store).[64–66] ☆ ★
  - The vast majority of all retail space is for foods intended for home preparation, consumption, and utilization.[67,71–74] △ △
  - Retailers consider the availability of healthy traditional foods, inclusive of fruits and vegetables, for ethno-cultural groups, including Indigenous peoples, living in the neighbourhood of the store (e.g., traditional crops for Indigenous people, including corn, tomatoes, potatoes, beans, peas, cabbage, berries).[75]
- Additionally, healthy food retail should undertake *one or more* of the following:
  - Place healthy foods like produce in high visibility areas and unhealthy foods in low visibility areas.[67–70] ☆ ★
  - Place low nutritional value and high sugar children's cereals high on shelves above children's eyesight and easy access.[67] ☆
  - Use signage promoting healthy items to consumers with directional arrows to fruits and vegetables, point-of-decision nutrition information and/or information/signage such as a stop light system at levels and angles visible to people of all abilities to highlight healthier versus less healthy options.[74,76–79] ★
  - Provide health-related information and education in multiple ways in the store including (but not limited to) advertising, signage, taste testing, recipes, brochures, shelf-tags, educational leaflets, information sessions, and/or partitioned shopping carts with flyers for healthy foods and beverages. Other considerations include cooking demonstrations, on-site registered dietitian consultations, and/or grocery store tours.[71] Standardizing the location of signage could also assist people with visual disabilities to more easily and independently locate such signage.[71,80,81] ★
  - Undertake multi-component strategies that include two or more of the above.[68–71,80] ★ ★
  - Have at least one farmers' market that carries fresh produce as the majority of items.[72,82,83] ☆

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- Develop and implement a street or mobile produce cart-permitting process for areas without access to a full-service grocery store or supermarket, a farmers' market, or other retailers that sell fruits and vegetables. Such mobile establishments allow vendors to sell fresh produce in community public spaces, indoor or outdoor, to promote healthy food access.[72,83] ☆

– A minority of food stores in the community do not meet the criteria above.[72] ☆

- For such stores (e.g., convenience stores), carry healthy foods and beverages in at least 30% of store area, such as produce (fresh, frozen, and/or canned) AND one or more of the following: whole grain products, nuts and seeds, dairy foods, eggs, lean proteins such as fish, poultry, plant-based proteins.[84,85] △

– The following are some considerations for restaurants:

- No more than a small minority of restaurants should be fast food outlets.[72] ☆
- Restaurants should undertake two or more of the following options:[67,68,70,86]

  - Default vegetable or fruit sides instead of unhealthy options (e.g., fries, onion rings).[68–70,80] ★
  - Default water (still or carbonated), milk, or unsweetened or low/no-calorie beverages (e.g., unsweetened coffee or tea) instead of unhealthy/less healthy beverages (e.g., soda pop, sports drinks, fruit juice).[80,74] ☆
  - Make available and promote half portions.[68–70] ★
  - Have point-of-decision nutritional information on menu/menu boards to promote healthy items.[80] Informational signage should include formats, heights, and angles visible and usable by people of all abilities (e.g., QR codes, button-activated auditory signage, braille signage).[87] Standardization of the location of signage could also assist people with visual, cognitive, and/or developmental disabilities to more easily and independently locate such signage. *(See **Appendix D** for signage formats for people of all abilities.)*[62,64–70] ☆★

- Make drinking water available.[87–90,74]
- Address accessibility needs for people of all abilities:
  - Have movable tables and chairs with backs and armrests of appropriate heights to accommodate different accessibility needs.[91]
  - Consider including areas that accommodate people in need of noise and/or sensory refuge.[87,91]
- Provide healthy socio-cultural and ethnic food options appropriate to the socio-demographic mix of the neighbourhood.[92]

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- If food vendors such as food trucks are present/allowed, they do not sell deep-fried foods or sugary beverages (e.g., pop/soda, slushes, sports drinks, juice, energy drinks, vitamin water). All food menu items contain at least some fruit or vegetables. *(See **Appendix E** for Healthier Food and Beverage Guidelines for Public Events.)*[67,71–74] △△
- Public buildings have only food premises that carry the majority of food items as healthy foods and do not sell deep-fried foods and sugary beverages (pop/soda, slushes, sports drinks, juice, energy drinks, and vitamin water). *(See **Appendix E** for Healthier Food and Beverage Guidelines for Public Events.)*[67,71–74] △△
- Public events food concessions (e.g., at tournaments, fairs, concerts, neighbourhood parties) carry the vast majority of food items as healthy foods and do not sell deep-fried foods and sugary beverages (e.g., soda, slushes, sports drinks, juice, energy drinks, and vitamin water). *(See **Appendix E** for Healthier Food and Beverage Guidelines for Public Events.)*[67,71–74] △△
- No vending machines carry any unhealthy foods or beverages in public spaces.[93,94,67,71–74] △△
- No other unhealthy food and beverage amenities in public spaces including candy machines, as a part of intervention strategies.[85,93,94] △

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→ Provide cold public drinking water fountains with water bottle refilling stations on key routes for pedestrians and/or cyclists, and/or in public parks.[87–90,95,74] ☆☆

Drinking water fountains should:

- Be accessible to populations of all abilities and different ages (e.g., fountains with multiple heights; operational mechanisms usable for all abilities) for both drinking and water bottle refilling.[87]
- Be available at key mixed-use, pedestrian, bicycling, and recreation locations.[87]
- Include a separated lower fountain for pets.[137]
- Be operational and accessible year-round (e.g., snow clearing around fountain during winter months).[142]
- Be designed and/or maintained to minimize clogging.

→ Have cold public drinking water provided at public events.[88–90,74] ☆

Total Physical Activity
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Medical Conditions

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△ Supported By Some Primary Studies (Mixed / Inconclusive in Moderate-High Quality Systematic Reviews)

Note: Strategies without a symbol do not have moderate-high quality systematic reviews (2010+).

→ Ensure all active recreation amenities:

- Have at least one barrier-free outdoor physical activity amenity for active recreation by various populations living in the neighbourhood,[96] including ethno-cultural and Indigenous populations (e.g., incorporate spaces that accommodate a variety of culturally appropriate physical activities, such as baseball fields converted into cricket pitches, spaces for powwow dancing) with exterior pedestrian-scale lighting for evening activities and incorporating current Crime Prevention Through Environmental Design (CPTED) principles with good design. Amenities include public parks, a children's playground with co-located adult exercise equipment, walking and/or multi-use trails.[54,55,59,60,62–64,97,98,249] ★★△★
- Provide specific amenities in parks, including off-leash areas for dogs (fenced dog parks, dog-run areas), with considerations for access by people of all abilities (e.g., surfaces used, gate design), with sites providing dog litter bags, water supply, and waste bins.[91,94,97,99] ★
- Provide active transportation (e.g., walking, wheeling, bicycling and/or transit) access to above opportunities.[27,51,52–56,100,250] ★★☆★

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→ Decrease emphasis on automobile dependency and ownership.[56] ☆

- In mixed-use areas with active transportation, ensure free automobile parking is not located within 800 m (0.5 mi.) of residential buildings, especially multi-family residential buildings, except dedicated parking for people with disabilities, to encourage walking, wheeling, cycling, and transit use in these areas.[83] If any free parking is provided beyond 800 m of residential buildings, the spots are clustered in one or fewer concentrated dedicated public automobile parking area. All parking spaces should have clear paths for pedestrian and barrier-free travel connecting to amenities and residential areas, and incorporate current CPTED principles.[56,83,87,95,101,102] ☆ ★
- In smaller municipalities, locate one or fewer concentrated dedicated public automobile parking area near core denser mixed-use areas for use by populations not living in core denser mixed-use areas. However, there should be dedicated accessible parking for people with disabilities in closer proximity and with a clear path of travel to amenities.[56,83,87,95,101,102] ☆ ★

→ Promote affordable and/or mixed-income housing that include units designed for accessibility and adaptable use by people of all abilities (e.g., visitable units, at least for the ground floor, mixed tenure for various levels of income, three to four-bedroom units for families, and for aging in place).[35]

- Consider housing designs suited for different ethno-cultural groups, including Indigenous People (e.g., units that accommodate multi-generations living together including seniors, units with large enough dining areas for regular extended family meals).[103]

Lauderdale Terrace Affordable Seniors Housing
(GEF Seniors Housing, RPK Architects)
Edmonton, Canada
Photo Credit: Karen Lee, Housing for Health

Telford Mews Mixed-Income Housing
(Fillmore Construction, Christenson Developments, Douglas Sollows Architect)
Leduc, Canada
Photo Credit: Faith Kampen, Housing for Health

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- → Utilize vacant lots or spaces to promote revitalization.[54,104] ☆ △ △
- → Create a safe and pleasant community incorporating good design using current CPTED principles.[235,236]
- → Consider including facilities with services and proactive programs associated with crime reduction (e.g., women's shelter, 24-hour youth facilities, and programs for children and youth in need), and litter reduction, as well as things to see and do in town, especially in denser mixed-use areas and along pedestrian, bicycling, transit, and/or multi-use paths and routes that accommodate people of all ages and abilities. Where possible, multi-use paths could separate those needing to move at slower speeds from those moving at faster speeds (e.g., detectable pedestrian demarcations on trails/paths). Include signage on shared pathways that increase awareness of users of all abilities. Signage can also include additional useful information for people of all abilities, including surfacing, gradients, and amenities on the route. *(See **Appendix D** for signage formats for people of all abilities.)*[27,54,56] ☆ ☆ △
- → Make public washroom facilities accessible to people of all abilities.[87]
- → Provide wayfinding signage to healthy amenities including healthy food outlets, active transportation facilities, and active recreation amenities like public parks or green spaces.[27,63,97,105–107] ☆ ★
- → Locate new schools within 400 m – 800 m (0.25 mi. – 0.5 mi.) of residential neighbourhoods.[49]
- → Conversely, where space allows, build new residential developments targeting families with school-age children within 400 m – 800 m (0.25 mi. – 0.5 mi.) of schools without such residences nearby.[27,54,56] ★
  - – Implement a "walk area" around schools where there is adequate roadway configuration for safe walking to school for students living within a walking distance of 1.6 km (1 mi.).[27,54,56] ★ ☆

    Ensure:

    - No fast food or convenience stores are within 400 m (0.25 mi.) of new schools.[72, 246] ★ ★
    - No new fast food or convenience stores are within the walk area of existing schools.[72, 246] ★ ★
    - No billboard advertising alcoholic beverages, tobacco, vaping products, cannabis products or venues, unhealthy food or beverage products, fast food outlets or convenience stores are within the walk area of the schools.[108]
  - – Consider multi-storey schools, especially for areas with limited space, and promote active mobility (e.g., stair and/or ramp use) as well as accessibility for students with disabilities in such schools.[83,109,110]

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- Have no fast food or convenience stores within 400 m (0.25 mi.) of new public recreation facilities, playgrounds or public libraries.[72,85] ☆ △
- Have no new fast food or convenience stores within 800 m (0.5 mi.) of existing recreation facilities, playgrounds or public libraries.[72,85] ☆ △
- Have no billboard advertising alcoholic beverages, tobacco, vaping products, cannabis products or venues, unhealthy food or beverage products, fast food outlets, or convenience stores within 1.6 km (1 mi.) of public recreation facilities or playgrounds or public libraries.[108]

Additional Options

In addition to the core strategies, neighbourhoods should consider offering *two or more* of the following active recreation amenities:

- Athletic field and/or courts.[54] ☆
- Hiking, biking, wheeling, and/or walking trail network at least 800 m in length with wayfinding signage placed at appropriate heights and angles, and in formats for people of all abilities. *(See **Appendix D** for signage formats for people of all abilities.)*[27,51,106,250] ☆ ☆ ☆
- Active recreation trails that function as active transportation networks, with dimensions, surfaces, and designs to facilitate users of all abilities.[27,51,55,57,250] ☆ ★ ★

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- Co-located activity spaces that have equipment that accommodates use by people of all abilities with:
  - Play space designed to maximize physical activity in children, such as a playground with a mix of human-made and natural elements, as well as ground markings (e.g., hopscotch markings) that stimulate increased physical activity.[27,97,107,111–114,249] ★★
  - Adult accessible all-weather fitness equipment that uses the full range of movement types with safety instructions, and/or walking trail/track, including around play spaces.[27,54,55,97,98,107] ★★
- Accessible adult fitness equipment and/or walking trail/track, including where active recreation amenities are intended for children's sports programs and practices (e.g., hockey rinks, soccer fields).[27,54,55,97,98,107] ★★
- Public parks or green spaces with context-specific amenities to support both active recreation (e.g., soccer fields, cricket fields, basketball courts, etc.) and social connection/community gatherings (e.g., picnic tables, benches, gazebos/covered spaces, etc.) that are accessible.[116] Public parks or green spaces should have adequate wayfinding signage at appropriate heights and angles, and in formats for people of all abilities connecting pedestrians to pedestrian pathways and connections and transit stops within 400 m – 800 m radius of the site.[54,59,61,117] △★
- Other culturally appropriate physical activity and socialization spaces, including for different ethno-cultural groups such as indigenous peoples (e.g., space for powwow dancing).[21,44–46,49,50,51,53,61,64,70,77–80,87,88,90,118,119] ★★☆★
- Designated public outdoor community meeting space (e.g., pedestrian plaza, outdoor courtyard) with exterior lighting.[55,120,121] ☆
- Active recreation spaces from improved underutilized public or private spaces.[27,53–55,59–61,63,64,97–99,107,115,122] ★★△★

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- Accessible all-weather fitness equipment that uses the full range of movement types with safety instructions.[65,55,98]
- Indoor public recreation facilities such as indoor rinks, fields, courts, swimming pools, etc. designed to be accessible and barrier free. Consider including childcare and other relevant mix of healthy uses in such facilities.[54,118]
- Private gyms.[54]
- Public active recreation spaces within 400 m (0.25 mi.) of a school(s).[27,54,55,59,61,63,99,115]
- No fast food or convenience stores within 400 m (0.25 mi.) of new public recreation facilities or playgrounds. No new fast food or convenience stores should be within 800 m (0.5 mi.) of existing recreation facilities or playgrounds. No billboard advertising alcoholic beverages, tobacco, vaping products, cannabis products or venues, unhealthy food or beverage products, fast food outlets, or convenience stores should be within 1.6 km (1 mi.) of public recreation facilities or playgrounds.[72,85]
- No new alcohol outlets in close proximity to (e.g., within 100 m or 330 ft.) of existing outlets.[123]

In addition to the above, include amenities that are accessible for people of all ages, abilities, and where relevant, cultural backgrounds.

Urban municipalities should include *five or more* of the following, and smaller municipalities should include *three or more* of the following:

- Health services (e.g., walk-in clinic, pharmacy/drug store).
- Healthy specialty food services.[67,71–73,111]
- Outdoor displays of fruits and vegetables in front of food stores and at food store entrances.[67]
- Mobile fruit and vegetable vendors.[72]
- Supermarkets AND farmers' markets.[72,83,85,124]
- Open air cafés offering primarily healthy food and beverage items:[67,71–74]
  - Temporary "patios" should not obstruct sidewalks, cycling or multi-use paths. Alternatively, create temporary pedestrian and cycling or multi-use pathways on the same side of the street to ensure pedestrian and cycling connectivity.[51,250]
- If food vendors such as food trucks are present/allowed, follow the Healthier Food and Beverage Guidelines for Public Events *(See **Appendix E**)*.[67,71–74]

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- For smaller municipalities with one or fewer grocery stores, have a transit stop (if applicable) within a walkable distance (within 800 m) of the store(s) to promote accessibility to the grocery store or farmers' market.[73,124,125]
- Community gardens with considerations for both access by people of all abilities and space requirements for growing food plants that are relevant for ethno-cultural groups, including Indigenous peoples, living in the neighbourhood (e.g., Indigenous food plants including corn, tomatoes, potatoes, beans, peas, cabbage, berries).[71,80]

Elevated Gardening Boxes at Lauderdale Terrace
(GEF Seniors Housing, RPK Architects)
Edmonton, Canada
Photo Credit: Jodie Stearns, Housing for Health

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- → Communal healthy food preparation facilities, including community kitchens with NO deep fryers.[126] Consider accessibility for such facilities.
- → Designated indoor community space that is available to the public, including for populations needing care.[118] ☆
- → Designated outdoor community meeting space that is adaptable, including for physical activity uses, and can enable spontaneous and programmed activities (e.g., outdoor plaza, piazza, open-air courtyard) year-round and provide opportunities for inclusive intergenerational and cross-cultural socialization.[21,44–46,49,50,61,53,61,64,70,77–80,87,88,90,127] ★★△★
- → Allow for diverse services or amenities.[54,128–130] ☆☆

  Consider including:

  - Outdoor retailing in the public spaces.
  - Personal service shops.
  - Professional, financial, and office support services.
  - General retail stores.
  - Childcare services.
  - Public libraries and cultural exhibits.
  - Religious assemblies.[131]
  - Spectator entertainment establishments.
  - Car-share services.[132]
  - Bicycle infrastructure that includes bicycle-share program.[133,134]

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- Public art for vacant buildings and spaces.[135]

  Revitalization of vacant buildings and spaces is associated with active transport and may assist with social connections.[47,93] ☆ △ △

- Outdoor spaces/displays or walk-through/bike-through windows where possible to allow customer purchases without needing to enter the store.[136]
- Cold public drinking water fountains with water bottle refilling stations regularly and frequently on key routes for pedestrians and/or cyclists, and/or in public parks.[87–90,95,74] ☆ ☆

  Drinking water fountains should:

  - Be accessible to populations of all abilities and different ages (e.g., fountains with multiple heights).[87]
  - Be placed at key mixed-use, pedestrian, bicycling, and recreation locations.[87]
  - Include a separated lower fountain for pets.[137]
  - Be operational and accessible year-round (e.g., clear snow around fountain during winter months).[142]
  - Be designed and/or maintained to minimize clogging.
- An alcohol-free zone that contains no alcohol-licensed businesses.[123,138]
- A healthy food and beverage zone that contains no unhealthy food and beverage vending in public indoor or outdoor sites, and no businesses selling primarily unhealthy foods or beverages (e.g., convenience stores, unhealthy fast-food outlets).[139]
- Placement of beacon devices that can connect to functions such as user counts as well as navigation applications used by people with disabilities.[140]
- In rural areas, one or fewer concentrated dedicated public automobile parking areas near core denser mixed-use areas for use by populations not living in those core denser mixed-use areas. There should be dedicated accessible parking in closer proximity and with a clear path of travel to amenities.[56,83,87,95,101,102] ☆ ★

COVID-19 Considerations:

- Retail businesses could consider outdoor customer spaces or walk-through or bike-through windows where possible to allow service and product purchases without needing to enter the store.

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II. Walkable, Bikeable and Transit Friendly Neighbourhoods with Complete Streets

A. Creating walkable communities with safe and accessible sidewalks.

Core Strategies for All

- *In urban municipalities with populations at or above 50,000, the following applies in all neighbourhoods.*
- *In smaller municipalities with populations below 50,000 but ≥ 1,000 and with one or more non-residential commercial areas, the following should occur in at least one core denser mixed-use area to ensure areas that can equitably accommodate populations who cannot or do not drive (such as seniors/older populations).*
- *In rural areas (towns, villages, hamlets) defined by Statistics Canada as areas with populations less than 1,000 people or population density less than 400 people per km^2,*[50] *if one or more non-residential commercial areas exists, if possible, strive for at least one core denser mixed-use area that can equitably accommodate populations who cannot or do not drive (such as seniors/older populations).*

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Sidewalks and/or multi-use paths on both sides of all streets.[51,57] ★☆

Sidewalks or paths should:

- → Be at least 1.8 m wide to accommodate two users including wheelchair users and/or person pushing a stroller to be or move on the sidewalk side by side.[141]
- → Be part of complete streets connecting residential premises to community amenities.[27,52–54,56,102,125] ★★☆★
- → Ensure continuity of pathways that connect to each other and lead to destinations with gridded or modified grid patterns (avoid dead-end pathways to promote pedestrian connectivity) on small block sizes. Where block sizes are large, retrofit with pedestrian paths and crossings that form a grid with intersections every 60 – 90 m (197 ft. – 295 ft.). Where there are dead end streets where cars cannot pass, ensure sidewalks, pedestrian paths, and cycling paths continue and include signage to indicate continuing paths.[27,51,54–56,125,250,252] ★★★☆
- → Be accessible to populations of all abilities and different ages,[87] user-friendly, continuous, even, well-paved, suitable, and safe for use in all-weather conditions, including winter months.[142] Materials that can pose accessibility challenges include cobblestone, brick, granite, marble, and soft carpet coverings.[27,54,55,125] ★☆
- → Lead to healthy destinations and include adjacent signage at appropriate heights and angles, and in formats for clear wayfinding for pedestrians, cyclists, and people of all abilities. *(See **Appendix D** for signage formats for people of all abilities.)*[27,51,87,106,125,250] ☆☆☆☆

Complete Street with protected bike lanes and sidewalks
Edmonton, Canada
Photo Credit: Karen Lee, Housing for Health

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- Where possible, have multi-use paths that separate those needing to move at slower speeds from those moving at faster speeds (e.g., detectable pedestrian demarcations on trails/paths). Include signage on shared pathways that increase awareness of users of all abilities. Signage can also include additional useful information for people of all abilities, including surfacing, gradients, and amenities on the route. *(See **Appendix D** for signage formats for people of all abilities.)*[51,125] ☆☆☆
- Be separated from vehicular travel lanes by a landscaped boulevard to provide additional comfort and safety for pedestrians.[51,57,141] ★
- Have well-designed street crossings for pedestrian safety.[27,54–56] ★★

  Include:

  - Curb cuts at intersections or crossings not less than 1.8 m (5.8 ft.) wide to allow two wheelchair users and/or stroller users to pass at the same time with a flat landing area immediately adjacent to it for users to rest.[141]
  - Separate curb cuts for each crossing direction at all intersections or features like raised pedestrian crossings that accommodate pedestrians of all abilities to transition between sidewalks and streets.[87]
  - Separate sufficient drainage at curb cuts to prevent pooling of water from rain or snow melt.[87]
  - Where there are unavoidable level changes, a slope with a maximum gradient of 5%.[141]
  - Minimization of mid-block vehicular curb cuts and ensuring that all sidewalks crossing driveway entrances are maintained in height, colour, and materiality to provide the highest level of convenience and safety for pedestrians.
  - Curb extensions at pedestrian street crossings to increase visibility of pedestrians and decrease crossing distances.[143]
- Be free of obstructions such as poles and advertising boards; street furniture should be positioned in a way that does not compromise accessibility; maintain suitable unobstructed path of travel clearance for all pedestrians, including wheelchair users and strollers.[141]
- During construction that obstructs sidewalks or multi-use paths, have temporary pedestrian or multi-use pathways on the same side of the street without obstructing pedestrian and cycling connectivity. If needed, add curb ramps to ensure connectivity for users of all abilities.[51,91,250,252] ★☆
- During construction, ensure CPTED principles such as adequate pedestrian-scale lighting to enhance safety on and around the construction site.[120]

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- Maintain a constant level.[144] Where possible, avoid pedestrian under- and over-passes. Increase lighting and visibility for safety at existing under- and over-passes.[141]
- Where feasible, incorporate green streets features (e.g., vegetated curb extensions, sidewalk planters, permeable paving, and/or street trees to concurrently promote environmental sustainability and health.[27,55,144,145] ☆☆
- During winter months, ensure accessibility for paths of travel for people of all abilities, including access routes to transit and entrances to facilities.[142] Prioritize snow and ice clearing on active transportation routes to ensure access for people of all abilities, including those who cannot drive.[91]
- In areas with extreme weather conditions (e.g., cold, heat, rain, snow, winds), consider these conditions in the design and maintenance of paths of travel for people of all abilities (e.g., shading sidewalks in very hot or rainy climates, appropriate landscaping to shield from wind conditions) to permit use for as much as possible year-round. Poor weather conditions can be a barrier to active transport.[56,87,91,146] ☆
- In rural areas, on roads where sidewalks and bike lanes are not possible outside the core denser mixed-use areas, have wider paved shoulders for pedestrian and bicycle use.[147] Include painted road demarcations +/- road signage to indicate possible pedestrian and bicycle use. Wider shoulders also assist with longer life cycles of the road.[148]
- Consider creating a "Percent for Art" program[149] to regularly incorporate art into neighbourhood, street, and/or building infrastructure.[105,150] ☆
- Maintain neighbourhood streets such that they are clean, free of litter, graffiti, vandalism and dog feces.[63] △

Additional Options

In addition to the core strategies, undertake *two or more* of the following actions:

- Use slip-resistant and heat-absorbing materials (e.g., black asphalt) to reduce ice.[142]
- Use heated sidewalks with safety considerations for transitional points.[142,151]
- Add railings for sidewalks or multi-use paths, particularly in areas with populations that can benefit (e.g., seniors).[142]
- Have high contrast coloured (e.g., yellow-coloured) tactile walking surface indicators on sidewalks and/or multi-use paths.[87,91]

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- → Increase visibility to vehicles through sidewalks and/or multi-use paths that have coloured patterns, but ensure patterns do not decrease usability for people with visual, cognitive, or developmental disabilities.[83,87,91]
- → Use ground and surfacing materials that can protect against injury (e.g., fractures, osteoarthritis).[152]
- → During construction that obstructs sidewalks or multi-use paths, create temporary pedestrian and/or multi-use pathways that include aesthetically pleasing features to offset construction blight (e.g., include temporary artwork along temporary pathway).[135]
- → Locate multiple school bus and parent drop-off accessible stops 400 m – 800 m (0.25 mi. – 0.5 mi.) away from a school, connected by safe pedestrian and/or multi-use paths or trails to school, except for children with disabilities who may need to be dropped off at the school outside main accessible doors.[54,55] ☆☆
- → Implement a "walking school bus" program where children walk together to school with adult supervision.[153] Include safety and accessibility considerations in programming and travel paths to allow children of all abilities to participate safely.
- → Create, implement, or use a "Percent for Art" program[149] to regularly incorporate art into neighbourhood, street, and/or building infrastructure.[105,150] ☆

COVID-19 Considerations

- To facilitate 2 m (7 ft.) distancing for pedestrians, consider one or more of the following options:
  - Sidewalks or multi-paths wider than 2 m (7 ft.).
  - Parking spaces adapted into parklet parks.
  - Regular paved small waiting/detour areas created adjacent to sidewalks or multi-use paths.
- During pandemics like COVID-19, main streets could have pedestrian priority zones that are not interrupted by motor vehicles.

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B. Ensuring bicycling infrastructure with connections to public transit.

Core Strategies for All

- *In urban municipalities with populations at or above 50,000, the following applies in all neighbourhoods.*
- *In smaller municipalities with populations below 50,000 but ≥ 1,000 and with one or more non-residential commercial areas, the following should occur in at least one core denser mixed-use area to ensure areas that can equitably accommodate populations who cannot or do not drive (such as seniors/older populations).*
- *In rural areas (towns, villages, hamlets) defined by Statistics Canada as areas with populations less than 1,000 people or population density less than 400 people per km², [50] if one or more non-residential commercial areas exists, if possible, strive for at least one core denser mixed-use area that can equitably accommodate populations who cannot or do not drive (such as seniors/older populations).*

Bicycling infrastructure should be present and have all of the following features:

→ Bike lanes do not block pedestrian access at crossings and throughout the pedestrian network.[54–56] ★☆

→ Bike lanes are demarcated or identifiable by a grade change, tactile surface change, and/or clear contrasting signage for pedestrians with visual or cognitive disabilities.[141]

→ Networks of bicycle lanes and/or multi-use trails accommodating bicycles lead to destinations and include adjacent signage placed at appropriate heights and angles, and in formats for people of all abilities for clear wayfinding for cyclists. *(See **Appendix D** for signage formats for people of all abilities.)* [51,87,106,154,250] ☆☆☆

→ Bicycle lanes and/or multi-use trails accommodate bicycles with a minimum width of 2.7 m - 3.5 m (8.8 ft. - 11.5 ft.) each way to accommodate travel in different directions on two-way streets or unidirectional on a one-way street, or 3.0 m - 4.6 m (9.4 ft. - 15.1 ft.) total width for a bi-directional bike lane on a one-way street.[141]

→ Bicycle lanes and/or multi-use trails accommodating bicycles are protected from automobiles.[27,51,55,57] ★★

– Sidewalk → bicycle lane → painted buffer → parked car or protector → car lane OR off-road bicycle path (including multi-use paths).

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- In areas with extreme weather conditions (e.g., cold, heat, rain, snow, winds), these circumstances are considered in the design and location of bicycle and storage infrastructures (e.g., shading in very hot or rainy climates, appropriate landscaping to shield from wind conditions) to permit use for as much as possible year-round. Poor weather conditions can be a barrier to active transport.[56,87] ☆
- Long-term sheltered secure bicycle parking is provided for tenants or occupants of public, commercial, worksite and multi-family residential buildings.[27,54,55] ★
- Optional long-term sheltered secure bicycle parking is available at major transit stations for commuters and transit workers.[57] ☆
- Short-term secure bicycle parking is provided for visitors or patrons in or outside public, commercial, worksite, and multi-family residential buildings; public parks, play and recreation areas; retail areas; and transit stops.[54,56] ★
- Bicycle lane networks and/or multi-use trails accommodating bicycles located within 400 m (0.25 mi.) walkable radius of all public, commercial, and multi-family residential buildings.[51,57,250] ★ ☆
- Off-road multi-use paths visible from well-used community roads, accommodating safe walking and bicycling to school and connecting to the surrounding residential neighbourhoods (e.g., within 5 km or 3.1 mi.).[51,55,125,250] ☆ ☆ ☆ ☆
- In rural areas outside the core denser mixed-use areas, roads where sidewalks and bike lanes are not possible have wider paved shoulders for pedestrian and bicycle use. Include painted road demarcations +/- road signage to indicate possible pedestrian and bicycle use.[131] Wider shoulders also assist with longer life cycles of the road.[148]

Bicycle Parking Near Amenities
Edmonton, Canada
Photo Credit: Karen Lee, Housing for Health

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Connaught Open Street
Calgary, Canada
Photo Credit: Celia Lee, Sustainable Calgary

Area One Council Play Street
Edmonton, Canada
Photo Credit: Karen Lee, Housing for Health

Additional Options

In addition to the core strategies, consider *two or more* of the following actions:

- → Make bicycle share service available.[155]
- → Provide programs that can increase bicycling for transportation, recreation, or service provision (e.g., Cycling Without Age).[156,157]
- → Offer open streets, summer streets, or slow street programming (streets temporarily closed to cars and opened for walking, cycling, and other active recreation or transportation on designated days and times).[54,97,158] ★
- → Provide bicycle repair stations (with pumps and tools) on bike and/or multi-use paths.[159]
- → Repurpose secondary roads that have less traffic, former railroads, and other under-utilized spaces such as old ports and piers into multi-use paths and trails accommodating bicycles.[51,55,250] ☆★☆

COVID-19 Considerations:

- During pandemics like COVID-19, consider automated bicycle traffic lights.
- During pandemics like COVID-19, consider implementing additional temporary bicycle lanes in commercial and residential areas.

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C. Providing access to public transit.

Core Strategies for All

Where present, public transit infrastructure should:

- Be reliable, ensuring:
  - Transit system is on time.[160,161]
  - Public transit is consistently operational and available in all seasons. Implement winter maintenance programs such as ice removal and clearing of windrows to ensure accessibility by people of all abilities throughout the winter season. Building up of snow can prevent access to the bus ramp and ice leading to the bus stop can prevent usability by patrons.[142]
  - Transit is available at night until amenities (e.g., recreation facility, commercial area) are closed.[162]
- Have transit stops located within 800 m (0.5 mi.) walking distance to public, commercial, and multi-family residential buildings; public parks, play and recreation areas; and healthy retail areas (e.g., supermarkets and farmers' markets, etc.).[27,49,125] ☆☆
- Have transit stops with convenient and safe pedestrian crossing facilities nearby to ensure all users can access these facilities travelling in either direction.[125] ☆
- Ensure transit stops are near and after intersections for accessibility and safety.[49,78,125] ☆☆
- Ensure transit stations are accessible and barrier-free (e.g., elevators plus stairs and/or ramps instead of escalators at transit stations). Use signage to alert users if elevators or other access points are not operational and indicate alternate routes or contact persons. Ensure signage meets accessibility requirements, including use of braille.[91,163]
- Ensure transit stops, including bus stops, have universal design and current CPTED principles including accessible design features, adequate lighting, and visibility to promote user safety.[91,163] Crime-related safety is a barrier to active transport.[54,56] ★
- Have transit stations that promote active mobility and, if possible, active living for users of all abilities (e.g., through use of stairs and ramps, through other available active amenities such as exercise equipment for use during wait times). Include signage to promote active mobility for those who are able.[164] ☆

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- → Ensure transit stops and stations have accessible seating for those who need it (e.g., seniors).[86,91,163]
- → Be accessible and accommodate mobility equipment such as wheelchairs, scooters, and walkers.[87,91,163]
- → Provide barrier-free walking and multi-use paths to transit stops that are maintained throughout the year, especially during winter months.[57,141,125] ☆☆
- → Ensure transit fare discounts based on need are available.[167]
- → Provide secure bicycle parking in or outside transit stops and stations.[27,54] ★
- → Accommodate bicycles (e.g., bicycle carriers on buses, one or more train cars allowing bicycles at all times).[168]
- → Ensure bus shelters are placed directly by bus stops for weather protection.[56,142] Poor weather conditions can be a barrier to active transport. ☆

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Additional Core Strategies for Urban Areas

- Ensure bus and/or rail transit is available and connects all mixed-use neighbourhoods with each other, and with key commercial, employment, recreational, and major residential hubs.[27,125] ☆ ☆
- On high-use transit routes and routes connecting to key commercial and employment hubs in high population areas, areas underserved or unserved by rail transit should be prioritized for other modes of rapid and active transportation, such as bus rapid transit with dedicated lanes and off-bus ticket purchasing stations/machines.[57,126,169] ☆ ☆

Additional Core Strategies for Rural Areas

- Have a request and access a ride program (e.g., Access-A-Ride or OnDemand Transit) is available for people with disabilities and seniors.[170,171]
- Ensure a basic transit system is available within a municipality and/or region. Transit should connect the core mixed-use areas with each other and with key commercial, employment, recreational, healthy food retail, and residential hubs within the municipality and/or region. Those routes connecting to key commercial and employment, recreational, and residential hubs should include bus rapid transit with dedicated lanes where traffic levels warrant.[27,122,125] ☆ ☆ △
- Implement a "request a stop" transit program to allow riders to enter and exit transit at the closest location along the bus route to their destination.[172]

Additional Options

In addition to the core strategies, consider *three or more* of the following actions:

- Provide transit stops with push button heaters.[142]
- Place public art at transit stations and along the transit system.[163]
- Locate transit stops within 400 m walking distance of major community amenities such as public and commercial buildings; large public parks, play and recreation areas; healthy retail areas (e.g., supermarkets and farmers' markets, etc.); and provide convenient and safe pedestrian crossing facilities nearby to ensure all users can access these facilities travelling in either direction.[49,57,125] ☆ ☆
- Include visible site maps at transit stops to key healthy destinations (e.g., parks, recreation facilities, supermarkets, farmers' markets, public libraries) within 800 m. Wayfinding is helpful for pedestrians and cyclists. Maps should be placed at appropriate heights and angles, and in formats for people of all abilities. *(See **Appendix D** for signage formats for people of all abilities.)*[47–49,75,96,98] ★ ★ ☆

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- → Provide transit stops with visible time of arrival information. Information should be placed at appropriate heights and angles, and in formats for people of all abilities. *(See **Appendix D** for signage formats for people of all abilities.)*[163]
- → Provide transit stops with information inside and outside advertising transit times, walking distance/time to next stop, and/or point-of-decision prompting signage to promote walking to the next stop where there is a significant waiting time at the current stop (e.g., wait times exceed walking time to the next stop). Information should be placed at appropriate heights and angles, and in formats for people of all abilities. *(See **Appendix D** for signage formats for people of all abilities.)*[173,174]
- → Provide schools with multiple school bus and parent drop-off stops located 400 m – 800 m (0.25 - 0.5 mi.) away from the school that are connected by safe walking paths or trails, except for children with disabilities who may need to be dropped off at the school.[54,55] ☆☆
- → Implement a "walking school bus" program where children walk together to school with adult supervision.[153]

COVID-19 Considerations:

- During pandemics like COVID-19, consider rear-door boarding to ensure all bus passengers (except for those with accessibility needs) board through the rear door for physical distancing.[175]
- During pandemics like COVID-19, consider increased frequency of bus transit to avoid overcrowding in buses and trains.[176]

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III. Street and Street Amenities Design

A. Improving design of and amenities on pedestrian pathways for safety and user friendliness

Core Strategies for All

For pedestrian safety, neighbourhood streets should:

- → Have pedestrian-controlled street crossings with sensors, and visual and audible signals at each end of the crosswalk with sufficient time for pedestrians of different ages and abilities to cross. In rural municipalities, include these features in the core denser mixed-use areas and on higher automobile use streets that could also be used by pedestrians.[83,141,177]
- → Include multiple crosswalks with visual and audible signals on long blocks in areas with pedestrian use and accessible amenities to increase convenience and safety, and reduce risk of pedestrian-vehicle collisions.[83]
- → Have regular pedestrian street crossings (e.g., every 30 m or 100 ft. or less) in areas with pedestrian use and amenities accessible by/to pedestrians, especially to accommodate vulnerable populations like seniors and people with mobility challenges.[27,54,56,102] ★★
- → Have street lights and crossing signals at crosswalks so vehicles are required to stop for pedestrians.[54,56] ★
- → Avoid continuous right turning lanes (e.g., "pork chop islands", "slip lanes"). This increases the length of crossing for pedestrians and can reduce user safety.[141] Where possible, raise intersections [83] and improve signage to prioritize pedestrians.[83,178] Ensure smooth transition at crossings between road and the island at the end of the crossing.[54,56,252] ★☆
- → Ensure smooth transition between roadways, sidewalks, multi-use paths/trails and curb cuts, including considerations for maintenance requirements during winter months.[27] ★
- → Have lower speed limits (no more than 50 km/hour or 30 mph) on streets with pedestrian sidewalks.[53,54,56,57,63,141,179] ★★☆
- → Have signage for motor vehicles at intersections and crossings that encourages drivers to slow down in residential and mixed-use areas.[83,106] ☆

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- Have measures to ensure drivers slowdown in residential and mixed-use areas, including considerations to narrow the width of lanes for cars and toll roadways going through towns/cities.[27,54,63,83,87,102] ★☆☆
- Where traffic levels and/or conditions (e.g., nearby schools, playgrounds, aging populations) warrant, include additional traffic calming measures in areas with pedestrian and/or bicycle infrastructure such as traffic circles, bulb outs/curb extensions, speed bumps, etc. to encourage drivers to slow down.[27,54,63,87,102] ★☆☆
- Where pedestrian and/or multi-use paths are provided along a vehicular roadway, use landscaping buffer(s) that do not impede pathways and are cane detectable to separate pedestrians from moving vehicles such as:[55,56,60] ☆☆△
  - Garden bed barriers, and/or
  - Raised planter boxes, and/or
  - Street furniture, and/or
  - Other infrastructure.

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- → Have curb cuts or ramps at intersections and crossings no less than 1.8 m (5.9 ft.) wide to allow two wheelchair and/or stroller users to pass at the same time, and with a flat landing area immediately adjacent to it for users to rest.[141]
- → Have curb cuts or ramps at all intersections for each crossing direction or features like raised pedestrian crossings that accommodate pedestrians of all abilities to transition between sidewalks and streets.[55,125] ☆ ☆
- → Have sufficient drainage at curb cuts to prevent pooling of water from rain or snowmelt.[87]
- → Where there are unavoidable level changes, have a slope with a maximum gradient of 5%.[91]
- → Minimize interruptions on sidewalks with high pedestrian use for improved accessibility and pedestrian continuity. For example, implement policy to minimize front driveways for major collectors that run through primarily residential areas; consolidate multiple access points for busier non-residential areas mid-block vehicular curb cuts and improve driveway-pedestrian interaction safety on.[136]

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Pedestrian Scale Lighting
Ottowa, Canada
Photo Credit: Karen Lee, Housing for Health

- → Include exterior pedestrian scale lights to increase safety. Pedestrian lights should be be at an appropriate height, brightness, orientation and colour, and be placed at frequent intervals, to provide sufficient and safe illumination of pedestrian facilities while maintaining pedestrian comfort.[53-56,180] ☆ ★
- → Include uncovered and unobstructed windows on ground floor commercial and retail building frontages to increase transparency between street and ground floor building interiors.[164] ☆
- → Be at the same elevation as ground floors of commercial and retail buildings to allow transparency between street and ground floor building interiors.[181]
- → Include retail or common uses for ground floors of multi-family residential buildings without main floor units and/or other buildings to improve the pedestrian realm.[167]
- → Minimize large setback spaces to increase transparency between street and ground floor building interiors and to maintain an accessible path of travel. Where large setbacks already exist, improve setbacks for safety through adequate lighting, and for use through pedestrian and bicycling-friendly amenities such as landscaping, benches, and bicycle racks on the space. Setbacks spaces may additionally be used for active recreation spaces, such as outdoor gym, community garden, etc. Ensure landscaping and amenities follow current CPTED principles for safety (e.g., avoid dense vegetation that could decrease the feelings of safety).[27,53–56,59,60,63,97,100,107,125,182,251,252] ★ ★ ★ ☆ ★

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To ensure neighbourhood streets are even more pedestrian friendly:

→ Connect streets to each other and to destinations with gridded or modified grid patterns (not looped lollipop patterns), multiple four-way intersections, and small block sizes.[27,51,54,56,125,250,252] ★☆☆

- Where block sizes are large in new developments, ensure pedestrian paths and crossings that form a grid have intersections every 60 m – 90 m (200 ft. – 300 ft.).[83]
- Where block sizes in existing areas are large, where possible, retrofit pedestrian paths and crossings that form a grid with intersections every 60 m – 90 m (200 ft. – 300 ft.).[83]
- Where there are dead end streets where cars cannot pass, ensure pedestrian and bicycling paths continue.[83]
- In rural municipalities, include the above features in the core denser mixed-use areas and on higher automobile use streets that could also be used by pedestrians.

→ Ensure street width to building height ratios use principles of human scale design.[146]

- In dense contexts such as main streets, residential streets and the like, the height-to-width is between 1:2 and 1:3.[183]
- In low-density environments, such as industrial areas, highway commercial and the like, the height-to-width ratio is no lower than 1:4.[183]

→ Incorporate variety and points of visual interest on building frontages on streets with sidewalks to improve the pedestrian experience. Blank walls should make up no more than a minority of façade.[144]

→ Provide frequent benches, regularly located (e.g., every 300 m or 1000 ft. or less) along streets and pathways connecting pedestrians to destinations. Consider placing two or more benches together (e.g., facing each other, side by side, etc.) to allow for rest and physically distanced socialization.[55,97,117,188] ★☆

Each bench should meet all the following recommendations:[63,87]

- Have backrests and armrests that accommodate a variety of users (e.g., one bench with side armrests only and one bench that also has mid-bench armrest(s).[91]
- Ensure bench seating, including seats as well as back and arm rests, are designed to meet accessibility requirements.[87]
- Benches are made from materials resistant to all-weather, are anti-slip, and are comfortable to as many users as possible.[91]

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- Bench handrail materials are splinter and rust-proof. Avoid metal for exterior railings that become too hot in summer and cold in winter.[141]

→ Ensure bicycle parking is available but does not obstruct the pedestrian network.[27,55–57] ★★

→ Along with other interventions to improve the public realm, include trees, planters and/or other landscaped biophilic elements.[27,55,59,60,63,68,100,102] ☆★★

Include all of the following features:

- Ensure branches are trimmed such that heights do not pose a hazard, especially to those with visual impairments.[184,185]
- Shrubs and bushes are kept below 0.9 m (3 ft.) height for transparency, safety, and views.[179]

→ Trees should be planted at regular intervals appropriate for the species and have tree pits/tree trenches which allow for tree growth and stormwater management.[59,60,63,100,178,186] ☆★★

→ Except for designated parking for people with disabilities, no automobile parking or only paid automobile parking to encourage walking, cycling, and transit use in areas with active transportation amenities.[56,102] ★

→ In urban areas, have pedestrian street crossings, especially those with traffic lights or flashing pedestrian-activated lights and auditory signals regularly (e.g., every 30 m or 100 ft.) on high pedestrian streets or streets with amenities accessible by pedestrians.[141] In rural municipalities, include this feature in the core denser mixed-use areas and on higher automobile-use streets that could also be used by pedestrians. Where signalized crossings are absolutely not possible, consider other methods to provide high visibility (e.g., reflective tape and paints).[54,56] ★

Landscaping to Assist in Traffic Calming
Montreal, Canada
Photo Credit: Robert Lipka, City of Edmonton

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Tactile Walking Surfaces at Transit Station
Edmonton, Canada
Photo Credit: Robert Lipka, City of Edmonton

- → Incorporate Attention Tactile Walking Surfaces (TWSI) and Guidance TWSIs (wayfinding tiles) on sidewalks to lead to destinations. This should be required where there are safety and/or access considerations promoting ease of use. They are particularly helpful at transportation hubs such as LRT, train and bus stations, airports, etc.[87,91,95] ☆
- → Place cold public drinking water fountains with water bottle refilling stations on key routes for pedestrians and/or cyclists in urban areas and in rural municipalities, in the core denser mixed-use areas.[87–90,95,74] ☆ ☆

  Drinking water fountains should:

  - Be accessible to populations of all abilities and different ages (e.g., fountains with multiple heights).[87]
  - Be located at key locations.
  - Have a separated lower fountain for pets.[137]
  - Be operational and accessible year-round (e.g., clear snow around fountains during winter months).[142]

Additional Options

In addition to the core strategies, undertake *one or more* of the following actions for safety:

- → Have narrow car lane widths (e.g., to a maximum of 3 m or 10 ft.) to decrease speeding and increase safety.[83]
- → Further reduce vehicular speed limits to 40 km/h (25 mph) or below.[141]
- → Include bulb outs/curb extensions to reduce pedestrian crossing times, enabling people of all abilities and ages to cross the road safely where the site and neighbourhood have significant populations of older adults, children, and/or people with varying disabilities.[27,63,102] ★ ☆

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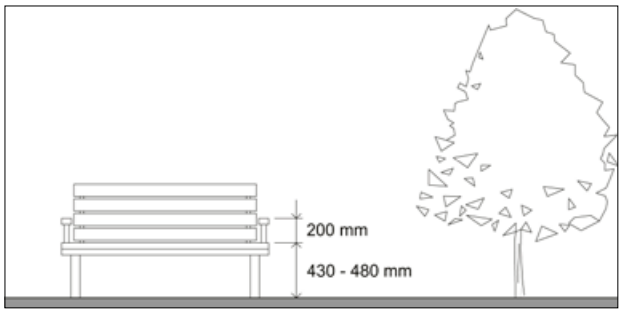
Bench with Accessible and Climate-Friendly Features
Edmonton, Canada
Photo Credit: Robert Lipka, City of Edmonton



Accessible Bench with Dimensions
Photo Credit: City of Edmonton, Access Design Guide

In addition to the core strategies, undertake two or more of the following for additional user friendliness:

→ Where the side and neighbourhood have a significant population of older adults and/or individuals with varying abilities, provide frequent benches, regularly located (e.g., every 300 m or 1000 ft. or less) along streets and pathways connecting pedestrians to destinations. Consider placing two or more benches together (e.g., facing each other, side by side, etc.) to allow for rest and physically distanced socialization.[55,97,117,188] ★☆

Each bench should meet all the following recommendations:[63,87]

- Have backrests and armrests that accommodate a variety of users (e.g., one bench with side armrests only) and one bench that also has mid-bench armrest(s).[91]
- Ensure bench seating, including seats as well as back and arm rests, are designed to meet accessibility requirements.[87]
- Benches are made from materials resistant to all-weather, are anti-slip, and are comfortable to as many users as possible.[91]
- Bench handrail materials are splinter and rust-proof. Avoid metal for exterior railings that become too hot in summer and cold in winter.[141]

→ Place signage and artwork in neighbourhoods for neighbourhood identity and sense of place to enhance uniqueness of the site/neighbourhood. Signs locating important places and buildings are hung horizontally on the exterior wall or attached perpendicularly to the wall. Signage should be placed at appropriate heights and angles, and in formats for people of all abilities. Non-glare large graphics signs should have easy to understand symbols in clear colour contrast to the background, preferably dark lettering on a light background and a mix of upper- and lower-case letters to increase readability. *(See **Appendix D** for signage formats for people of all abilities.)*[63,105,164] ★△

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- Provide infrastructure that supports increased frequency and duration of walking and use by people with all abilities such as public art for beauty (e.g., artistic installations, water features) and/or animation in streets.[27,54–56,59,60,63,252] ★★★△
- Provide natural or human-made shelter, or shading devices for weather protection (e.g., deciduous trees to provide shade in the summer and natural light to filter through during the winter). Ensure branches are trimmed such that heights do not pose a hazard, especially to those with visual impairments.[56,184,185] Weather conditions can be a barrier to active transport. ☆
- Provide outdoor space for small commercial or other uses at street level. Original façade openings and street-level transparency elements between the sidewalk and building interiors should not be obstructed by such spaces.[97,99,107,164] ★△
- Have open streets or summer streets programming (e.g., streets temporarily closed to cars and opened for walking, wheeling, cycling, use by people of all abilities, and other active recreation or transportation on designated days and times) encompassing multiple events over the course of a season and involving various neighbourhoods with diverse socio-demographic groups.[54,97] ★
- Have building setbacks that are minimized to increase transparency between street and ground floor building interiors, while ensuring sufficient space for accessibility. Where large setbacks already exist, improve setbacks for safety through adequate lighting, and for use through pedestrian and bicycling-friendly amenities such as landscaping, benches, and bicycle racks on the space. Setbacks spaces may additionally be used for active recreation spaces, such as outdoor gym, community garden, etc. Ensure landscaping and amenities follow current CPTED principles for safety (e.g., avoid dense vegetation that could decrease the feelings of safety).[27,53–56,59,60,63,97,100,107,125,182,251] ★★★☆★
- In rural areas, all roads leading into towns or municipal centres, especially denser mixed-use areas, include multi-use trails or other designated cycling facilities where bicycling for transportation or recreation can occur from surrounding areas where there are homes.[27,51,54,57,250] ★★☆☆

COVID-19 Considerations:

- During pandemics like COVID-19, consider dedicated delivery/loading zones such as curbside pickup spots for restaurants, commercial businesses and school lunch pickup.
- For COVID-19, where there are two or more benches placed together, consider spacing them at least 2 m (7 ft.) apart.
- During pandemics like COVID-19, consider pop-up bike lanes and multi-use road spaces to protect cyclists and pedestrians from car traffic.[175]
- During pandemics like COVID-19, consider opening parkways to pedestrian and cycling traffic, and closing roads around park edges and bodies of water to promote social distancing and ease overcrowding.

Total Physical Activity
Active Transportation
Active Mobility
Active Recreation
Social Connections
Healthy Eating
Medical Conditions

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△ Supported By Some Primary Studies (Mixed / Inconclusive in Moderate-High Quality Systematic Reviews)

Note: Strategies without a symbol do not have moderate-high quality systematic reviews (2010+).

B. Providing social spaces and amenities using streets within communities.

Core Strategies for All

Streets should have all of the following:

- Human-scale seating and street furniture along streets and pathways connected to destinations for pedestrians.[27,55] ☆☆
- Where streetscapes allow, pedestrian plazas or pedestrian gathering spaces with appropriate lighting.[54,61,97,187] ★
- Commercial or public amenities for social gathering along streets with high pedestrian and/or cyclist volume (e.g., markets, parks, etc.).[144]
- Public restrooms accessible for all demographics including genders, ages, and abilities and include necessary amenities in all restrooms for different populations such as diaper changing stations.[95] ☆

Additional Options

In addition to the core strategies, undertake *one or more* of the following actions:

- Provide communal seating and tables along streets and pathways. At least some of the seating and tables accommodate accessibility needs.[91]
- Include local cultural, historical, or heritage attributes within the public realm or land-use projects in collaboration with the community (e.g., public art, signage, heritage conservation, cultural spaces, or commemorative design features).[83,144]
- Incorporate appropriate public spaces for use for healthy socialization and active recreation by populations living in the neighbourhood. For example, in areas with high populations of Indigenous peoples and/or other ethno-cultural groups, integrate design considerations for public spaces to accommodate traditional healthy social activities (e.g., spaces for powwow dancing and other ethno-cultural dances).[27,53–55,59,60,63,71,74,80,87–90,97,98,100,115,118] ★★☆★
- Have open streets, summer streets, or play streets programming (streets temporarily closed to cars and opened for walking, cycling, and other active recreation or transportation on designated days and times) for use by people of all abilities.[54,97] ★
- Offer programs that can increase bicycling for social connection and/or service provision (e.g., Cycling Without Age).[156,157]

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Winter Outdoor Pedestrian Gathering Space
Montreal, Canada
Photo Credit: Karen Lee, Housing for Health

COVID-19 Considerations:

- Consider adequate space for physical distancing (at least 2 m or 7 ft. width); if possible, implement multi-use pathways for pedestrians and cyclists.
- During pandemics like COVID-19, main streets could have pedestrian priority zones that are not interrupted by motor vehicles.

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IV. Street Signs at Active Transportation Nodes

Fostering successful navigation through active transportation modes.

Core Strategies for All

All street signs should:

- → Designate bicycle paths, multi-use paths, and transit stops and identify key healthy community focal points within 800 m (0.5 mi.) of these active transportation amenities, particularly supermarkets, farmers' markets, and active recreation facilities.[51,55,57,250] ☆★☆
- → Provide pedestrian, cyclist, and driver wayfinding to key healthy community focal points including supermarkets, farmers' markets, active recreation amenities, bicycle paths, and multi-use trails and transit stops at decision points such as junctions and bends.[63,97,99,105,107] ★★
- → Be located for visibility for all users and in all weather conditions.[141,142] Signage should be placed at appropriate heights and angles, and in formats for people of all abilities. *(See **Appendix D** for signage formats for people of all abilities.)*[63,97,99,105,107] ★★
- → Use non-glare large graphics and materials with easy to understand symbols in clear colour contrast to the background, preferably dark lettering on a light background and a mix of upper- and lower-case letters to increase readability. *(See **Appendix D** for signage formats for people of all abilities.)*[91,142]

Additional Options

In addition to the core strategies, undertake *two or more* of the following actions:

- → Provide wayfinding signage that supports local place-making by integrating significant cultural or heritage attributes identified through meaningful engagement and decision-making with residents and local organizations.[91]
- → Include architectural features familiar to community residents.[141]
- → Include a site street map with large font that includes street names and, if possible, is available in different languages that cater to the community.[87]
- → Minimize street clutter (e.g., signs, advertising billboards, and pillars).[141]
- → Not allow the advertising of unhealthy products or premises as part of interventions.[71,80] ★

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Pedestrian and Cyclist Wayfinding
Edmonton, Canada
Photo Credit: Karen Lee, Housing for Health

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Site

Scale 2

The HCG can and should be used for improving new as well as existing sites. When planning, designing, and constructing new sites, there is opportunity and need to use the HCG to guide such activities from the start. Previous experience and studies suggest that many strategies can be incorporated feasibly with minimal to no extra cost when considered in planning and design of built environment projects from the beginning. Major site renovations involving landscaping and street infrastructure are also key opportunities for integrating relevant HCG strategies feasibly for minimal or no extra cost. Some strategies are also amenable to low cost, easily-feasible, non-renovation retrofits (e.g., addition of health-promoting and wayfinding signage as well as art onsite, addition of gardening amenities and/or co-located adult and children physical activity equipment in available spaces, adding benches for aging populations). Developers as well as planning and design firms can routinely integrate relevant strategies into their sites. Public sector site projects should routinely integrate relevant strategies to maximize benefits, including health and wellbeing benefits, from public sector funds.

Total Physical Activity
- Active Transportation
- Active Mobility
- Active Recreation

Social Connections

Healthy Eating

Medical Conditions

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I. On-Site Landscape Design and Uses

Supporting physical activity, social connections, healthy eating, and availability of green spaces in the site landscape design.

Core Strategies for All

The site should have all the following:

- Building setbacks that are minimized to increase transparency between street and ground floor building interiors, while ensuring sufficient space for accessibility. Where large setbacks already exist, improve setback spaces for safety through adequate lighting and for use through pedestrian- and bicycling-friendly amenities such as landscaping, benches, and bicycle racks on the space. Setbacks spaces may additionally be used for active recreation spaces, such as outdoor gym, community garden, etc. Ensure landscaping and amenities follow current CPTED principles for safety (e.g., avoid dense vegetation that could decrease the feelings of safety).[27,53–56,59,60,63,97,100,107,125,182,251] ★★★☆★
- Frequent benches, regularly located (e.g., every 300 m or 1000 ft. or less) along streets and pathways connecting pedestrians to destinations. Consider placing two or more benches together (e.g., facing each other, side by side, etc.) to allow for rest and physically distanced socialization.[55,97,117,188] ★☆
- Each bench should meet all the following recommendations:[63,87]
  - Have backrests and armrests that accommodate a variety of users (e.g., one bench with side armrests only and one bench with that also has mid-bench armrest(s)).[91]
  - Ensure bench seating, including seats as well as back and arm rests, are designed to meet accessibility requirements.[87]
  - Be made from materials resistant to all-weather, are anti-slip, and are comfortable to as many users as possible.[91]
  - Bench handrail materials are splinter and rust-proof. Avoid metal for exterior railings that become too hot in summer and cold in winter.[141]

- → Landscaping onsite, preferably within 18 months of the occupancy of a development.[27,55,59,60,63,97,100] ★★★

  Include:

  - Trees, planters and/or other landscaped biophilic elements with all of the following features:
    - Ensure tree branches are trimmed or cut such that heights do not pose a hazard, especially to those with visual impairments.[184,185]
    - Shrubs and bushes kept below 0.9 m (3 ft.) height for transparency, safety, and/or views.[179]
  - Trees should be planted at regular intervals appropriate for the species.[178]

- → Secure bicycle parking in or outside public, commercial, retail, worksite, and multi-family residential buildings.[27,55–57,106] ★★

- → Pedestrian lights at an appropriate height, brightness, orientation and colour, and placed at frequent intervals, to provide sufficient and safe illumination of pedestrian facilities while maintaining pedestrian comfort.[53–56,180] ★★☆☆

- → At least 37 m^2 (400 $ft.^2$) of dedicated multi-use space for any site with greater than 10 residential or work units, and for daycares if publicly accessible cost-free recreational physical activity facilities are not located within 400 m (0.25 mi.) of the site. This multi-use space can be indoor or outdoor and used for exercise/activity that includes a variety of exercise/activity equipment inclusive of cardio and strength training and/or for group exercise classes. It should be accessible to all building occupants and available for use by at least 5% of building occupants at any given time. Co-locate activity spaces for adults and children in residential buildings with both adults and children. Gardening activity space and equipment (permanent accessible and open urban agriculture space of at least 1 m^2 per dwelling unit/office staff) can also count as adult active recreation space and equipment onsite for occupants. Where possible, gardens should have south facing exposure. Exercise/activity spaces will have at least one drinking water fountain with a water bottle refilling station.[27,53–55,59,60,63,71,74,80,87–90,97,98,100,115,118,251] ★★☆★★

- → Adequate outdoor space onsite at all schools for daily recess and lunch physical activity to meet the daily physical education needs of all students not met by interior school spaces. Gardening and physical activity spaces and equipment should include considerations for heights, formats, and amenities accessible to people of all abilities.[27,59,71,80,115,189] ★★☆

Total Physical Activity
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Social Connections
Healthy Eating
Medical Conditions

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- For sites located in areas with extreme weather conditions (e.g., cold, heat, rain, snow, winds), consideration of these conditions in the design and location of healthy amenities (e.g., outdoor active recreation and gardening areas, active transportation amenities) to permit use for as much as possible year-round.[56,142] ☆
- If food vendors such as food trucks are present, no selling of deep-fried foods and sugary beverages (e.g., soda, slushes, sports drinks, juice, energy drinks, and vitamin water), and trucks should carry the vast majority of healthy food items. *(See **Appendix E** for Healthier Food and Beverage Guidelines for Public Events).*[67,71–74] △△

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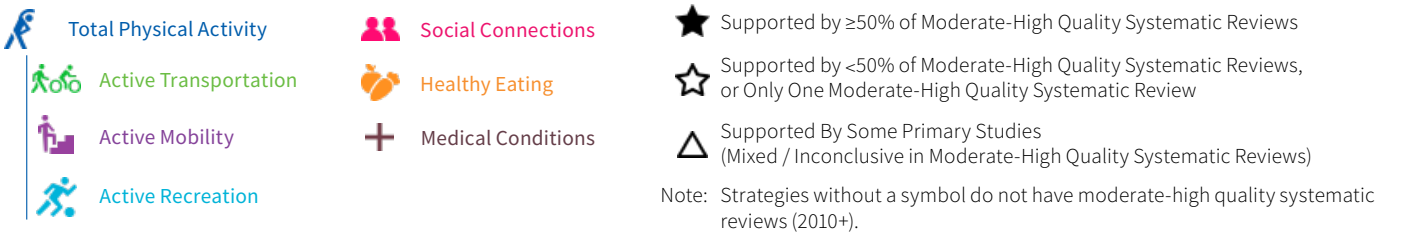
- If there are public event food concessions (e.g., at tournaments, fairs, concerts, neighbourhood parties), vendors who carry healthy food as the vast majority of items and do not sell deep-fried foods and sugary beverages (soda, slushes, sports drinks, juice, energy drinks, and vitamin water). *(See **Appendix E** for Healthier Food and Beverage Guidelines for Public Events).*[67,71–74] △△
- Where feasible, green street features incorporated into the site (e.g., vegetated curb extensions, sidewalk planters, permeable paving, street trees to concurrently promote environmental sustainability and health). Include considerations for such features at transit sites also.[55,57] ☆☆
- Considerations for creating a "Percent for Art" program[149] to regularly incorporate art into neighbourhood, street, and/or building infrastructure.[150,105] ☆
- Maintainence of streets around homes and buildings such that they are clean, free of litter, graffiti, vandalism and dog feces.[63] △

Additional Options

In addition to the core strategies, consider *four or more* of the following actions:

- Choose a site located in a neighbourhood with healthy mixed-use within 800 m (0.5 mi.) of the site and with at least two active transportation options (e.g., sidewalks or pedestrian paths, bicycle lanes or multi-use paths, and/or public transit stops) within 800 m (0.5 mi.) of site to various destinations *(See Neighbourhood Section).*[27,54,56,57] ★
- Place pedestrian and cyclist wayfinding signage at appropriate heights and angles, and in formats for people of all abilities to relevant healthy destinations onsite and in neighbourhood. *(See **Appendix D** for signage formats for people of all abilities.)*[55,56,106] ★★☆
- Where healthy food retailers are not available within 800 m (0.5 mi.) of the building site, incorporate space for healthy food retail (e.g., ground floor supermarket or fruit and vegetable market, farmers' markets on the site that carry fresh produce as the vast majority of items and runs at least once per week for at least three months).[72,83,85,124] ☆△
- Provide fresh produce through landscaping (e.g., edible fruit orchards and vegetables as part of landscaping) with labels for edible and non-edible plants, and signage for harvesting/picking directions. Landscaping design should include considerations for heights, formats, and amenities accessible to people with all abilities. Also consider landscaping conditions (e.g., uncontaminated soil) that allow the edible plants to grow safely and not impede pathways.[71,80] ★
- Provide community gardening space for public use by people of all abilities.[54,64,71,80,97,107,251] ★★★



- → Create, implement, or use a "Percent for Art" program[149] to regularly incorporate art into neighbourhood, street, and/or building infrastructure.[150,105] ☆
- → Provide an outdoor drinking water fountain with water bottle refilling station for public use.[63,74,87–90] ☆

  Drinking water fountains should:

  - Be accessible to populations of all abilities and different ages (e.g., fountains with multiple heights).[87]
  - Be located at key locations.
  - Have a separated lower fountain for pets.[137]
  - Be operational and accessible year-round (e.g., clear snow around fountains during winter months).[142]

- → Include outdoor walking spaces that provide a clear and accessible path of travel of at least 800 m (0.5 mi.) total distance or outdoor exercise spaces of at least 37 m^2 (400 $ft.^2$) that include a variety of exercise/activity equipment accessible for public use. Surfaces should be designed to allow users of all abilities and ages to navigate independently. Avoid curbed or winding paths and use turns that closely equal to 90 degrees. Surfaces should be slip resistant, firm, stable and glare free. Avoid busy and heavily patterned surfaces. Consider use of railings, and/or heated surfacing for winter conditions.[55,97,98,107,190] ☆ ★

Total Physical Activity
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- Provide designated outdoor community meeting space (e.g., pedestrian plaza, outdoor courtyard) with exterior lighting.[87,97,125,187] ☆☆
- Offer outdoor retailing that can be paired with temporary outdoor patios to facilitate merchandising in the public spaces and is accessible to people of all abilities.[54,191] ☆☆
- Where the site and neighbourhood have a significant older adult and/or varying abilities population, provide frequent benches, regularly located (e.g., every 300 m or 1000 ft. or less) along streets and pathways connecting pedestrians to destinations. Consider placing two or more benches together (e.g., facing each other, side by side, etc.) to allow for rest and physically distanced socialization.[55,97,117,188] ★☆

  Each bench should meet all the following recommendations:[63,87]

  - Have backrests and armrests that accommodate a variety of users (e.g., one bench with side armrests only and one bench with that also has mid-bench armrest(s).[91]
  - Ensure bench seating, including seats as well as back and arm rests, are designed to meet accessibility requirements.[87]
  - Be made from materials resistant to all-weather, are anti-slip, and are comfortable to as many users as possible.[91]
  - Bench handrail materials are splinter and rust- proof. Avoid metal for exterior railings that become too hot in summer and cold in winter.[141]
- Use landscape plan in compliance with local policies and relevant authorities
  - Provide for non-pesticide based pest management.[192]
  - Incorporate native flora into the landscape design, including considerations for salt and pollution resistant plants along roadways.[178,193]
  - Incorporate fire smart landscaping design.[194]
- Ensure no advertising of unhealthy products or premises onsite.[71] △

COVID-19 Considerations:

- During pandemics like COVID-19, consider installing outdoor hand washing stations; ensure soap dispensers are always full.

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II. Parking

Encouraging active transportation, accessibility for parking, and safety on the building site.

Core Strategies for All

The site should have all of the following:

- Automobile parking for residential, commercial, retail, workplace, and/or school uses not exceeding the minimum number of spaces required.[56,102] ★
- Automobile parking situated at a distance from buildings being served and/or made less visible (e.g., behind the building) to promote walking or other forms of active transport to the store.[56,102] ★
- Automobile parking situated away from edible landscaping to prevent exhaust fume contamination.[195]
- Disabled parking implemented in accordance with the relevant codes, including at sites for physical activity and active recreation.[95] ☆
- Parking spots for people with disabilities, including at sites for physical activity and active recreation that: [95] ☆
  - Meet or exceed the number of dwelling units in the project that are accessible. At sites serving large numbers of seniors, older adults and persons with different abilities, include more accessible parking spots.[91]
  - Are located within 50 m (164 ft.) or less from the barrier-free building entrances.[87]
  - Includes disability parking signage to ensure that parking stalls are visible and accessible to persons with a disability.[91]
  - Meet the minimum width of a barrier-free parking stall. Wherever possible, include a Transfer Zone (i.e., the space between designated disability parking stall(s) and the nearby pedestrian path). No parking should be allowed in the Transfer Zone; the curb cut is included in the Transfer Zone.[91]

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- Dedicated secure bicycle parking areas (e.g., within parking garages and/or building interiors, high foot traffic outdoor areas) for building occupants and site visitors, including for grocery stores and farmers' markets. If provided within a parking garage, ensure cyclists have a separate ramp or other convenient and safe access route to the internal parking. At minimum, except for dwelling units that have access to an individual garage, at least one bicycle parking spot per every two tenants or one bicycle parking spot per dwelling unit, whichever is the greater, in multi-family residential buildings. In residential assisted living facilities, at least one bicycle parking spot per 20 dwelling units. For any premises, including commercial, at least 5% of parking areas are dedicated to bicycle parking, or at least two bicycle parking spots per 100 m^2 of primary space, whichever is the greater. Dedicated bicycle parking areas are located within 180 m (590 ft.) of main building onsite.[27,55–57,106,196] ★★
- Pedestrian and cyclist wayfinding signage placed at appropriate heights and angles, and in formats for people of all abilities to parking areas including bicycle parking areas. *(See **Appendix D** for signage formats for people of all abilities.)*[54–56,106] ★★☆
- For safety, parking areas, including bicycle parking, with all of the following:[87]
  - Pedestrian wayfinding signage placed at appropriate heights and angles, and in formats for people of all abilities to site area destinations including entry and exit points, stairwells, and parking elevators. *(See **Appendix D** for signage formats for people of all abilities.)*[54–56,105,106,249] ★★☆★
  - White reflective paint.[91]
  - Surveillance cameras in the lot and stairwells.[197]
  - Pedestrian-scale lighting to ensure spaces are well lit.[53–56] ★★☆☆

Total Physical Activity
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Note: Strategies without a symbol do not have moderate-high quality systematic reviews (2010+).

Bicycle Share
Edmonton, Canada
Photo Credit: Karen Lee, Housing for Health

Bicycle Share
Vancouver, Canada
Photo Credit: Karen Lee, Housing for Health

- Parking lots and/or surrounding streets of grocery stores and farmers' markets spaces designed as multi-use space that can accommodate temporary conversions of part of the area for other uses such as play-spaces.[54,55,97,158,198,124] ☆ ★
- Unused parking areas that are repurposed and activated into other permanent healthy uses such as pedestrian plazas, pocket parks, needed play and/or exercise spaces.[54,55,97] ☆ ★
- In mixed-use areas with active transportation, no free automobile parking within 800 m (0.5 mi.) of residential buildings, except dedicated parking for people with disabilities, to encourage walking, cycling, and transit use in these areas.[56,102] ★

Additional Options

In addition to core strategies, consider *one or more* of the following actions:

- Provide a bicycle-share program.[133,134]
- Provide shared bicycles/tricycles with carriers for residential or worksite building tenant use.[133,134]
- Provide needed amenities to support physically active modes of movement, such as sheltered and secured storage area for bicycles/tricycles with carriers on the ground floor of building.[164] ☆
- Provide paid automobile parking and/or reduced parking to encourage walking, cycling, and transit use.[56,102] ★
- Designate at least some (e.g., 5%) of the total parking spaces for shared-use vehicles (e.g., car-sharing program).[132]
- Provide electric vehicle charging stations.[199]
- In rural municipalities, provide one or fewer concentrated dedicated public automobile parking areas near core denser mixed-use areas for use by populations not living in those core denser mixed-use areas. However, there should be designated accessible parking in the core denser mixed-use areas.[56,95,102] ☆ ★

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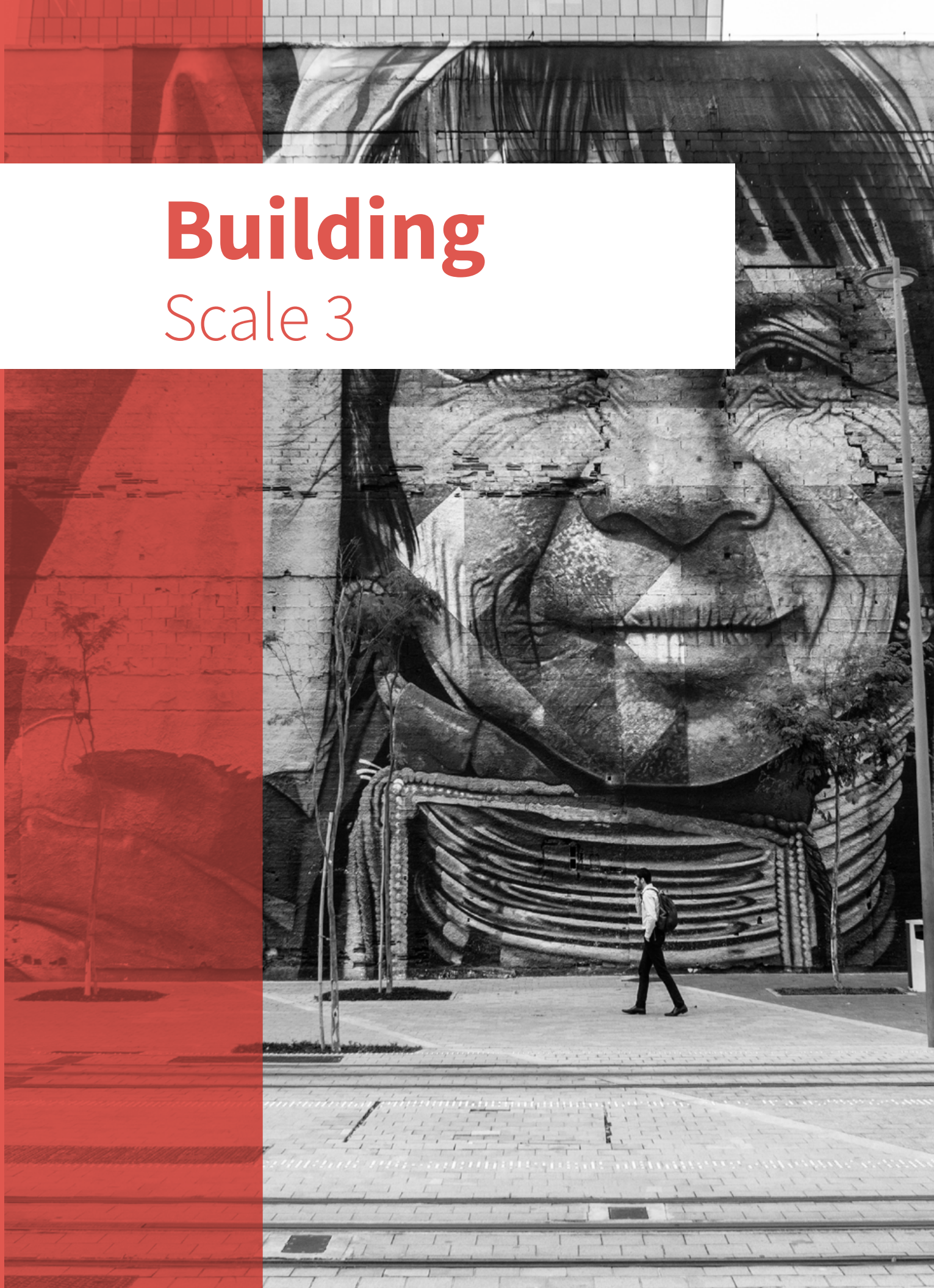
Building

Scale 3



The HCG can and should be used for improving new as well as existing buildings. When planning, designing, and constructing new buildings, there is opportunity and need to use the HCG to guide such activities from the start. Previous experience and studies suggest that many strategies can be incorporated feasibly with minimal to no extra cost when considered in planning and design of built environment projects from the beginning. Major renovations of buildings are also key opportunities for integrating relevant HCG strategies feasibly for minimal or no extra cost. Based on experience with private and non-profit developers, and facility managers, some strategies are also amenable to low cost, easily-feasible, non-renovation retrofits (e.g., addition of health-promoting and wayfinding signage in buildings, art in stairwells, re-programming elevators, co-located adult and children physical activity equipment in available building spaces). Municipalities can also consider improving building codes by removing barriers to healthier building designs (e.g., allowing fire-rated glass to be used on stairwell doors and walls) and mandating healthier amenities where feasible (e.g., water bottle refilling stations on each floor of non-residential buildings). Developers and design firms can routinely integrate relevant strategies into their building projects. Public sector building projects should routinely integrate relevant strategies to maximize benefits, including health and wellbeing benefits, for building users from public sector funds.

I. Façade Design

Creating an active, engaging, inviting, and safe pedestrian environment through building façade design.

Core Strategies for All

- *In urban municipalities with populations at or above 50,000, the following applies in all neighbourhoods.*
- *In smaller municipalities with populations between 1,000-50,000 and with one or more non-residential commercial areas, the following should occur in at least one core denser mixed-use area to ensure areas that can equitably accommodate populations who cannot or do not drive (such as seniors/older populations).*
- *In rural areas (towns, villages, hamlets) defined by Statistics Canada as areas with populations less than 1,000 people or population density less than 400 people per km², [50] if one or more non-residential commercial areas exists, strive for at least one core denser mixed-use area that can equitably accommodate populations who cannot or do not drive (such as seniors/older populations).*

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Façades should:

- Have human scale design where street width to building height ratios are the following:
  - In dense urban contexts such as main streets, residential streets, and the like, the height-to-width is between 1:2 and 1:3.
  - In the low-density environments, such as industrial areas, highways, commercial, and the like, the height-to-width ratio is no lower than 1:4.[183,197]
- Blank walls should make up no more than a minority of façades that face a public roadway other than a lane. Building frontages on streets with sidewalks have variety and points of visual interest to improve the pedestrian experience.[144,181]
- Sensitively reflect light onto streets, north-facing neighbouring buildings and/or into open spaces. Lighter colours on south-facing walls also passively reflect light.[200]
- Have ground floors of commercial and retail buildings that are not at a height that prevents transparency between street and ground floor building interiors.[181]
- Have street-level windows that:
  - Are made from transparent materials that increase transparency between street and ground floor building interiors to allow for visibility of pedestrians on the street outside.[181]
  - For ground floor commercial and retail building frontages, have uncovered and unobstructed windows to increase transparency between street and ground floor building interiors.[201]
- If clear glass is used for walls, doors, or large windows, use contrasting strips or something similar to prevent people (with low vision) from walking into it.[142]
- Ensure façade designs, including any signage, plantings, etc. used in the designs, do not obstruct pedestrian paths and overhead clearance connecting entrances and pedestrian pathways in the public realm.[142]
- Where ground floors of multi-family residential or office buildings are without main residential or office floor units, include healthy retail (e.g., supermarket or grocery store) or common uses (e.g., building gym or physical activity spaces) that also improves the pedestrian realm.[27,55,59,63,72,85,97,98,107,115,164] ★★☆△

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- Have setbacks minimized to increase transparency between street and ground floor building interiors. Where large setbacks already exist, improve setbacks for safety through adequate lighting, and for use through pedestrian and bicycling-friendly amenities such as landscaping, benches, and bicycle racks on the space. Setbacks spaces may additionally be used for active recreation spaces, such as outdoor gym, community garden, etc. Ensure landscaping and amenities follow current CPTED principles for safety (e.g., avoid dense vegetation that could decrease the feelings of safety).[27,53–56,59,60,63,97,100,107,125,182,251] ★★★
- For larger commercial buildings and buildings with double frontage (either corner lots or lots fronting two streets), have multiple points of public access that can help minimize distance to entrances.[142]
- Integrate mixed building textures, colours, and/or other design elements.[142]
- Incorporate CPTED principles to promote safety (e.g., transparency between indoors and outdoors, pedestrian-scale lighting outdoors).[53–56,179,182,202] ★★☆☆
- During façade construction, ensure CPTED principles such as adequate pedestrian-scale lighting for safety on and around the site.[53–56] ★★☆☆
- To ensure that pedestrian and cycling connectivity is maintained at all times, during façade construction obstructing sidewalks or multi-use paths, create temporary pedestrian or multi-use pathways on the same side of the street.[51,55,91,250,252] ★★
- Maintain streets around homes and buildings such that they are clean, free of litter, graffiti, vandalism and dog feces.[63] △

Additional Options

In addition to the core strategies consider *three or more* of the following actions:

- Include window display cases that allow for transparency between building occupants and pedestrians on the streets.[181]
- Ensure spaces and buildings are oriented to avoid creating areas of dark shadow or bright glare.[91]
- Incorporate murals or other artistic installations in public spaces and places.[142]
- Use culturally diverse façades that reflect ethno-cultural groups in the neighbourhood.[30]
- Use biophilic, greening, and other landscape elements.[27,53,55,59,60,63,100] ★☆★★
- Create, implement, or use “Percent for Art” programs to improve building façades of public and private sector developments.[142]

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- For vacant buildings, make improvements such as incorporating public art.
- Revitalization of vacant buildings and spaces is associated with active transport and may assist with social connections.[47,93] ☆ △ △
- During construction, adjacent sidewalks or multi-use paths include aesthetically pleasing features to offset construction blight (e.g., include temporary artwork on construction barriers and materials).[135]
- Enclose stairs in transparent materials of the building façade so they are highly visible from the exterior of the building and provide views to the exterior for the users.[164] ☆
- Integrate healthy retail, such as healthy food and beverage premises (e.g., grocery store), into buildings especially on the ground floor.[27,52–54,56,67,71–74,85] ★ ★ ☆ ★
- Minimize unhealthy food and beverage premises in buildings, especially on the ground floor (i.e., no premises that sell deep-fried foods and sugary beverages (soda, slushes, sports drinks, juice, energy drinks, and vitamin water), and that do not carry healthy food as the vast majority of items. *(See **Appendix E** Healthier Food and Beverage Guidelines for Public Events.)*[67,71–74] △ △
- Provide outdoor space for small commercial or other uses at street level. However, original façade openings and street-level transparency elements between the sidewalk and building interiors should not be obstructed by such spaces.[52,53,122,181] ☆ △
- Utilize vacant lots or spaces to promote revitalization.
  Revitalization of vacant buildings and spaces is associated with active transport and may assist with social connections.[47,93] ☆ △ △

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II. Building Entrances

Making building entrances accessible and healthy, and address weather- related needs.

Core Strategies for All

Building entrances should:

- Be clearly marked and visible to invite pedestrians and users of all abilities. Where there are clear glass walls, ensure entrances are clearly marked with contrasting strips or markings to prevent people (with low vision) from walking into it.[35,91]
- Have seamless-grade transition between the building entrances and the sidewalk to enhance wheelchair accessibility.[200]
- Use visually appealing signs to indicate accessible entrances. Signage related to fitness facilities have been found to be helpful for physical activity among people with disabilities.[95] ☆
- Have doorways that are designed to meet accessibility requirements (e.g., more than 1 m or 3 ft. wide when the door is in an open position).[91] Use of accessible doors for fitness facilities have been found to be helpful for physical activity among people with disabilities.[95] ☆
- Have entrances that have more than one set of doors be designed for accessibility requirements (e.g., a minimum clear space of 1.5 m or 5 ft. between the sets of doors in open position).[87]
- Provide a large and visible automated button for people with various disabilities.[91] Accessible door features for fitness facilities have been found to be helpful for physical activity among people with disabilities.[95] ☆
- Use door release hardware that meets accessibility requirements (e.g., between 0.9 m - 1.1 m or 2.6 ft. – 3.6 ft. above the floor for accessibility).[87] Accessible door features for fitness facilities have been found to be helpful for physical activity among people with disabilities.[95] ☆
- For new construction or major renovations, ensure entrances of multi-storey buildings do not open onto areas where the elevator or escalator is visible.[203]
- For new construction or major renovations of multi-storey buildings, have entrances that open onto areas where stairs +/- ramps are visible.[164] ☆ △
- In existing buildings where stairs +/- ramps are not visible from an entrance, incorporate wayfinding at the entrance to the stairs +/- ramps.[91,105,249] ★ ★

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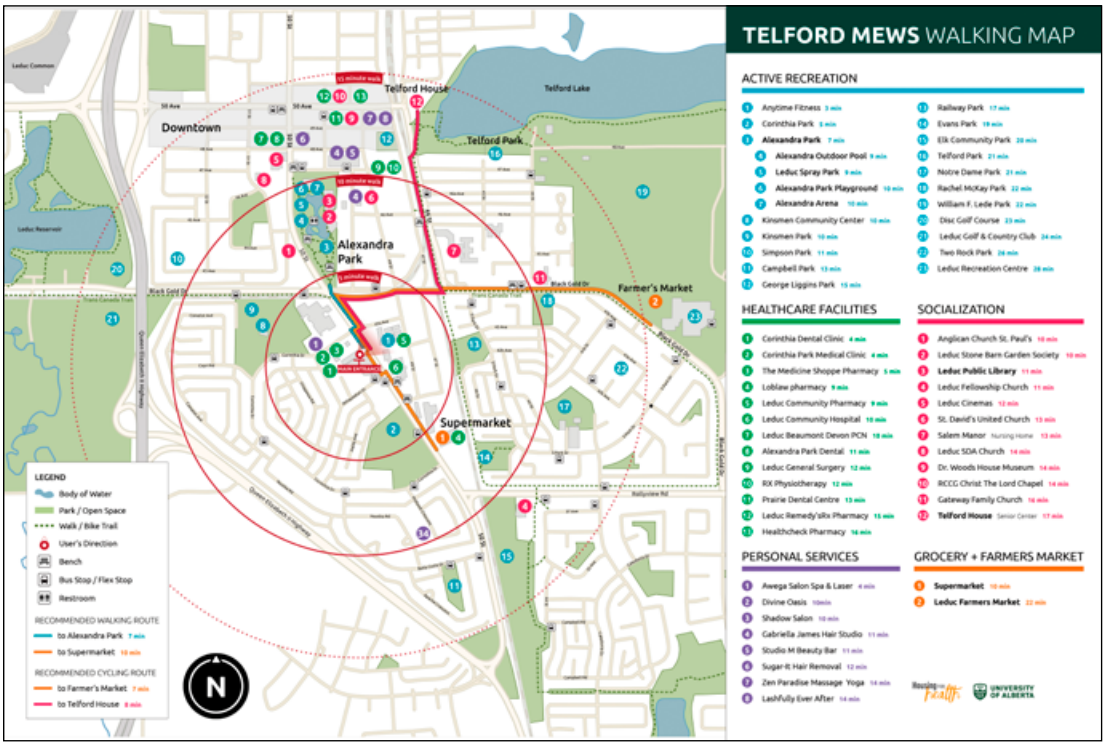

Healthy Ameneties Walking Map for Lobby at Telford Mews
(Fillmore Construction, Christenson Developments, Douglas Sollows Architect)
Leduc, Canada
Photo Credit: Mikaela Yeo, Housing for Health

- For larger commercial buildings and buildings with double frontage (either corner lots or lots fronting two streets), have multiple public access points to minimize distance to entrances.[91] Prioritize as the primary entrance, the entrance opening to the visible or nearby stairs +/- ramps and not opening to visible elevators or escalators.[164] ☆ △
- Use stair signage to promote stair use amongst those who are able.[105,204,249] ★ ★
- Include wayfinding in appropriate formats (e.g., beacons that can be used with apps, activated auditory signage, braille signage) for people with disabilities who require use of an elevator.[91] Signage related to fitness facilities have been found to be helpful for physical activity among people with disabilities.[95] ☆
- Include directional signage for cyclists, such as to secured bicycle parking areas.[54–56,106] ★ ★ ☆
- Include other signage as needed to prompt building-user healthy behaviours and behaviours that are aligned with other building goals or priorities (e.g., health and wellbeing of tenants, environmental sustainability).[68–70,74,76–79,105] ☆ ★ ★
- Have appropriately designed vestibules for local inclement weather.[205]
- Have a map in the lobby of healthy area amenities (e.g., grocery stores, recreation and sports amenities, public transit, bike lanes, and multi-use paths, etc.) that supports active living, healthy eating, and social connections within walkable and bikeable networks. Wayfinding is helpful for pedestrians and cyclists.[54–56,83,106] ★ ★ ☆

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- Ensure buildings are accessible for seniors and people of all abilities (e.g., wide doors with push door buttons, ramps, accessible washrooms).[91]
- Accessibility to buildings with fitness facilities is particularly important for physical activity among people with disabilities.[95] ☆

Additional Options

In addition to the core strategies, consider *one or more* of the following actions:

- Locate entrances along or near usable external spaces and pedestrian pathways to neighbourhood amenities (e.g., pedestrian plazas, parks, stores, bike lanes, transit stops, etc.) to enhance pedestrian accessibility.[91]
- Provide public Wi-Fi coverage to facilitate the use of apps to navigate the building amenities in buildings using apps for wayfinding.[206]
- Ensure no unhealthy foods or beverages, including vending machines are placed at building entrances. This applies to all buildings and includes building entrances for food retail establishments as well as other uses.[67,93,94] ☆
- In food retail establishments, encourage placement of healthy foods and beverages at entrances (e.g., high visibility of produce and low visibility of unhealthy foods).[67] ☆

COVID-19 Considerations:

- During pandemics like COVID-19, consider widening the lobby to promote physical distancing.
- Consider separate entrances and exits to promote physical distancing.
- In multi-storey buildings, consider prioritizing entrances that open onto a lobby with visible stairwell or signage to stairwell.
- Consider hand washing or hand sanitizer stations by every building entrance with signage on healthy hand washing (e.g., thoroughly clean hands for 20 seconds).
- Consider hand sanitizer stations by the top and bottom of each staircase.
- If soap dispensers and alcohol-based sanitizers are present, ensure they are full for usage.
- Commercial building owners could open service entrances to office workers and convert retail or loading docks to new lobbies to encourage more social distancing.

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III. Healthy Food and Beverage Amenities in Buildings

Increasing access to healthy foods and beverages, and decreasing exposure to unhealthy foods and beverages.

Core Strategies for All

Buildings should have:

- Drinking water fountains with water bottle refilling stations available on each floor of non-residential buildings.[74,87–90] ☆

  Drinking water fountains should:

  - Be accessible to populations of all abilities and different ages (e.g., fountains with multiple heights).[87]
  - Be located at key locations.
  - Have a separated lower fountain for pets.[137]
  - Be operational and accessible year-round (e.g., clear snow around fountains during winter months).[142]

- No vending machines with sugary beverages (e.g., pop, sports drinks, fruit juice) as part of interventions. If a beverage vending machine is being provided, alternatives include beverages such as unsweetened no-calorie flavoured sparkling waters.[67–70,74,78,86,93,94] ☆
- As part of multi-component interventions to support healthy eating, no food vending machines OR if there are food vending machines, vending machines with only healthy foods (e.g., fresh fruits and/or vegetables, high-fibre/low-sugar granola bars, unsalted nuts/seeds, tuna and whole grain cracker kits, hummus and whole grain crackers).[67–70,78,86,93,94] ☆ ★
- No unhealthy food and beverage vendors in the building, i.e., no vendors that sell deep-fried foods and sugary beverages (soda, slushes, sports drinks, juice, energy drinks, and vitamin water), and that do not carry healthy food items as the majority of items. (*See **Appendix E** for Healthier Food and Beverage Guidelines For Public Events.*)[67,72,74] ★ △
- No other unhealthy food and beverage amenities including candy machines.[85,93,94] △

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→ If the building's primary function is to house a food retail vendor like a food store, the following rules apply to the food vendor:

- Vendor carries produce (fresh, frozen, and/or canned in water and low sodium) in at least 47 m^2 (500 $ft.^2$) of retail space and displays in a highly visible area (i.e., at or near the entrance of store) as well as additional healthy foods and beverages (e.g., whole grain products, nuts and seeds, dairy foods, eggs, lean proteins such as fish, poultry, plant-based proteins) with produce, and healthy foods and beverages in the vast majority of the store area.[67,72,83,84,85,124] ☆ △
  - Additionally, undertake one or more of the following:

- Place healthy foods like produce in high visibility areas and unhealthy foods in low visibility areas.[67–70] ☆ ★
- Place low nutritional value and high sugar children's cereals high on shelves above children's eyesight and easy access.[67] ☆
- Promote healthy items to consumers using directional arrows to produce, point-of-decision nutrition information, information/signage to highlight healthier versus less healthy options such as a stop light system, and/or areas for education in store including (but not limited to) recipes, cooking demonstration, on-site registered dietitian, or grocery store tours.[68–70,74,76–79] ★ ★
- Provide informational signage with formats, heights, and angles visible and usable by people of different abilities (e.g., button-activated auditory signage, braille signage, beacons that can be used with apps). Standardization of location of signage could also assist people with visual, cognitive, and developmental disabilities to more easily and independently locate such signage. *(See **Appendix D** for signage formats for people of all abilities.)*[87]

→ If the building's primary function is to house one or more restaurants, the following rules that apply to the restaurants:

- Have a vast majority be healthy eating premises and no more than a small minority of restaurants will be unhealthy fast food outlets.[73,85,207] ☆ △
- Additionally, undertake two or more of the following options:
  - Default vegetable or fruit sides instead of unhealthy options (e.g., fries, onion rings).[67,68,70,78,86] ★

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- Default still or carbonated water, milk, or unsweetened or low/no calorie beverages (e.g., unsweetened coffee or tea) instead of unhealthy/less healthy beverages (e.g., pop, sports drinks, fruit juice).[74,80] ☆
- Make available and promote half portions.[68–70] ★
- Include point-of-decision nutritional information on menu/menu boards.[74] △
- Include dining room enhancements in restaurants, such as playing background music. However, do not play music with references to alcohol or drug use in bars as this has been associated with increased alcohol consumption.[67,68,70,78,86] ★
- Provide movable tables and chairs with backs and armrests of appropriate heights to accommodate different accessibility needs.[91]
- Consider including areas that accommodate for noise and sensory refuge for people with invisible disabilities.[208]
- Provide healthy socio-cultural and ethnic food options appropriate to the socio-demographic mix of the neighbourhood.[92]
- Make drinking water available.[74,87–90] ☆

→ At all worksite buildings, spaces to prepare, store, and reheat food for employees; at minimum includes a fridge and a microwave. This should also include areas for employees to eat meals together. Where possible, include water bottle refilling amenities. Sustainable options such as tap drinking water should be prioritized over bottled options.[74] ☆

Additional Options

In addition to core strategies, consider *one or more* of the following actions:

→ If there is no grocery store carrying fresh produce or farmers' market within 800 m (0.5 mi.) of the site, allocate space that promotes healthy food accessibility through farmers' market carrying fresh produce as the vast majority of items and/or a grocery store that carries produce (fresh, frozen, and/or canned in water and low sodium) in at least 47 m^2 (500 $ft.^2$) of retail space and displayed in a highly visible area (i.e., at or near the entrance of store), as well as additional healthy foods and beverages (e.g., whole grain products, nuts and seeds, dairy foods, eggs, lean proteins such as fish, poultry, plant-based proteins) with produce and healthy foods and beverages in the vast majority of the store area. Allocating such space is particularly important in a rural setting with one or fewer grocery stores. Consider varied dietary needs based on the population (e.g., diabetic options, anti-inflammatory diets, gluten intolerance options, nut allergies).[67,72,83,84,85,124] ☆△

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- Have lease preference or incentive criteria for food vendors that sell affordable healthy foods.[209]
- If the building's primary function is to house a food retail vendor such as a food store or restaurant, ensure the food vendor offers healthy food and beverage items at the same or lower cost as unhealthy food and beverage items.[71,74,210] ★☆
- Provide spaces for multi-family building and/or community residents to gather and safely prepare and eat healthy foods together (NO deep fryers).[126]
- Include multi-family building and/or community building exteriors and/or rooftop spaces dedicated to community gardening use.[71,80,251] ★☆
- For businesses or buildings using apps for wayfinding provide public Wi-Fi coverage to facilitate the use of apps to navigate the store.[206]
- Have no food or beverage vending machines.[93,94]
- Implement additional environmentally friendly and/or accessible options (e.g., paper straws, cups with handles for those with disabilities).[211]

COVID-19 Considerations:

Grocery stores could allocate curb space for customers to be physically distanced while lining up to enter the store.

Grocery stores could implement one-way aisles with marked flooring.

Consider physical distancing floor makers.

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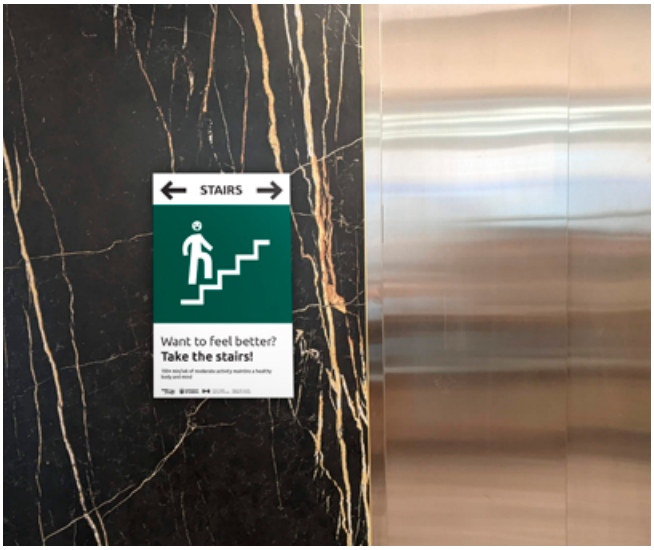
IV. Active Mobility Promotion through Stairs and Ramps

Promoting active mobility through use of stairs and ramps.

Core Strategies for All

Buildings should:

- Provide everyday access to one or all stairs (including fire stairs) for building occupants.[164,212] ☆
- Eliminate locks or use card keys/code locks for building occupant access between stairwells and floor areas, with the exception in high-security floors (e.g., psychiatric ward).[164,212] ☆
- Have stairwells that are easily visible from the main building entrance(s) and in close proximity to the main building entrance (e.g., within 7.5 m or 25 ft. walking distance from any one edge of the lobby), other commonly used building entrances and hallways, so they are the first choice of movement.[35,164,190] ☆
- In existing buildings where stairwells may not be visible from the main building entrance or commonly used entrances, have wayfinding signage to the stairs that is visible at main and commonly used building entrances.[82,105,249] ★★



Point-of-Decision Stair Promoting and Wayfinding Signage at Telford Mews
(Fillmore Construction, Christenson Developments, Douglas Sollows Architect)
Leduc, Canada
Photo Credit: Mikaela Yeo, Housing for Health

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- Open stairwells for everyday use that are available in addition to fire stairs, or stairwells that have doors with transparent glazing on the majority of the door. To open stairwells with solid doors, magnetic hold-open devices can also be considered.[35,164,190] ☆
- Paint stairwells with bright multi-colour paints and/or include artwork such as murals on all or most floors. Consider creating a "Percent for Art" program[149] to regularly incorporate art into building areas such as stairwells.[105,249] ★★
- Ensure slip-resistant floor finishes on stairs to ensure individuals' safety.[91]
- Provide stair-promoting signage that encourages stair use for health, environmental, and/or physical distancing benefits that are linguistically and culturally appropriate to the building's users, and that are placed outside stairwells and at elevator call areas.[35,87,91,105,190,204,214,249] ★★
- Where space allows, incorporate building code compliant ramps with handrails and appropriate landings for active mobility opportunities for those with disabilities.[213,215]
  Accessibility of physical activity facilities, including through well-designed ramps, is important for people with disabilities.[95] ☆
- Have elevators and escalators that are not visible from main entrances. However, include wayfinding in appropriate formats (e.g., beacons that can be used with apps, activated auditory signage, braille signage) for people with disabilities who require use of an elevator.[203]

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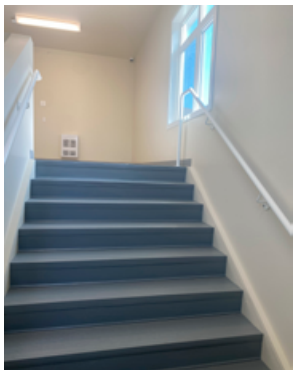

Finished Fire Stairwell with Windows at The Manor
(Christenson Developments, Raimond Fung Architects)
Whitecourt, Canada
Photo Credit: Mackenzie Bosch, Housing for Health

Additional Options

In additional to the core strategies, consider *five or more* of the following actions:

- Have all elevators except one start on the second floor or higher.[164] ☆
- Have elevator doors open and close more slowly.[46]
- Program all elevators, except one, to skip stop to every third or fourth floor.[164] ☆
- Do not program elevators to return to the ground floor automatically.[203]
- Have no escalators in the building.[216]
- Provide everyday access to one or all stairs, including fire stairs, for all building users including visitors.[164] ☆
- Have stairs that are in the correct dimension to accommodate travel in two directions. To enhance the comfort and safety of stairs, consider risers between 125 mm - 180 mm (5 in. - 7 in.) and treads should be between 280 mm - 355 mm (11 in. - 14 in.).[91,217]
- Have articulated and unique stair composition to promote interest in stair travel (e.g., by having grand staircases in a building's main orientation space, and/or by highlighting stair details such as balustrades, handrails, and landings and/or having artwork in stairwells with fire-rated glass doors and/or walls).[105,164,249] ★ ★ △
- Have natural lighting in stairwells.[164,212] ☆ △
- Play music in stairwells.[105,249] ★ ★
- Create, implement, or use a "Percent for Art" program[149] to regularly incorporate art into building areas such as stairwells.[105,249] ★ ★
- Where possible, include ramps for daily use and emergency-related safety egress to accommodate active living and building safety for people of all abilities.[91,213]

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COVID-19 Considerations

- During pandemics like COVID-19, consider community-appropriate PPE supply for sale to building residents.
- During pandemics like COVID-19, consider implementing cleaning schedules/procedures to disinfect high-touch surfaces such as stairwell railings, door handles, sinks and toilets.
- Consider converting freight elevators to passenger use and repurpose fire exit stairs for regular use to prevent lines of workers waiting for elevators.
- During pandemics like COVID-19, buildings could allow blinds and shades to be opened to admit abundant daylight and sunlight).[218]
- During pandemics like COVID-19, consider rooftops as a gardening and recreational space.
- During pandemics like COVID-19, each condo/apartment could have at least one balcony to allow dwellers who must be isolated at home to enjoy the fresh air and sunshine, to maintain outdoor activities such as gardening, and to socialize at least 2 m (7 ft.) apart with one other person such as a neighbour.
- During pandemics like COVID-19, the balcony design could consider the following recommendations:
  - Minimum dimensions are 2.4 m (8 ft.) deep by 2.7 m (9 ft.) wide.
  - Avoid exposing balconies to a traffic-noisy street.
  - Create a wheelchair-accessible balcony (such as without door lips).
  - Build recessed balconies (balconies set in the surrounding wall) or protect the sides of cantilevered balconies with full height glass to cut down on wind impact on higher floors.
- Consider having hand sanitizers at every building entrance and by elevators.
- Consider having no more than two people in an elevator at all times.
- Consider placing stair-promoting signage that encourages stair use for health, environmental, and physical distancing benefits outside stairwells and at elevator call areas.
- Consider setting up patio blinds on the east- and west-facing balconies to provide shading from over-heat and glare.
- Consider avoiding balconies from two close buildings facing each other. If so, create opaque or semi-opaque railings by using frosted glass or dense latticework.

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V. Indoor Physical Activity Spaces

Promoting physical activity through additional spaces to help reduce chronic diseases, improve mental health and wellbeing, and build social connections.

Core Strategies for All

Building Should:

→ If publicly-accessible cost-free recreational physical activity facilities are not located on or within 400 m (0.25 mi.) of the site, a building housing greater than 10 residential or work units or 100 or more workers (whichever is fewer), or a day-care, should include indoor and/or outdoor recreational physical activity spaces that have all the following:

- At least 37 m^2 (400 $ft.^2$) of dedicated or multi-use space indoors for exercise/activity that includes a variety of exercise/activity equipment inclusive of cardio and strength training and/or for group exercise classes. This should be accessible to all building occupants and for use by at least 5% of building occupants at any given time. Spaces for residential buildings with both adults and children should have and co-locate activity spaces for adults and children. Gardening activity space and equipment (permanent accessible and open urban agriculture space of at least 1 m^2 (11 $ft.^2$) per dwelling unit/office staff) can also count as adult active recreation space and equipment onsite for occupants .[54,59,251] ☆☆★★
- Drinking water fountains with water bottle refilling stations in/near physical activity spaces.[63,74,87–90,219] ☆

  Drinking water fountains should:

  - Be accessible to populations of all abilities and different ages (e.g., fountains with multiple heights).[87]
  - Be located at key locations.
  - Have a separated lower fountain for pets.[137]
  - Be operational and accessible year-round (e.g., clear snow around fountains during winter months).[142]

→ Ensure recreational facility/space is in a visible location in the building or provide wayfinding signage.

→ Provide adult physical activity spaces designed for two or more people to use concurrently (e.g., two or more pieces of exercise equipment to allow people to exercise together).[219]

Total Physical Activity
Active Transportation
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Active Recreation
Social Connections
Healthy Eating
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- Provide active furniture equipment (e.g., standing desks, treadmill/exercise bike desks, exercise balls in place of chairs, under desk pedal machines) to decrease sedentariness. More expensive active furniture such as treadmill desks could be provided for shared use, while less expensive active furniture such as standing desks and exercise balls for chairs could be provided individually for all staff.[164,220,221,189] ☆ △
- Ensure physical activity spaces are accessible for various generations and abilities, including older adult populations, people with dementia, and those with disabilities.[95,222] ☆
- Buildings located in areas with extreme weather conditions (e.g., cold, heat, rain, snow, winds) should consider such conditions in the design and location of healthy amenities (e.g., indoor gardening areas to maximize sun exposure) to permit year-round use.[143]
- All school buildings must provide enough gymnasium space +/- gymnatorium space (auditorium convertible into an extra gymnasium) for daily physical education and recess for all students. Existing schools that do not have sufficient interior spaces may also use outdoor spaces onsite for daily physical education and recess needs of all students not met by interior school spaces. Active furniture equipment (e.g., standing desks, exercise balls in place of chairs) should also be used to decrease sedentariness.[27,55,59,97–99,107,115,164,221,189,247,248] ★ ☆ ★ ☆

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VI. Spaces to Support Active Transportation

Providing spaces that support building occupants to use active transportation modes.

Core Strategies for All

Buildings should:

- Provide dedicated secure bicycle parking areas (e.g., within parking garages and/or building interiors) for building occupants. If provided within a parking garage, ensure cyclists have a separate ramp or other convenient and safe access route to the internal parking. At minimum, provide at least one bicycle spot per every two tenants in multi-family residential buildings, and ensure 5% of parking areas are dedicated to bicycle parking for non-residential buildings. Dedicated bicycle parking areas are located near (e.g., within 180 m or 590 ft.) of the main building onsite.[27,55–57,106,196] ★★
- In new construction and/or major renovations, interventions that include showers and change rooms with lockers to accommodate active transportation users in non-residential buildings within 200 m (0.12 mi.) of main building where there are 10 or more work units or 100 or more workers, whichever is fewer. All showers and change rooms should be accessible to people of all ages and abilities.[164,196] ☆
- In existing buildings, provide change rooms to accommodate active transportation users in non-residential buildings with 200 m (0.12 mi.) of main building where there are 10 or more work units or 100 or more workers, whichever is fewer. All showers and change rooms should be accessible to people of all ages and abilities.[164,196] ☆

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Additional Options

In addition to the core strategies, consider *one or more* of the following actions:

- Exceed the bicycle parking minimum.[27,55–57,106] ★★
- Offer indoor bicycle parking.[27,55–57,106] ★★
- Provide showers and change rooms in a building with fewer than 10 work units or fewer than 100 workers.[164,196] ☆
- In existing buildings, incorporate one or more showers with change rooms.[164] ☆

VII. Additional Building Considerations

Promoting and protecting the health and wellbeing of building users through additional measures.

Core Strategies for All

Buildings should:

- Have protruding balconies that allow neighbours to see and interact with each other outdoors in multi-family residential buildings.[136]
- Use available and new buildings to create a pleasant community with things to see and do in town,[223] especially in denser mixed-use areas and along pedestrian, bicycling, transit, and/or multi-use paths and routes.[27,52,53] ☆ △
- Include social spaces for building users to accommodate people of all ages, abilities, and various backgrounds. Consider inclusive intergenerational and cross-cultural socialization spaces.[118,224] ☆

Outdoor Children's Play, Gardening Boxes and Social Gathering Spaces at Ti'nu Affordable Rental Housing
Banff, Canada
Photo Credit: Karen Lee, Housing for Health

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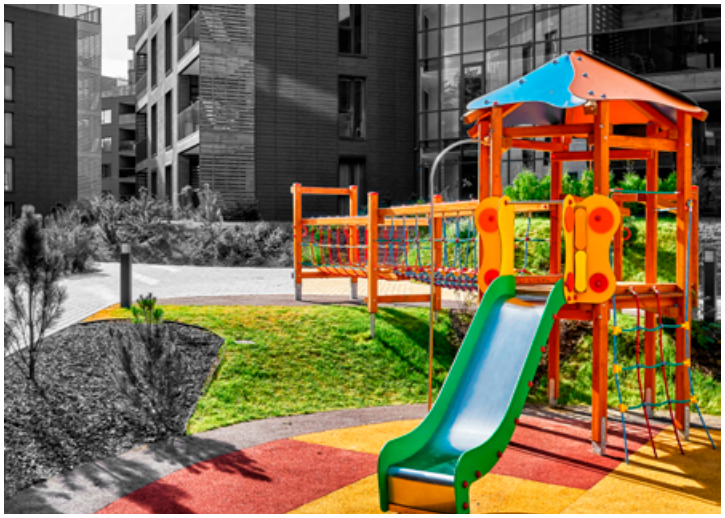
- In nursing homes and care facilities, place social spaces for residents at either end of short corridors.[125] ☆
- Ensure building amenities are accessible for seniors and people with disabilities (e.g., washrooms with wide stall doors and rails). Accessibility to buildings with fitness facilities is particularly important for physical activity among people with disabilities.[91,95] ☆
- Ensure new housing units can be retrofitted/adapted for people with disabilities and seniors.[225]
- Ban smoking inside non-residential buildings, in interior common areas of multi-family residential buildings, and within 5 m (16 ft.) of all entrances, operable windows, and building air intakes.[226,227]

Additional Options

In addition to the core strategies, multi-family residential buildings should have *two or more* of the following:

- Affordable and/or mixed-income housing with units designed for accessibility and adaptability by people of all abilities (e.g., visitable units, at least for the ground floor).
- Use vacant buildings, lots, or spaces to promote revitalization.
  Revitalization of vacant buildings and spaces is associated with active transport and may assist with social connections.[54,104] ☆ △ △
- Childcare/day-care facilities.[228]
- A ban on smoking in all interior spaces of residential buildings, including within individual condominium and apartment units.[226,227]



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- A rule that noise does not exceed 65 dB (A) from 7am and 10pm and 50 dB (A) before 7 am or after 10 pm.[229]
- Reduction in outdoor light trespassing into dwelling units by:
  - Fully shielding or designing the dwelling to prevent light from directly penetrating windows of dwelling units.[82]
  - Providing window shading that can be controlled by the occupants or set to automatically prevent glare.[82]
- To improve accessibility for those with visual disabilities, clear separation between floors and walls through the use of contrasting colours, appropriate lighting, and/or light reflection from the flooring. For existing buildings, employ strategies and materials to reduce glare from the floor. Reduce shiny flooring materials that can reflect light and reduce visibility.[82]
- Use outdoor spaces, including roof spaces, for active recreation including hydroponic or soil-based fruit and vegetable gardening.[53,54,59,64,71,80,97,107,251] ★★★★
- Create additional social spaces for residents, including use of roof space.[118,230] ☆
- Use of roof space for green energy such as solar panels.[231]

Note: Use of roof spaces for the various functions identified can be considered for residential and non-residential buildings.

COVID-19 Considerations:

- During pandemics like COVID-19, consider placing hand sanitizers at every building entrance, stairwell entrance, and by elevators.

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Appendices

Appendix A: Glossary of Terms

Active Mobility:
Human powered movement from one place to another.[232] For the purposes of the Healthy Community Guidelines, active mobility has been used particularly for movement from one place to another within buildings while active transportation (see below) has been used for movement on streets in the public realm.

Active Recreation:
Physical activity that is done for leisure (e.g., playing a basketball game, dancing) either formally or informally.[40]

Active Transportation:
Human powered transport (e.g., walking, cycling).[39]

Curb Cuts or Curb Ramps:
A sloped sidewalk feature that allows for persons with mobility disabilities (e.g., wheelchair, walker, strollers) to gain access to the sidewalk. Generally, there are specific width and slope requirements for accessibility.[233]

Complete Streets:
A street or road that is designed considering the functionality and safety of all users (e.g., pedestrians, cyclists, public transit users, cars) equally.[234]

Crime Prevention Through Environmental Design (CPTED):
The concept that features of the built environment can either promote or deter crime. Key principles within CPTED include surveillance, access control, neighbourhood maintenance, and community liveability.[235,236]

Green Streets:
A street lined with trees and other vegetation.[237]

Food Environment:
The food environment includes the consumer, community, and organizational food environments. Generally, the food environment includes the availability, variety, accessibility, cost and quality of food and food stores and the information provided regarding food.[238,239]

Healthy Community:
An extension of healthy cities, healthy communities are safe, sustainable, economically stable and have strong community ties, high health outcomes, and adequate health resources. A healthy city/community is one that is creating and improving physical and social environments for optimizing the health and wellbeing of different groups of residents.[37]

Healthy Eating:
Refers to eating habits or behaviours that are congruent with increasing or sustaining health including the intake of healthy food and beverages in relation to the bodies dietary needs. Two realms of the food environment are important for healthy eating: increased access to healthy foods and beverages, and decreased exposure to unhealthy foods and beverages.[41,42]

Healthy Food:
A healthy food is one that limits potentially harmful ingredients like fat, sugar, and sodium while providing essential nutrients such as protein, vitamins, and fibre.[42]

Neighbourhood Streets:
An interconnecting pattern of streets in a neighbourhood or area. When well designed, they can shorten pedestrian routes and decrease traffic congestion.[240]

Pedestrian-scale Lighting:
Lighting that is designed for pedestrian environments including sidewalks and walking paths. Pedestrian-scale lighting poles are generally shorter, and have differences in colouring, luminescence and spacing relative to roadway lighting.[180]

Physical Activity:
Movement that requires energy from the body. Physical activity can include sports, conditioning, occupation, household, or other daily activities. Exercise is a subset of physical activity in which there is a final or intermediate goal of increasing or maintaining physical fitness.[38] There are three important realms of physical activity: active mobility (in buildings), active recreation and active transportation.

Rural:
A rural area is defined by Statistics Canada as an area with populations less than 1,000 people or population density less than 400 people per km^2.[50]

Social Connections:

A term that includes the structure, quality, and function of an individual's relationships where: structure refers to the existence of social ties; quality refers to an individual's perception of whether their interactions are positive or negative; and function refers to the support received from relationships.[241] Emerging and existing research shows that social isolation is associated with poorer physical and mental health outcomes, while a sense of community and belonging is associated with healthier and longer lives.[20]

Suburban:

An area where at least 50% of the area's working inhabitants must commute to the urban core for work. Typically, suburban areas have low population densities, are comprised of single-family homes, and are car centric.[242]

Unhealthy Foods: Foods that are considered to be high in sugar, salt, total fat, saturated and trans fats.[165]

Urban:

Across the Organization for Economic Co-Operation and Development (OECD) countries an urban area is a continuously dense area (1,500 individuals per km^2) with a minimum population of 50,000 people. An urban area generally consists of a city (where most of the inhabitants within the urban area reside) and a commuting area (where at least 15% of inhabitants work within the city and need to commute to get to work).[166]

Appendix B: References

1. Evans GW. The built environment and mental health. J Urban Health. 2003 Dec 1;80(4):536–55.

2. Frank L, Engelke P, Schmid T. Health and Community Design: The Impact Of The Built Environment On Physical Activity. Island Press; 2003. 273 p.

3. Renalds A, Smith TH, Hale PJ. A Systematic Review of Built Environment and Health. Fam Community Health. 2010;33(1):68–78.

4. Lee K. New York City: The Fit City Example. In: Urban Health. Oxford University Press; 2019. p. 309–15. Available from:https://academic.oup.com/book/35255/chapter/299818573

5. Kelly PM, Davies A, Greig AJM, Lee KK. Obesity Prevention in a City State: Lessons from New York City during the Bloomberg Administration. Front Public Health. 2016 Mar 30;4.

6. Rube K, Veatch M, Huang K, Sacks R, Lent M, Goldstein GP, et al. Developing Built Environment Programs in Local Health Departments: Lessons Learned From a Nationwide Mentoring Program. Am J Public Health. 2014 May; 104(5):e10–8.

7. Lee K. Fit Cities My Quest to Improve the World's Health and Wellness--Including Yours. Available from:https://www.penguinrandomhouse.ca/books/258495/fit-cities-by-dr-karen-k-lee/9780385685320

8. Handy SL, Boarnet MG, Ewing R, Killingsworth RE. How the built environment affects physical activity: Views from urban planning. Am J Prev Med. 2002 Aug 1;23(2):64–73.

9. World Health Organization. Noncommunicable diseases country profiles 2018. World Health Organization; 2018. 223 p. Available from:https://apps.who.int/iris/handle/10665/274512

10. World Health Organization. Noncommunicable diseases World Health Organization; 2022. Available from:https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases

11. World Health Organization. Leading causes of death and disability. A visual summary of global and regional trends 2000–2019. 2020. Available from:https://www.who.int/news/item/09-12-2020-who-reveals-leading-causes-of-death-and-disability-worldwide-2000-2019

12. Budreviciute A, Damiati S, Sabir DK, Onder K, Schuller-Goetzburg P, Plakys G, et al. Management and Prevention Strategies for Non-communicable Diseases (NCDs) and Their Risk Factors. Front Public Health. 2020;8.

13. World Health Organization. Global action plan for the prevention and control of noncommunicable diseases 2013-2020. World Health Organization; 2013. Available from:https://www.who.int/publications/i/item/9789241506236

14. Ezzati M, Riboli E. Behavioral and Dietary Risk Factors for Noncommunicable Diseases. N Engl J Med. 2013 Sep 5;369(10):954–64.

15. Schraufnagel DE, Balmes JR, Cowl CT, De Matteis S, Jung SH, Mortimer K, et al. Air Pollution and Noncommunicable Diseases. Chest. 2019 Feb;155(2):417–26.

16. World Health Organization. Global Accelerated Action for the Health of Adolescents (AA-HA!): guidance to support country implementation. 2017; Available from:https://www.who.int/publications/i/item/9789241512343

17. Vigo D, Thornicroft G, Atun R. Estimating the true global burden of mental illness. Lancet Psychiatry. 2016 Feb 1;3(2):171–8.

18. Whiteford HA, Degenhardt L, Rehm J, Baxter AJ, Ferrari AJ, Erskine HE, et al. Global burden of disease attributable to mental and substance use disorders: findings from the Global Burden of Disease Study 2010. Lancet Lond Engl. 2013 Nov 9;382(9904):1575–86.

19. Valtorta NK, Kanaan M, Gilbody S, Ronzi S, Hanratty B. Loneliness and social isolation as risk factors for coronary heart disease and stroke: systematic review and meta-analysis of longitudinal observational studies. Heart. 2016 Jul 1;102(13):1009–16.

20. Holt-Lunstad J, Smith TB, Baker M, Harris T, Stephenson D. Loneliness and Social Isolation as Risk Factors for Mortality: A Meta-Analytic Review. Perspect Psychol Sci. 2015 Mar 1;10(2):227–37.

21. Lee EE, Depp C, Palmer BW, Glorioso D, Daly R, Liu J, et al. High prevalence and adverse health effects of loneliness in community-dwelling adults across the lifespan: role of wisdom as a protective factor. Int Psychogeriatr. 2019 Oct;31(10):1447–62.

22. World Health Organization. WHO Framework Convention on Tobacco Control [Internet]. World Health Organization; 2003. Available from:https://fctc.who.int/publications/i/item/9241591013

23. World Health Organization. Global status report on alcohol and health [Internet]. World Health Organization; 2018. Report No.: ISBN: 978-92-4-156563-9. Available from:https://www.who.int/publications/i/item/9789241565639

24. Lee K. Want to create a healthier country? Start by creating fitter cities. 2020 Jan; Available from:https://www.theglobeandmail.com/opinion/article-want-to-create-a-healthier-country-start-by-creating-fitter-cities/

25. Popkin BM, Du S, Green WD, Beck MA, Algaith T, Herbst CH, et al. Individuals with obesity and COVID-19: A global perspective on the epidemiology and biological relationships. Obes Rev. 2020;21(11):e13128.

26. Lytvyak E, Straube S, Modi R, Lee KK. Trends in obesity across Canada from 2005 to 2018: a consecutive cross-sectional population-based study. CMAJ Open. 2022 Apr;10(2):E439–49. Available from:https://www.cmajopen.ca/content/10/2/E439

27. Kärmeniemi M, Lankila T, Ikäheimo T, Koivumaa-Honkanen H, Korpelainen R. The Built Environment as a Determinant of Physical Activity: A Systematic Review of Longitudinal Studies and Natural Experiments. Ann Behav Med Publ Soc Behav Med. 2018 Feb 17;52(3):239–51.

28. Dixon BN, Ugwoaba UA, Brockmann AN, Ross KM. Associations between the built environment and dietary intake, physical activity, and obesity: A scoping review of reviews. Obes Rev Off J Int Assoc Study Obes. 2021 Apr;22(4):e13171.

29. Bower M, Kent J, Patulny R, Green O, McGrath L, Teesson L, et al. The impact of the built environment on loneliness: A systematic review and narrative synthesis. Health Place. 2023;79:102962.

30. Public Health Agency of Canada. The Chief Public Health Officer's Report on the State of Public Health in Canada 2017: Designing Healthy Living. 2017. Available from:https://www.canada.ca/en/public-health/services/publications/chief-public-health-officer-reports-state-public-health-canada/2017-designing-healthy-living.html

31. Lee KK. Barriers and enablers to change in transport and health. In: Advances in Transportation and Health. Elsevier; 2020. p. 391–406. Available from:https://www.sciencedirect.com/science/article/pii/B9780128191361000188?via%3Dihub

32. World Health Organization. Healthy cities effective approach to a rapidly changing world. 2020: Availble fromhttps://www.who.int/publications/i/item/9789240004825

33. Designed to Move. Active Cities: A Guide for City Leaders. 2015. Available from: http://www.drkarenlee.com/resources/who-citiesforhealth

34. City of New York, Department of Transportation. Measuring the street: New Metrics for 21st Century Streets. City of New York. 2012. Available from:https://www.nyc.gov/html/dot/downloads/pdf/2012-10-measuring-the-street.pdf

35. Nicoll G, Lee K, Dubose J. Active Design: Affordable Designs for Affordable Housing. City of New York; 2014. Available from:https://www.drkarenlee.com/resources/housing

36. Rideout K, Kosatsky T, Lee KK. What role for environmental public health practitioners in promoting healthy built environments? Can J Public Health. 2016; 107(1):e126–9.

37. Hancock T. The Evolution, Impact and Significance of the Health Cities/Healthy Communities Movement. J Public Health Policy. 1993;14(1):5–18.

38. Caspersen CJ, Powell KE, Christenson GM. Physical activity, exercise, and physical fitness: definitions and distinctions for health-related research. Public Health Rep. 1985;100(2):126–31.

39. Sallis JF, Frank LD, Saelens BE, Kraft MK. Active transportation and physical activity: opportunities for collaboration on transportation and public health research. Transp Res Part Policy Pract. 2004 May 1;38(4):249–68.

40. Dahmann N, Wolch J, Joassart-Marcelli P, Reynolds K, Jerrett M. The active city? Disparities in provision of urban public recreation resources. Health Place. 2010 May 1;16(3):431–45.

41. Taylor JP, Evers S, McKenna M. Determinants of Healthy Eating in Children and Youth. Can J Public Health Rev Can Santé Publique. 2005 Jul;96(Suppl 3):S22–9.

42. Drewnowski A. Concept of a nutritious food: toward a nutrient density score2. Am J Clin Nutr. 2005 Oct 1;82(4):721–32.

43. Lee K, Lee J. Active Design: Converging Design Efforts to Promote Environmental Sustainability and Address Today's Leading Causes of Death. In Sustainable Healthcare Architecture. 2nd Ed. Wiley & Sons; 2013. p. 33–4. Available from:https://www.wiley.com/en-es/+Healthcare+Architecture%2C+2nd+Edition-p-9781118086827

44. Giles-Corti B, Foster S, Shilton T, Falconer R, Giles-Corti B, Foster S, et al. The co-benefits for health of investing in active transportation. New South Wales Public Health Bull. 2010 Jul 16;21(6):122–7.

45. Birney CI, Franklin KF, Davidson FT, Webber ME. An assessment of individual foodprints attributed to diets and food waste in the United States. Environ Res Lett. 2017 Oct;12(10):105008.

46. Houten RV, Nau PA, Merrigan M. Reducing Elevator Energy Use: A Comparison of Posted Feedback and Reduced Elevator Convenience. J Appl Behav Anal. 1981;14(4):377–87.

47. Eisenmann JC, Bartee RT, Wang MQ. Physical Activity, TV Viewing, and Weight in U.S. Youth: 1999 Youth Risk Behavior Survey. Obes Res. 2002;10(5):379–85.

48. Crosbie T. Household energy consumption and consumer electronics: The case of television. Energy Policy. 2008 Jun 1;36(6):2191–9.

49. King TL, Thornton LE, Bentley RJ, Kavanagh AM. The Use of Kernel Density Estimation to Examine Associations between Neighborhood Destination Intensity and Walking and Physical Activity. PLOS ONE. 2015 Sep 10;10(9):e0137402.

50. Statistics Canada. Population growth in Canada's rural areas, 2016 to 2021. Government of Canada; 2022. Available from:https://www12.statcan.gc.ca/census-recensement/2021/as-sa/98-200-x/2021002/98-200-x2021002-eng.cfm

51. Mölenberg FJM, Panter J, Burdorf A, van Lenthe FJ. A systematic review of the effect of infrastructural interventions to promote cycling: strengthening causal inference from observational data. Int J Behav Nutr Phys Act. 2019 Oct 26;16(1):93.

52. Barbosa D, Santos CP, Martins M. The application of cycling and cycling combined with feedback in the rehabilitation of stroke patients: a review. J Stroke Cerebrovasc Dis Off J Natl Stroke Assoc. 2015;24(2):253–73.

53. Malacarne D, Handakas E, Robinson O, Pineda E, Saez M, Chatzi L, et al. The built environment as determinant of childhood obesity: A systematic literature review. Obes Rev Off J Int Assoc Study Obes. 2022 Jan;23 Suppl 1:e13385.

54. Nordbø ECA, Nordh H, Raanaas RK, Aamodt G. Promoting activity participation and well-being among children and adolescents: a systematic review of neighborhood built-environment determinants. JBI Evid Synth. 2020 Mar;18(3):370–458.

55. Smith M, Hosking J, Woodward A, Witten K, MacMillan A, Field A, et al. Systematic literature review of built environment effects on physical activity and active transport – an update and new findings on health equity. Int J Behav Nutr Phys Act. 2017 Nov 16;14(1):158.

56. Ikeda E, Hinckson E, Witten K, Smith M. Associations of children's active school travel with perceptions of the physical environment and characteristics of the social environment: A systematic review. Health Place. 2018 Nov;54:118–31.

57. Stankov I, Garcia LMT, Mascolli MA, Montes F, Meisel JD, Gouveia N, et al. A systematic review of empirical and simulation studies evaluating the health impact of transportation interventions. Environ Res. 2020 Jul 1;186:109519.

58. Bartley KF, Eisenhower DL, Harris TG, Lee KK. Accelerometer and Survey Data on Patterns of Physical Inactivity in New York City and the United States. Public Health Rep. 2019 May;134(3):293–9.

59. Fyfe-Johnson AL, Hazlehurst MF, Perrins SP, Bratman GN, Thomas R, Garrett KA, et al. Nature and Children's Health: A Systematic Review. Pediatrics. 2021 Oct;148(4):e2020049155.

60. Geneshka M, Coventry P, Cruz J, Gilbody S. Relationship between Green and Blue Spaces with Mental and Physical Health: A Systematic Review of Longitudinal Observational Studies. Int J Environ Res Public Health. 2021 Aug 26;18(17):9010.

61. Houlden V, Weich S, Albuquerque JP de, Jarvis S, Rees K. The relationship between greenspace and the mental wellbeing of adults: A systematic review. PLOS ONE. 2018 Sep 12;13(9):e0203000.

62. Georgiou M, Morison G, Smith N, Tieges Z, Chastin S. Mechanisms of Impact of Blue Spaces on Human Health: A Systematic Literature Review and Meta-Analysis. Int J Environ Res Public Health. 2021 Jan;18(5):2486.

63. Lambert A, Vlaar J, Herrington S, Brussoni M. What Is the Relationship between the Neighbourhood Built Environment and Time Spent in Outdoor Play? A Systematic Review. Int J Environ Res Public Health. 2019 Oct 11;16(20):3840.

64. Teixeira A, Gabriel R, Quaresma L, Alencoão A, Martinho J, Moreira H. Obesity and Natural Spaces in Adults and Older People: A Systematic Review. J Phys Act Health. 2021 Jun 1;18(6):714–27.

65. Levinger P, Panisset M, Parker H, Batchelor F, Tye M, Hill KD. Guidance about age-friendly outdoor exercise equipment and associated strategies to maximise usability for older people. Health Promot J Austr. 2021;32(3):475–82.

66. Lebel L, Krittasudthacheewa C, Salamanca A, Sriyasak P. Lifestyles and consumption in cities and the links with health and well-being: the case of obesity. Curr Opin Environ Sustain. 2012 Oct 1;4(4):405–13.

67. Shaw SC, Ntani G, Baird J, Vogel CA. A systematic review of the influences of food store product placement on dietary-related outcomes. Nutr Rev. 2020 Dec 1;78(12):1030–45.

68. McLaren-Hedwards T, D'cunha K, Elder-Robinson E, Smith C, Jennings C, Marsh A, et al. Effect of communal dining and dining room enhancement interventions on nutritional, clinical and functional outcomes of patients in acute and sub-acute hospital, rehabilitation and aged-care settings: A systematic review. Nutr Diet J Dietit Assoc Aust. 2022 Feb;79(1):140–68.

69. Melián-Fleitas L, Franco-Pérez Á, Caballero P, Sanz-Lorente M, Wanden-Berghe C, Sanz-Valero J. Influence of Nutrition, Food and Diet-Related Interventions in the Workplace: A Meta-Analysis with Meta-Regression. Nutrients. 2021 Nov 4;13(11):3945.

70. Pineda E, Bascunan J, Sassi F. Improving the school food environment for the prevention of childhood obesity: What works and what doesn't. Obes Rev Off J Int Assoc Study Obes. 2021 Feb;22(2):e13176.

71. Hartmann-Boyce J, Bianchi F, Piernas C, Payne Riches S, Frie K, Nourse R, et al. Grocery store interventions to change food purchasing behaviors: a systematic review of randomized controlled trials. Am J Clin Nutr. 2018 Jun 1;107(6):1004–16.

72. Turner C, Kalamatianou S, Drewnowski A, Kulkarni B, Kinra S, Kadiyala S. Food Environment Research in Low- and Middle-Income Countries: A Systematic Scoping Review. Adv Nutr Bethesda Md. 2020 Mar 1;11(2):387–97.

73. Hollands GJ, Carter P, Anwer S, King SE, Jebb SA, Ogilvie D, et al. Altering the availability or proximity of food, alcohol, and tobacco products to change their selection and consumption. Cochrane Database Syst Rev. 2019 Sep 4;2019(9):CD012573.

74. von Philipsborn P, Stratil JM, Burns J, Busert LK, Pfadenhauer LM, Polus S, et al. Environmental Interventions to Reduce the Consumption of Sugar-Sweetened Beverages: Abridged Cochrane Systematic Review. Obes Facts. 2020;13(4):397–417.

75. Parker B, Burnett K, Hay T, Skinner K. The Community Food Environment and Food Insecurity in Sioux Lookout, Ontario: Understanding the Relationships between Food, Health, and Place. J Hunger Environ Nutr. 2019 Nov 2;14(6):762–79.

76. Carter P, Bignardi G, Hollands GJ, Marteau TM. Information-based cues at point of choice to change selection and consumption of food, alcohol and tobacco products: a systematic review. BMC Public Health. 2018 Mar 27;18(1):418.

77. Daley AJ, McGee E, Bayliss S, Coombe A, Parretti HM. Effects of physical activity calorie equivalent food labelling to reduce food selection and consumption: systematic review and meta-analysis of randomised controlled studies. J Epidemiol Community Health. 2020 Mar;74(3):269–75.

78. Harbers MC, Beulens JWJ, Rutters F, de Boer F, Gillebaart M, Sluijs I, et al. The effects of nudges on purchases, food choice, and energy intake or content of purchases in real-life food purchasing environments: a systematic review and evidence synthesis. Nutr J. 2020 Sep 17;19(1):103.

79. Scapin T, Fernandes AC, Curioni CC, Pettigrew S, Neal B, Coyle DH, et al. Influence of sugar label formats on consumer understanding and amount of sugar in food choices: a systematic review and meta-analyses. Nutr Rev. 2021 Jul 1;79(7):788–801.

80. Hillier-Brown FC, Summerbell CD, Moore HJ, Routen A, Lake AA, Adams J, et al. The impact of interventions to promote healthier ready-to-eat meals (to eat in, to take away or to be delivered) sold by specific food outlets open to the general public: a systematic review. Obes Rev. 2017;18(2):227–46.

81. Nekitsing C, Blundell-Birtill P, Cockroft JE, Hetherington MM. Systematic review and meta-analysis of strategies to increase vegetable consumption in preschool children aged 2–5 years. Appetite. 2018 Aug;127:138–54.

82. McCormack LA, Laska MN, Larson NI, Story M. Review of the Nutritional Implications of Farmers' Markets and Community Gardens: A Call for Evaluation and Research Efforts. J Am Diet Assoc. 2010 Mar 1;110(3):399–408.

83. City of New York. Active Design Guidelines: Promoting Physical Activity and Health in Design. City of New York; 2010. Available from:https://www.drkarenlee.com/resources/adg

84. City of New York, Economic Development Corporation. Food Retail Expansion to Support Health (FRESH) [Internet]. Available from:https://edc.nyc/program/food-retail-expansion-support-health-fresh

85. da Costa Peres CM, Gardone DS, Costa BV de L, Duarte CK, Pessoa MC, Mendes LL. Retail food environment around schools and overweight: a systematic review. Nutr Rev. 2020 Oct 1;78(10):841–56.

86. Whatnall MC, Patterson AJ, Ashton LM, Hutchesson MJ. Effectiveness of brief nutrition interventions on dietary behaviours in adults: A systematic review. Appetite. 2018 Jan 1;120:335–47.

87. City of Edmonton. Access Design Guide: Age Friendly Edmonton. Edmonton: City of Edmonton; 2018. Report No.: Version 2. Available from:https://www.edmonton.ca/public-files/assets/document?path=PDF/AFE-AccessDesignGuide.pdf

88. Muckelbauer R, Libuda L, Clausen K, Toschke AM, Reinehr T, Kersting M. Promotion and provision of drinking water in schools for overweight prevention: randomized, controlled cluster trial. Pediatrics. 2009 Apr;123(4):e661-667.

89. Elbel B, Mijanovich T, Abrams C, Cantor J, Dunn L, Nonas C, et al. A Water Availability Intervention in New York City Public Schools: Influence on Youths' Water and Milk Behaviors. Am J Public Health. 2015 Feb;105(2):365–72.

90. Schwartz AE, Leardo M, Aneja S, Elbel B. Effect of a School-Based Water Intervention on Child Body Mass Index and Obesity. JAMA Pediatr. 2016 Mar;170(3):220–6.

91. City of Toronto. Toronto Accessibility Design Guidelines. 2021. Available from:https://www.toronto.ca/wp-content/uploads/2021/08/8ee5-Revised-TADG.pdf

92. Monterrosa EC, Frongillo EA, Drewnowski A, de Pee S, Vandevijvere S. Sociocultural Influences on Food Choices and Implications for Sustainable Healthy Diets. Food Nutr Bull. 2020 Dec;41(2_suppl):59S-73S.

93. Rovner AJ, Nansel TR, Wang J, Iannotti RJ. Food sold in school vending machines is associated with overall student dietary intake. J Adolesc Health Off Publ Soc Adolesc Med. 2011 Jan;48(1):13–9.

94. Ermetici F, Zelaschi RF, Briganti S, Dozio E, Gaeta M, Ambrogi F, et al. Association between a school-based intervention and adiposity outcomes in adolescents: The Italian "EAT" project. Obesity. 2016;24(3):687–95.

95. Calder A, Sole G, Mulligan H. The accessibility of fitness centers for people with disabilities: A systematic review. Disabil Health J. 2018 Oct;11(4):525–36.

96. Saitta M, Devan H, Boland P, Perry MA. Park-based physical activity interventions for persons with disabilities: A mixed-methods systematic review. Disabil Health J. 2019 Jan;12(1):11–23.

97. Derose KP, Wallace DD, Han B, Cohen DA. Effects of park-based interventions on health-related outcomes: A systematic review. Prev Med. 2021 Jun;147:106528.

98. Jansson AK, Lubans DR, Smith JJ, Duncan MJ, Haslam R, Plotnikoff RC. A systematic review of outdoor gym use: Current evidence and future directions. J Sci Med Sport. 2019 Dec 1;22(12):1335–43.

99. Jones M, Defever E, Letsinger A, Steele J, Mackintosh KA. A mixed-studies systematic review and meta-analysis of school-based interventions to promote physical activity and/or reduce sedentary time in children. J Sport Health Sci. 2020 Jan;9(1):3–17.

100. Riazi NA, Wunderlich K, Yun L, Paterson DC, Faulkner G. Social-Ecological Correlates of Children's Independent Mobility: A Systematic Review. Int J Environ Res Public Health. 2022 Jan 30;19(3):1604.

101. Petrunoff N, Rissel C, Wen LM, Martin J. Carrots and sticks vs carrots: Comparing approaches to workplace travel plans using disincentives for driving and incentives for active travel. J Transp Health. 2015 Dec 1;2(4):563–7.

102. Lin CY, Koohsari MJ, Liao Y, Ishii K, Shibata A, Nakaya T, et al. Workplace neighbourhood built environment and workers' physically-active and sedentary behaviour: a systematic review of observational studies. Int J Behav Nutr Phys Act. 2020 Nov 20;17(1):148.

103. Memmott P, Keys C. Redefining architecture to accommodate cultural difference: designing for cultural sustainability. Archit Sci Rev. 2015 Oct 2;58(4):278–89.

104. Salvo D, Banda JA, Sheats JL, Winter SJ, Lopes dos Santos D, King AC. Impacts of a Temporary Urban Pop-Up Park on Physical Activity and Other Individual- and Community-Level Outcomes. J Urban Health. 2017 Aug 1;94(4):470–81.

105. Landais LL, Damman OC, Schoonmade LJ, Timmermans DRM, Verhagen EALM, Jelsma JGM. Choice architecture interventions to change physical activity and sedentary behavior: a systematic review of effects on intention, behavior and health outcomes during and after intervention. Int J Behav Nutr Phys Act. 2020 Apr 7;17(1):47.

106. Foster C, Kelly P, Reid HAB, Roberts N, Murtagh EM, Humphreys DK, et al. What works to promote walking at the population level? A systematic review. Br J Sports Med. 2018 Jun;52(12):807–12.

107. Roberts H, McEachan R, Margary T, Conner M, Kellar I. Identifying Effective Behavior Change Techniques in Built Environment Interventions to Increase Use of Green Space: A Systematic Review. Environ Behav. 2018 Jan 1;50(1):28–55.

108. Chung A, Zorbas C, Riesenberg D, Sartori A, Kennington K, Ananthapavan J, et al. Policies to restrict unhealthy food and beverage advertising in outdoor spaces and on publicly owned assets: A scoping review of the literature. Obes Rev. 2022;23(2):e13386.

109. Gorman N, Lackney JA, Rollings K, Huang TTK. Designer Schools: The Role of School Space and Architecture in Obesity Prevention. Obesity. 2007;15(11):2521–30.

110. Han JC, Lawlor DA, Kimm SY. Childhood obesity. The Lancet. 2010 May 15;375(9727):1737–48.

111. Terrón-Pérez M, Molina-García J, Martínez-Bello VE, Queralt A. Relationship Between the Physical Environment and Physical Activity Levels in Preschool Children: A Systematic Review. Curr Environ Health Rep. 2021 Jun;8(2):177–95.

112. Stierlin AS, De Lepeleere S, Cardon G, Dargent-Molina P, Hoffmann B, Murphy MH, et al. A systematic review of determinants of sedentary behaviour in youth: a DEDIPAC-study. Int J Behav Nutr Phys Act. 2015 Oct 9;12(1):133.

113. Herrington S, Brussoni M. Beyond Physical Activity: The Importance of Play and Nature-Based Play Spaces for Children's Health and Development. Curr Obes Rep. 2015 Dec 1;4(4):477–83.

114. Escalante Y, García-Hermoso A, Backx K, Saavedra JM. Playground designs to increase physical activity levels during school recess: a systematic review. Health Educ Behav Off Publ Soc Public Health Educ. 2014 Apr;41(2):138–44.

115. Clevenger KA, Wierenga MJ, Howe CA, Pfeiffer KA. A Systematic Review of Child and Adolescent Physical Activity by Schoolyard Location. Kinesiol Rev. 2020 May 1; 9(2):147–58.

116. Padial-Ruz R, Puga-González ME, Céspedes-Jiménez Á, Cabello-Manrique D. Determining Factors in the Use of Urban Parks That Influence the Practice of Physical Activity in Children: A Systematic Review. Int J Environ Res Public Health. 2021 Jan;18(7):3648.

117. Stearns JA, Avedzi HM, Yim D, Spence JC, Labbaf F, Lamboglia CG, et al. An Umbrella Review of the Best and Most Up-to-Date Evidence on the Built Environment and Physical Activity in Older Adults ≥60 Years. Public Health Rev . 2023 Mar 10;44:1605474.

118. Jovanović N, Campbell J, Priebe S. How to design psychiatric facilities to foster positive social interaction - A systematic review. Eur Psychiatry J Assoc Eur Psychiatr. 2019 Aug;60:49–62.

119. Low SM, Taplin D, Scheld S. Rethinking Urban Parks: Public Space and Cultural Diversity. In: Rethinking Urban Parks. University of Texas Press; 2009.

120. Lee JS, Park S, Jung S. Effect of Crime Prevention through Environmental Design (CPTED) Measures on Active Living and Fear of Crime. Sustainability. 2016 Sep;8(9):872.

121. Baek S, Raja S, Park J, Epstein L, Yin L, Roemmich J. Park design and children's active play: a microscale spatial analysis of intensity of play in Olmsted's Delaware Park. Environ Plan B Plan Des. 2015 Aug 3;42.

122. Ohly H, Gentry S, Wigglesworth R, Bethel A, Lovell R, Garside R. A systematic review of the health and well-being impacts of school gardening: synthesis of quantitative and qualitative evidence. BMC Public Health. 2016 Dec; 16(1):286.

123. Sherk A, Stockwell T, Chikritzhs T, Andréasson S, Angus C, Gripenberg J, et al. Alcohol Consumption and the Physical Availability of Take-Away Alcohol: Systematic Reviews and Meta-Analyses of the Days and Hours of Sale and Outlet Density. J Stud Alcohol Drugs. 2018 Jan;79(1):58–67.

124. Kouritzin T, Spence JC, Lee K. Food Intake and Food Selection Following Physical Relocation: A Scoping Review. Public Health Rev. 2023 Feb 1;44:1605516.

125. Mazumdar S, Learnihan V, Cochrane T, Davey R. The Built Environment and Social Capital: A Systematic Review. Environ Behav. 2018 Feb 1;50(2):119–58.

126. Iacovou M, Pattieson DC, Truby H, Palermo C. Social health and nutrition impacts of community kitchens: a systematic review. Public Health Nutr. 2013 Mar;16(3):535–43.

127. Pleson E, Nieuwendyk L, Lee K, Chaddah A, Nykiforuk C, Schopflocher D. Understanding Older Adults' Usage of Community Green Spaces in Taipei, Taiwan. Int J Environ Res Public Health. 2014 Jan 27;11(2):1444–64.

128. Elshahat S, O'Rorke M, Adlakha D. Built environment correlates of physical activity in low- and middle-income countries: A systematic review. PLOS ONE. 2020 Mar 17;15(3):e0230454.

129. Gong Y, Palmer S, Gallacher J, Marsden T, Fone D. A systematic review of the relationship between objective measurements of the urban environment and psychological distress. Environ Int. 2016 Nov;96:48–57.

130. Mueller N, Daher C, Rojas-Rueda D, Delgado L, Vicioso H, Gascon M, et al. Integrating health indicators into urban and transport planning: A narrative literature review and participatory process. Int J Hyg Environ Health. 2021 Jun 1;235:113772.

131. Ellison CG, George LK. Religious Involvement, Social Ties, and Social Support in a Southeastern Community. J Sci Study Relig. 1994;33(1):46–61.

132. Ferrero F, Perboli G, Rosano M, Vesco A. Car-sharing services: An annotated review. Sustain Cities Soc. 2018 Feb 1;37:501–18.

133. Pedroso FE, Angriman F, Bellows AL, Taylor K. Bicycle Use and Cyclist Safety Following Boston's Bicycle Infrastructure Expansion, 2009–2012. Am J Public Health. 2016 Dec;106(12):2171–7.

134. Smith A, Zucker S, Lladó-Farrulla M, Friedman J, Guidry C, McGrew P, et al. Bicycle lanes: Are we running in circles or cycling in the right direction? J Trauma Acute Care Surg. 2019 Jul;87(1):76–81.

135. Sampson N, Nassauer J, Schulz A, Hurd K, Dorman C, Ligon K. Landscape care of urban vacant properties and implications for health and safety: Lessons from photovoice. Health Place. 2017 Jul 1;46:219–28.

136. Ren H, Strickfaden M, Spence JC, Stearns JA, Jackson M, Avedzi HM, et al. 'We are developing our bubble': role of the built environment in supporting physical and social activities in independent-living older adults during COVID-19. Cities Health. 2023 May 8;1–14.

137. Holderness-Roddam B. Dog park design, planning and management. Aust Plan. 2020 Jan 2;56(1):48–57.

138. Holder HD, Gruenewald PJ, Ponicki WR, Treno AJ, Grube JW, Saltz RF, et al. Effect of Community-Based Interventions on High-Risk Drinking and Alcohol-Related Injuries. JAMA. 2000 Nov 8;284(18):2341–7.

139. Cutumisu N, Traoré I, Paquette MC, Cazale L, Camirand H, Lalonde B, et al. Association between junk food consumption and fast-food outlet access near school among Quebec secondary-school children: findings from the Quebec Health Survey of High School Students (QHSHSS) 2010–11. Public Health Nutr. 2017 Apr;20(5):927–37.

140. Bohonos S, Lee A, Malik A, Thai C, Manduchi R. Universal real-time navigational assistance (URNA): an urban bluetooth beacon for the blind. In: Proceedings of the 1st ACM SIGMOBILE international workshop on Systems and networking support for healthcare and assisted living environments. New York, NY, USA: Association for Computing Machinery; 2007. p. 83–8. (HealthNet '07).

141. City of Edmonton. Complete street design and construction standards. Edmonton: City of Edmonton; 2021. Report No.: COE-IM-GUIDE-0011. Available from:https://www.edmonton.ca/sites/default/files/public-files/documents/PDF/CompleteStreets_DesignStandards_2021.pdf

142. City of Edmonton. Winter Design Guidelines: Transforming Edmonton into a Great Winter City. Edmonton: CIty of Edmonton; 2016. City of Edmonton; 2016. Available from:https://www.edmonton.ca/public-files/assets/document?path=PDF/WinterCityDesignGuidelines_draft.pdf

143. BC Centre for Disease Control. Healthy Built Environment Linkages Toolkit: making the links between design, planning and health. Vancouver, BC: Public Health Services Authority; 2018. Report No.: Version 2.0. Available from:https://www.bccdc.ca/health-professionals/professional-resources/healthy-built-environment-linkages-toolkit

144. City of New York. Active Design: Shaping the Sidewalk Experience. City of New York; 2013. Available from:https://www.nyc.gov/assets/planning/download/pdf/plans-studies/active-design-sidewalk/tools_resources.pdf

145. Lu Y. Using Google Street View to investigate the association between street greenery and physical activity. Landsc Urban Plan. 2019 Nov 1;191:103435.

146. City of Edmonton. Edmonton Main Streets Guidelines. CIty of Edmonton; 2016. Available from:https://www.edmonton.ca/sites/default/files/public-files/assets/MainStreet_Guidelines_Feb2016.pdf

147. Jensen SU. Pedestrian and Bicyclist Level of Service on Roadway Segments. Transp Res Rec. 2007 Jan 1;2031(1):43–51.

148. Santero N, Loijos A, Akbarian M, Ochsendorf J. Methods, Impacts, and Opportunities in the Concrete Pavement Life Cycle. MIT Concrete Sustainability Hub; 2011 Aug.

149. City of Edmonton. Public Art to Enhance Edmonton's Public Realm [Internet]. City of Edmonton; 2021. Available from:https://publicart.edmontonarts.ca/public_art_-_about_public_art/public_art_-_percent_for_art_policy/

150. Bauman A, Milton K, Kariuki M, Fedel K, Lewicka M. Is there sufficient evidence regarding signage-based stair use interventions? A sequential meta-analysis. BMJ Open. 2017 Nov 1;7(11):e012459.

151. Morales E, Gamache S, Edwards G. Winter: public enemy #1 for accessibility exploring new solutions. J Access Des JACCES. 2014;4(1):30–52.

152. Drahota A, Gal D, Windsor J. Flooring as an intervention to reduce injuries from falls in healthcare settings: an overview. Qual Ageing Older Adults. 2007 Jan 1;8(1):3–9.

153. Kearns RA, Collins DCA, Neuwelt PM. The walking school bus: extending children's geographies? Area. 2003;35(3):285–92.

154. Noyes P, Fung L, Lee KK, Grimshaw VE, Karpati A, DiGrande L. Cycling in the City: An In-Depth Examination of Bicycle Lane Use in a Low-Income Urban Neighborhood. J Phys Act Health. 2014 Jan;11(1):1–9.

155. Fishman E, Schepers P, Kamphuis CBM. Dutch Cycling: Quantifying the Health and Related Economic Benefits. Am J Public Health. 2015;105(8):e13-5.

156. Grimes A, Smirnova M. Perspectives on an earn-a-bike intervention on transportation, health and self-esteem among men experiencing homelessness. J Transp Health. 2020 Sep 1;18:100904.

157. McNiel P, Westphal J. Cycling Without Age Program: The Impact for Residents in Long-Term Care. West J Nurs Res. 2020 Sep;42(9):728–35.

158. Wolf SA, Grimshaw VE, Sacks R, Maguire T, Matera C, Lee KK. The Impact of a Temporary Recurrent Street Closure on Physical Activity in New York City. J Urban Health. 2015 Apr;92(2):230–41.

159. Krukowicz T, Firląg K, Sobota A, Kołodziej T, Novačko L. The relationship between bicycle traffic and the development of bicycle infrastructure on the example of Warsaw. Arch Transp. 2021 Dec 1;60:187–203.

160. Agarwal A, Collins P. Opportunities and Barriers to Promoting Public Transit Use in a Midsize Canadian City. Can J Urban Res. 2016;25(2):1–10.

161. Zhang Y, Farber S, Young M. Eliminating barriers to nighttime activity participation: the case of on-demand transit in Belleville, Canada. Transportation. 2022 Oct 1;49(5):1385–408.

162. Widener MJ, Minaker L, Farber S, Allen J, Vitali B, Coleman PC, et al. How do changes in the daily food and transportation environments affect grocery store accessibility? Appl Geogr. 2017 Jun 1;83:46–62.

163. City of Edmonton. LRT Design Guidelines. 2017. Available from:https://www.edmonton.ca/public-files/assets/t?path=RoadsTraffic/2017LRTDesignGuidelines.pdf

164. Engelen L. Does Active Design Influence Activity, Sitting, Wellbeing and Productivity in the Workplace? A Systematic Review. Int J Environ Res Public Health. 2020 Dec 10;17(24):9228.

165. Lobstein T, Davies S. Defining and labelling "healthy" and "unhealthy" food. Public Health Nutr. 2009 Mar;12(3):331–40.

166. Dijkstra L, Poelman H, Veneri P. The EU-OECD definition of a functional urban area. Paris: OECD; 2019 Dec.

167. Perrotta AF. Transit Fare Affordability: Findings From a Qualitative Study. Public Works Manag Policy. 2017 Jul;22(3):226–52.

168. Pucher J, Buehler R. Integrating Bicycling and Public Transport in North America. J Public Transp. 2009 Sep;12(3):79–104.

169. Day K, Loh L, Ruff RR, Rosenblum R, Fischer S, Lee KK. Does Bus Rapid Transit Promote Walking? An Examination of New York City's Select Bus Service. J Phys Act Health. 2014 Nov;11(8):1512–6.

170. City of Edmonton. City of Edmonton. On Demand Transi. City of Edmonton; Available from:https://www.edmonton.ca/ets/on-demand-transit

171. City of New York. Access-A-Ride Paratransit Service (AAR), Metropolitan Transportation Authority (MTA). Public transportation for people with disabilities. City of New York; Available from:https://access.nyc.gov/programs/access-a-ride/

172. Clarke AJ, USA, editors. Transportation in an aging society: a decade of experience; technical papers and reports from a conference, November 7 - 9, 1999, Bethesda, Maryland [Internet]. Washington, D.C: Transportation Research Board; 2004. 325 p. (Conference proceedings / Transportation Research Board). Available from:https://onlinepubs.trb.org/onlinepubs/conf/reports/cp_27.pdf

173. Ferris B, Watkins K, Borning A. OneBusAway: results from providing real-time arrival information for public transit. In: Proceedings of the SIGCHI Conference on Human Factors in Computing Systems [Internet]. Atlanta Georgia USA: ACM; 2010 [cited 2023 Jun 16]. p. 1807–16. Available from:https://dl.acm.org/doi/10.1145/1753326.1753597

174. Brakewood C, Watkins K. A literature review of the passenger benefits of real-time transit information. Transp Rev. 2019 May 4;39(3):327–56.

175. National Association of City Transportation Officials. Rapid Response: Emerging Practices for Cities]. NACTO; 2020. Available from:https://nacto.org/covid19-rapid-response-tools-for-cities/

176. Roberts D. How to make a city livable during lockdown [Internet]. 2020. Available from:https://www.vox.com/cities-and-urbanism/2020/4/13/21218759/coronavirus-cities-lockdown-covid-19-brent-toderian

177. World Health Organization. Global age-friendly cities: a guide. 2007. Available from:https://apps.who.int/iris/handle/10665/43755

178. City of Edmonton. Design and Construction Standards: Landscaping. Edmonton, AB, Canada: CIty of Edmonton; 2017. Report No.: Volume 5. Available from:https://www.edmonton.ca/city_government/urban_planning_and_design/city-design-construction-standards

179. Johns Hopkins Center for Injury Research and Policy, NYC Department of Health and Mental Hygiene, Society for Public Health. Active Design Supplement: Promoting Safety. Version 2. 2013. Available from:https://www.drkarenlee.com/resources/safety

180. Markowitz F. Integrating Pedestrian Lighting into Transportation Design, Operations, and Maintenance. In: Outdoor Lighting for Pedestrians. Routledge; 2021.

181. Ewing R, Handy S. Measuring the Unmeasurable: Urban Design Qualities Related to Walkability. J Urban Des. 2009 Feb;14(1):65–84.

182. City of Edmonton. Design Guide for a Safer City. The City of Edmonton; 1995. Available from:https://webdocs.edmonton.ca/InfraPlan/safer_city.pdf

183. Institute of Transportation Engineers, editor. Designing walkable urban thoroughfares: a context sensitive approach. Washington, DC: Institute of Transportation Engineers; 2010. 215 p.

184. Astell-Burt T, Feng X. Urban green space, tree canopy and prevention of cardiometabolic diseases: a multilevel longitudinal study of 46 786 Australians. Int J Epidemiol. 2020 Jun 1;49(3):926–33.

185. Astell-Burt T, Feng X. Association of Urban Green Space With Mental Health and General Health Among Adults in Australia. JAMA Netw Open. 2019 Jul 26;2(7):e198209.

186. Szota C, Coutts AM, Thom JK, Virahsawmy HK, Fletcher TD, Livesley SJ. Street tree stormwater control measures can reduce runoff but may not benefit established trees. Landsc Urban Plan. 2019 Feb 1;182:144–55.

187. Cattell V, Dines N, Gesler W, Curtis S. Mingling, observing, and lingering: Everyday public spaces and their implications for well-being and social relations. Health Place. 2008 Sep 1;14(3):544–61.

188. Public Health Agency of Canada. Age-Friendly Communities Evaluation Guide: Using Indicators to Measure Progress. Government of Canada; 2015. Report No.: 978-1-100-25897–3. Available from:https://www.canada.ca/en/public-health/services/health-promotion/aging-seniors/friendly-communities-evaluation-guide-using-indicators-measure-progress.html

189. Brittin J, Sorensen D, Trowbridge M, Lee KK, Breithecker D, Frerichs L, et al. Physical Activity Design Guidelines for School Architecture. Adams MA, editor. PLOS ONE. 2015 Jul 31;10(7):e0132597.

190. U.S. Green Building Council. Leadership in Energy and Environmental Design(LEED) Innovation: Design for Active Occupants [Internet]. Available from:https://www.usgbc.org/credits/new-construction-schools-new-construction-retail-new-construction-healthcare-commercial-in-3?return=/credits/new-construction/v2009/innovation-catalog

191. Outdoor Patio Information Guide [Internet]. City of Victoria; 2023. Available from:https://www.victoria.ca/assets/Business/Permits~Licences/Outdoor%20Patio%2 Information%20Guide_0323.pdf

192. Kim KH, Kabir E, Jahan SA. Exposure to pesticides and the associated human health effects. Sci Total Environ. 2017 Jan;575:525–35.

193. Lau SSY, Gou Z, Liu Y. Healthy campus by open space design: Approaches and guidelines. Front Archit Res. 2014 Dec;3(4):452–67.

194. FireSmart BC Landscaping Guide. FireSmart [Internet]. Available from:https://firesmartbc.ca/wp-content/uploads/2021/04/FireSmartBC_LandscapingGuide_Web_v2.pdf

195. Brown KH, Jameton AL. Public Health Implications of Urban Agriculture. J Public Health Policy. 2000;21(1):20.

196. U.S. Green Building Council. Leadership in Energy and Environmental Design(LEED) Bicycle facilities. Smart location and linkage [Internet]. Available from:https://www.usgbc.org/credits/neighborhood-development-plan-neighborhood-development/v4-draft/sllc4

197. Talen E, Jeong H. Does the classic American main street still exist? An exploratory look. J Urban Des. 2019 Jan 2;24(1):78–98.

198. D'Haese S, Van Dyck D, De Bourdeaudhuij I, Deforche B, Cardon G. Organizing "Play Streets" during school vacations can increase physical activity and decrease sedentary time in children. Int J Behav Nutr Phys Act. 2015 Dec ;12(1):14.

199. Buekers J, Van Holderbeke M, Bierkens J, Int Panis L. Health and environmental benefits related to electric vehicle introduction in EU countries. Transp Res Part Transp Environ. 2014 Dec 1;33:26–38.

200. Linne Tse. Barrier-Free Design Guide. Alberta Municipal Affairs; 2017. Report No.: Version 5. Available from:https://www.alberta.ca/assets/documents/tr/tr-barrierfree2017.pdf

201. The City of Woonsocket. Woonsocket Main Street Design Guideline. The city of Woonsocket; 2015. Available from:https://www.woonsocketri.org/sites/g/files/vyhlif5231/f/uploads/woonsocket_design_guidelines_v2_fonts_fixed.pdf

202. CPTED. Crime Prevention Through Environmental Design (CPTED) Principles. CPTED; 2023. Available from:https://cptedcanada.com/cpted-principles/

203. Nicoll G, Zimring C. Effect of Innovative Building Design on Physical Activity. J Public Health Policy. 2009 Jan ;30(S1):S111–23.

204. Lee KK, Loh L, Adamic J, Perry A, Sacks R, Lam K, et al. Lessons learned from the development and implementation of a citywide stair prompt initiative. Prev Med Rep. 2019 Mar;13:218–23.

205. City of Vancouver. Passive Design Toolkit [Internet]. 2009 Jul. Available from:https://vancouver.ca/files/cov/passive-design-large-buildings.pdf

206. Garcia JC, Marron M, Amaral P, Bastos T, Palazuelos S, Martin JL, et al. Proposal for a Building Accessibility Service (BASE). p. 393–400. Available from:https://ebooks.iospress.nl/publication/1369/

207. Harvard T.H. Chan School of Public Health. Healthy Food Environment Recommendations: Complete List; How Eating Well Becomes the Easy Choice [Internet]. Harvard University. Available from:https://www.hsph.harvard.edu/obesity-prevention-source/obesity-prevention/food-environment/healthy-food-environment-recommendations-for-obesity-prevention-complete-list/

208. Rindel J. Suggested acoustical requirements for restaurants, canteens, and cafeterias. In 2018.

209. City of San Francisco. San Francisco Municipal Code; SEC. 59.4. Healthy Food Retailer Incentives Program. [Internet]. City of San Francisco; 2023. Available from:https://codelibrary.amlegal.com/codes/san_francisco/latest/sf_admin/0-0-0-29116

210. Afshin A, Peñalvo JL, Del Gobbo L, Silva J, Michaelson M, O'Flaherty M, et al. The prospective impact of food pricing on improving dietary consumption: A systematic review and meta-analysis. Adams J, editor. PLOS ONE. 2017 Mar 1;12(3):e0172277.

211. Molloy S, Varkey P, Walker TR. Opportunities for single-use plastic reduction in the food service sector during COVID-19. Sustain Prod Consum. 2022 Mar;30:1082–94.

212. Ruff RR, Rosenblum R, Fischer S, Meghani H, Adamic J, Lee KK. Associations between building design, point-of-decision stair prompts, and stair use in urban worksites. Prev Med. 2014 Mar;60:60–4.

213. Benjamin K, Edwards N, Caswell W. Factors Influencing the Physical Activity of Older Adults in Long-Term Care: Administrators' Perspectives. J Aging Phys Act [Internet]. 2009 Apr;17(2):181–95.

214. Lee KK, Perry AS, Wolf SA, Agarwal R, Rosenblum R, Fischer S, et al. Promoting Routine Stair Use. Am J Prev Med. 2012 Feb;42(2):136–41.

215. Liu SY, Lapane KL. Residential Modifications and Decline in Physical Function Among Community-Dwelling Older Adults. The Gerontologist. 2009 Jun 1;49(3):344–54.

216. Zacharias J, Ling R. Choosing Between Stairs and Escalator in Shopping Centers: The Impact of Location, Height, and Pedestrian Volume. Environ Behav. 2015 Jul;47(6):694–709.

217. Nicoll G. Spatial Measures Associated with Stair Use. Am J Health Promot. 2007 Mar;21(4_suppl):346–52.

218. UO's indoor research center takes aim at COVID-19 risks. University of Oregon; 2020. Available from:https://around.uoregon.edu/content/uos-indoor-research-center-takes-aim-covid-19-risks

219. The Community Guide. Physical Activity: Social Support Interventions in Community Settings. 2001. Available from:https://www.thecommunityguide.org/findings/physical-activity-social-support-interventions-community-settings.html

220. Venema TAG, Kroese FM, De Ridder DTD. I'm still standing: A longitudinal study on the effect of a default nudge. Psychol Health. 2018 May 4;33(5):669–81.

221. Kininmonth AR, Smith AD, Llewellyn CH, Dye L, Lawton CL, Fildes A. The relationship between the home environment and child adiposity: a systematic review. Int J Behav Nutr Phys Act. 2021 Dec;18(1):4.

222. Bjornsdottir G, Arnadottir SA, Halldorsdottir S. Facilitators of and Barriers to Physical Activity in Retirement Communities: Experiences of Older Women in Urban Areas. Phys Ther. 2012 Apr 1;92(4):551–62.

223. Frost SS, Goins RT, Hunter RH, Hooker SP, Bryant LL, Kruger J, et al. Effects of the built environment on physical activity of adults living in rural settings. Am J Health Promot AJHP. 2010;24(4):267–83.

224. Ofosu NN, Luig T, Chiu Y, Mumtaz N, Yeung RO, Lee KK, et al. Understanding the bigger picture: syndemic interactions of the immigrant and refugee context with the lived experience of diabetes and obesity. BMC Public Health. 2022 Dec;22(1):345.

225. City of Toronto. Affordable Rental Housing Design Guidelines. City of Toronto; 2015. Available from:https://www.toronto.ca/wp-content/uploads/2017/11/8fea-AFFORDABLE-HOUSING-DESIGN-GUIDELINES.FINAL_.07.06.2017.pdf

226. City of Edmonton. Smoking bylaws for Edmonton Business. 2010. Available from:https://www.edmonton.ca/public-files/assets/document?path=PDF/SmokingBro_10HR.pdf

227. The Community Guide. Tobacco Use: Smoke-Free Policies. Available from:https://www.thecommunityguide.org/findings/tobacco-use-smoke-free-policies.html

228. City of Toronto. Growing Up: Planning for Children in New Vertical Communities. 2017. Available from:https://www.toronto.ca/legdocs/mmis/2017/pg/bgrd/backgroundfile-103920.pdf

229. City of Edmonton. Community Standards Bylaw. 2023. Available from:https://www.edmonton.ca/public-files/assets/document?path=Bylaws/C14600.pdf

230. Pomeroy J. Room at the Top—The Roof as an Alternative Habitable / Social Space in the Singapore Context. J Urban Des. 2012 Aug 1;17(3):413–24.

231. Hu A, Levis S, Meehl GA, Han W, Washington WM, Oleson KW, et al. Impact of solar panels on global climate. Nat Clim Change. 2016 Mar;6(3):290–4.

232. Koszowski C, Gerike R, Hubrich S, Götschi T, Pohle M, Wittwer R. Active Mobility: Bringing Together Transport Planning, Urban Planning, and Public Health. In: Müller B, Meyer G, editors. Towards User-Centric Transport in Europe: Challenges, Solutions and Collaborations. Cham: Springer International Publishing; 2019. p. 149–71. Available from:https://link.springer.com/chapter/10.1007/978-3-319-99756-8_11

233. Bennett S, Lee Kirby R, Bennett S, Lee Kirby R, Macdonald B. Wheelchair accessibility: Descriptive survey of curb ramps in an urban area. Disabil Rehabil Assist Technol. 2009 Jan 1;4(1):17–23.

234. LaPlante J, McCann B. Complete Streets: We Can Get There from Here. World Transit Res. 2008 Jan 1.

235. Cozens PM, Saville G, Hillier D. Crime prevention through environmental design (CPTED): a review and modern bibliography. Prop Manag. 2005 Jan 1;23(5):328–56.

236. Mihinjac M, Saville G. Third-Generation Crime Prevention Through Environmental Design (CPTED). Soc Sci. 2019 Jun;8(6):182.

237. Takano T, Nakamura K, Watanabe M. Urban residential environments and senior citizens' longevity in megacity areas: the importance of walkable green spaces. J Epidemiol Community Health. 2002 Dec 1;56(12):913–8.

238. Glanz K, Sallis JF, Saelens BE, Frank LD. Healthy Nutrition Environments: Concepts and Measures. Am J Health Promot. 2005 May 1;19(5):330–3.

239. Rideout K, Mah CL, Minaker L. Food Environments: An Introduction for Public Health Practice.

240. Duany A, Plater-Zyberk E. The Neighborhood, the District and the Corridor.

241. Holt-Lunstad J, Robles TF, Sbarra DA. Advancing social connection as a public health priority in the United States. Am Psychol. 2017;72:517–30.

242. Gordon DLA, Janzen M. Suburban Nation? Estimating the Size of Canada's Suburban Population. J Archit Plan Res. 2013;30(3):197–220.

243. Green WD, Beck MA. Obesity Impairs the Adaptive Immune Response to Influenza Virus.Ann Am Thorac Soc. 2017;14(Supplement_5):S406-S409.

244. Canadian Society for Exercise Physiology. Canadian 24-Hour Movement Guidelines: An Integration of Physical Activity, Sedentary Behaviour, and Sleep [Internet]. Available from:https://csepguidelines.ca/

245. Government of Canada. Applying Canada's Dietary Guidelines: Advice on nutrition for different life stages [Internet]. Available from:https://food-guide.canada.ca/en/applying-guidelines/advice-nutrition-different-life-stages/

246. Williams J, Scarborough P, Matthews A, Cowburn G, Foster C, Roberts N, et al. A systematic review of the influence of the retail food environment around schools on obesity-related outcomes. Obes Rev. 2014 May;15(5):359–74.

247. Williams AJ, Wyatt KM, Hurst AJ, Williams CA. A systematic review of associations between the primary school built environment and childhood overweight and obesity. Health Place. 2012 May;18(3):504–14.

248. Bonell C, Wells H, Harden A, Jamal F, Fletcher A, Thomas J, et al. The effects on student health of interventions modifying the school environment: systematic review. J Epidemiol Community Health. 2013 Aug;67(8):677–81.

249. Reynolds R, McKenzie S, Allender S, Brown K, Foulkes C. Systematic review of incidental physical activity community interventions. Prev Med. 2014 Oct;67:46–64.

250. Yang L, Sahlqvist S, McMinn A, Griffin SJ, Ogilvie D. Interventions to promote cycling: systematic review. BMJ. 2010 Oct 18;341(oct18 2):c5293–c5293.

251. Whear 2014: Whear R, Coon JT, Bethel A, Abbott R, Stein K, Garside R. What Is the Impact of Using Outdoor Spaces Such as Gardens on the Physical and Mental Well-Being of Those With Dementia? A Systematic Review of Quantitative and Qualitative Evidence. J Am Med Dir Assoc. 2014 Oct;15(10):697–705.

252. Grasser G, Van Dyck D, Titze S, Stronegger W. Objectively measured walkability and active transport and weight-related outcomes in adults: a systematic review. Int J Public Health. 2013 Aug;58(4):615–25.

Appendix C: Evidence Review Methods

The evidence base shown for strategies in the Healthy Community Guidelines (HCG) was based on a systematic review of published systematic reviews in the academic literature.

The review followed the methodology developed by Joanna Briggs Institute (JBI)[1] and Cochrane's approach to systematic reviews.[2] These organizations provide recommendations and guidance using the following six steps for generating evidence: systematic literature searches, literature selection, data extraction from the selected literature, synthesis of key findings from the selected literature, quality assessment, and rating the strength and quality of key findings. Following their guidance, the Housing for Health evidence review team developed a protocol using each of these steps for conducting a systematic review of systematic reviews. The review adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA).[3]

Data Sources and Search Strategy

The search strategy was conducted from January to July 2022 in collaboration with research librarians using the following health sciences databases: Ovid MEDLINE(R); Ovid EMBASE; Ovid PsycINFO; Wiley Cochrane; CINAHL Plus with Full Text; SPORTDiscus; SocIndex; SCOPUS; Compendex. Google Scholar and Grey Literature were not included. Searches used a three-section formula. The search strategy used a combination of search terms related to three different concepts: A) a Built Environment (BE) Factor, B) a corresponding intervention or feature of the BE Factor, and C) the outcome. An example can be seen in Figure 1.

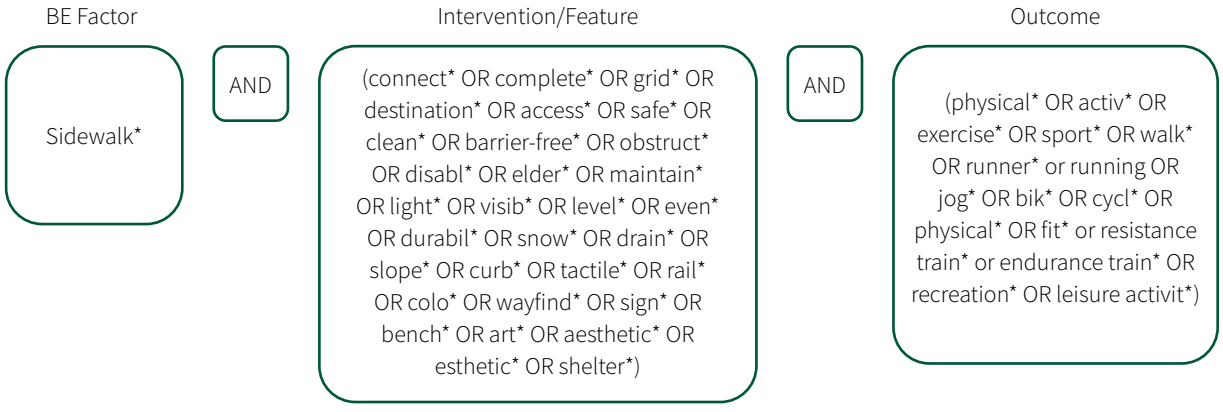

Figure 1: Example Search Strategy

Inclusion Criteria

Primary studies were excluded and only reviews published in English were included. Reviews initially did not have any restrictions on the date of publication, or country of publication. Due to the large number, reviews were restricted to systematic reviews published in 2010 or later. This yielded 449 systematic reviews for further full-text screening. The detailed review flow process is presented in Figure 2.[3] We used the Population, Exposure, Comparison and Outcome (PECO) framework[4] to formulate our review question.

Population

There were no population restrictions.

Exposures and Outcomes

A systematic review evaluating one or more HCG-relevant BE exposures or interventions (single- or multi-component), and outcomes of interest was considered eligible for inclusion if at least two primary quantitative studies were included in the review. Reviews were included if methods of searches, quality appraisal, data extraction, and synthesis of findings were described. Included studies were reviews that examined BE Factors along with outcomes of interest, specifically those related to physical activity, healthy eating, and/or social connections. The definitions for these outcomes are described in the HCG. Additionally, health outcomes (e.g., obesity, cardiovascular disease, diabetes, depression, etc.) mediated by physical activity, healthy eating, and/or social connections were also included.

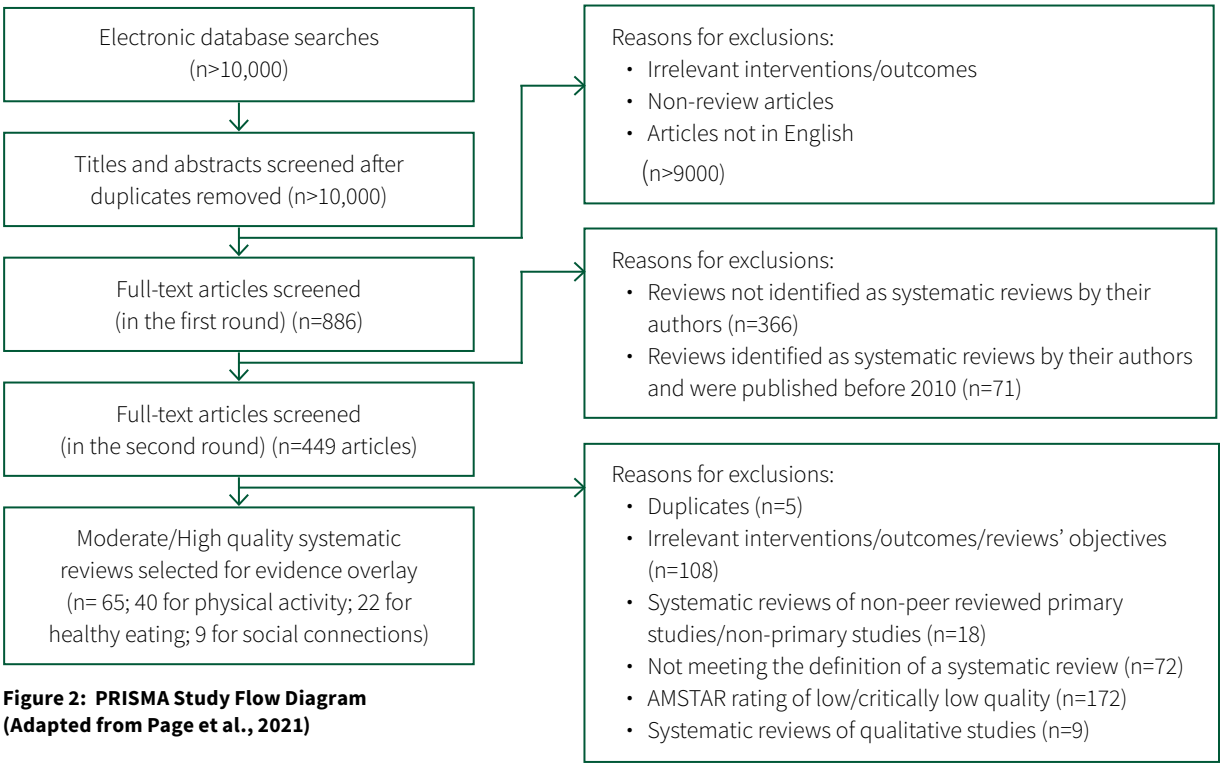

Figure 2: PRISMA Study Flow Diagram (Adapted from Page et al., 2021)

Comparison

Included reviews could compare any BE Factor to null or other BE Factors within the context.

Study Designs

Systematic reviews that followed the Cochrane definition were eligible to be included, i.e. performed critical appraisal and synthesis of included studies. Reviews were considered eligible for inclusion if at least two primary quantitative studies of relevant HCG factors were included in the review. The "Best Evidence Synthesis"[5] methodology was used and we restricted inclusion to systematic reviews deemed as moderate or high quality according to AMSTAR 2 (A MeaSurement Tool to Assess Systematic Reviews).[6] AMSTAR 2 appraises the search strategy, methods for critical appraisal, transparency in reporting results, and potential conflict of interest. To enhance transparency and reliability, at least two reviewers independently assessed the quality of each review based on the 16-item checklist. All other literature review types (scoping reviews, rapid reviews, environmental scans, overviews) and grey literature were excluded.

Analysis

Individual review characteristics and key findings were narratively summarized and tabulated as part of the preliminary analysis. We used a vote-counting approach supported by an effect direction table to synthesize individual review findings. Associations between built environment exposures or interventions, and relevant outcomes were rated as: positive, negative, null or mixed associations. We assessed the certainty of the evidence using the GRADE (Grading of Recommendations Assessment, Development and Evaluation) framework.[7] Evidence was categorized as follows: Level A: >75% of reviews in the same direction; Level B: 75% to 50% of reviews in the same direction; Level C: <50% of reviews in the same direction or evidence based on individual reviews. We also identified reviews where primary study evidence was mixed or inconclusive.

REFERENCES:

1. Aromataris E, Munn Z (Editors). JBI Manual for Evidence Synthesis. JBI, 2020. Available from:https://doi.org/10.46658/JBIMES-20-01

2. Higgins, J.P.T., Thomas, J., Chandler, J., Cumpston, M., Li, T., Page, M.J., et al. (Eds.),2019. Cochrane Handbook for Systematic Reviews of Interventions version 6.0.Available from:https://training.cochrane.org/handbook

3. Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ.2021 Mar 29;n71.

4. Morgan RL, Whaley P, Thayer KA, Schünemann HJ. Identifying the PECO: A framework for formulating good questions to explore the association of environmental and other exposures with health outcomes. Environ Int. 2018 Dec;121:1027–31.

5. Popay J, Roberts H, Sowden A, Petticrew M, Arai L, Rodgers M, et al. Guidance on the conduct of narrative synthesis in systematic reviews: A product from the ESRC Methods Programme. Lancaster University; 2006.

6. Shea BJ, Reeves BC, Wells G, Thuku M, Hamel C, Moran J, et al. AMSTAR 2: a critical appraisal tool for systematic reviews that include randomised or non-randomised studies of healthcare interventions, or both. BMJ. 2017 Sep 21; j4008.

7. Morgan RL, Thayer KA, Bero L, Bruce N, Falck-Ytter Y, Ghersi D, et al. GRADE: Assessing the quality of evidence in environmental and occupational health. Environ Int. 2016 Jul;92–93:611–6.

Appendix D: Accessible Signage Considerations

The Housing for Health team worked with the People of All Abilities Subgroup of our Healthy Community Guidelines Subcommittee to identify a list of considerations for accessible signage:

PLACEMENT

Wall Signage

- Wall signage be placed at heights above the floor or ground surfaces consistent with barrier-free design and CNIB design considerations. Consider lower heights for areas that host children.
- Wall signage be placed near front entrances and doors.

Overhead Signage

- Overhead signage be placed such that is it not an obstacle.

FONT

Font

- Signage use more accessible fonts such as sans-serif fonts. Examples include Arial, Futura, Helvetica, and Trebuchet. Stylized text may be more difficult to read.
- Mix of Uppercase and Lowercase
- Initial uppercase letters can be used to help with word recognition.
- Accessibility Symbols
- The international symbol for physical disabilities be used wherever barrier-free facilities, including entrances, are located.

MATERIAL FINISHES

Non-Glare Finishes

- Signage have a non-glare finish (e.g., matte finish).

High Contrast Coloring

- Accessible signage have a high level of contrast between the background color and signage characters, so the characters stand out and are easily read on background. Some examples of combinations include but are not limited to: black/yellow, black/white, dark blue/white.

Raised Text and Braille

- Signage include Braille identification through the use of Braille dots.
- Braille signage accompany all signs and be placed in common general spaces and places, including restrooms, elevators, stairways, changing rooms, storage rooms, and kitchens.

LANGUAGE

Multilingual Design

- Signage located in multilingual environment have different languages for all visitors to be able to read and understand the information on the sign. In such cases, Braille be included as well.

ADDITIONAL CONSIDERATIONS

- Facilities and services for persons with a specific disability be identified using nationally recognized symbols.
- A washroom, shower, elevator, or parking space designed to be barrier-free be identified by a sign consisting of the international symbol of accessibility for persons with physical disabilities and by appropriate graphic or written directions to indicate the type of facility available.
- Offer braille menus at food establishments.
- Provide QR codes for wayfinding in buildings.
- Integrate more beacon technology in public buildings.
- Signage not be an obstruction in pathways.

REFERENCES

- Alberta Government. Barrier-Free Design Guide. 2017. Available from:https://ebs.safetycodes.ab.ca/documents/webdocs/PI/Barrier-Free-Design-Guide_WEB-Aug2019.pdf
- Canadian National Institute for the Blind. Clearing Our Path. 2022. Available from:https://www.clearingourpath.ca/default_e.php
- City of Toronto. Toronto Accessibility Design Guidelines. 2021. Available from:https://www.toronto.ca/wp-content/uploads/2021/08/8ee5-Revised-TADG.pdf
- Government of Canada. Accessibility Standards Canada. Available from:https://accessible.canada.ca/
- Shabluk, M. An Overview of Accessible Signage Guidelines for Canadian Businesses. 2021.

Appendix E: Healthier Food and Beverage Guidelines for Public Events

Healthier Food and Beverage Guidelines for Public Events

Healthy food environments make healthy eating possible. Those providing food and beverages at public events can help by following these simple guidelines. A public event is any event open to the public where food and beverages are provided, including those for sale, catered, and provided for free.

CRITERIA TO MEET

All meals must contain vegetables or fruit

No sugary beverages

✖ **DON'T** serve pop, slushes, sports drinks, juice, energy drinks, and vitamin water.

✔ **DO** replace sugary beverages with water and/or sparkling water (can include unsweetened flavoured waters), low fat milk or unsweetened plant-based beverages, coffee or tea.

Note: Sugar substitutes and caffeine are not recommended for children and youth.

No deep-fried food items

✖ **DON'T** serve deep fried foods.

✔ **DO** serve foods that are baked, grilled, broiled, sautéed, and/or poached. Consider offering a vegetable or fruit side instead.

No candy or sugary foods

✖ **DON'T** serve candy, cookies, pre-packaged sweet snacks.

✔ **DO** consider fruit and nut bars that are higher in fibre and lower in sugar instead.

No high fat and salty snacks

✖ **DON'T** serve chips and crackers.

✔ **DO** consider unsalted nuts and popcorn instead.

ADDITIONAL GUIDELINES TO CONSIDER

- **For Full Meal Deals** – a vegetable or fruit side dish and an unsweetened beverage
- **Whole grains** instead of refined grains
- **Condiments and dressings** served on the side or in portion-controlled containers
- **Signage** promoting healthier options
- **More prominent display** of healthier options
- **Pricing** of healthier options match or beat less healthy options

Scan this QR code to access a copy of these guidelines.

For more information about marketing healthy food and beverages at events, visit How to Market Healthy Food & Drinks

For more information about selling healthy food options, take the FREE Healthy Eating in Recreation Settings eCourse

For more information about healthier food choices for meetings, visit Eat Smart, Meet Smart planning guide

For more information about improving health and wellbeing of communities in Alberta and across Canada, visit Housing for Health

Housing for health · University of Alberta · Alberta Health Services · choosewell

Appendix F: Other Resources

The Healthy Community Guidelines are informed by and/or complementary to other academic, international, national, provincial, and local documents. These include, but are not restricted to, the following:

Canadian Documents:

1. Alzheimer Society of British Columbia. Dementia Friendly Municipalities. Alzheimer Society of Canada. Available from:https://alzheimer.ca/bc/en/take-action/dementia-friendly-communities/dementia-friendly-municipalities

2. Armstrong-Pritty, Pepper Mackena. Indigenizing the Healthy Built and Social Environment: A public health case study of O-Pipon-Na-Piwin Cree Nation (OPCN). University of Manitoba Libraries; 2018. Available from:https://mspace.lib.umanitoba.ca/bitstream/handle/1993/33468/Armstrong-Pritty_Pepper-Mackena%20.pdf?sequence=3&isAllowed=y

3. British Columbia Centre for Disease Control. Healthy Built Environment Linkages Toolkit. BC Centre for Disease Control; 2018. Available from:http://www.bccdc.ca/health-professionals/professional-resources/healthy-built-environment-linkages-toolkit

4. British Columbia Healthy Communities. Social Environments Framework Summary. BC Centre for Disease Control; 2020. Available from:http://bchealthycommunities.ca/wp-content/uploads/2020/11/SE-Framework-Summary-V1-Dec2020.pdf

5. City of Edmonton. Access Design Guide. City of Edmonton; 2021. Available from:https://www.edmonton.ca/public-files/assets/document?path=PDF/AFE-AccessDesignGuide.pdf

6. City of Edmonton. Complete Streets Design Standards; 2021. Available from:https://www.edmonton.ca/sites/default/files/public-files/documents/PDF/CompleteStreets_DesignStandards_2021.pdf

7. City of Edmonton. Winter Design Guidelines. City of Edmonton; 2016. Available from:https://www.edmonton.ca/sites/default/files/public-files/assets/PDF/WinterCityDesignGuidelines_draft.pdf?cb=1687382682

8. City of Toronto. Toronto Accessibility Design Guidelines. City of Toronto; 2021. Available from:https://www.toronto.ca/city-government/planning-development/official-plan-guidelines/design-guidelines/toronto-accessibility-design-guidelines/

9. Communities Choosewell. Healthy Communities Framework. Communities Choosewell. Alberta Parks and Recreation Association. Available from:https://communitieschoosewell.ca/healthy-communities-framework/

10. DIALOG. Community Wellbeing Framework. Available from:https://dialogdesign.ca/community-wellbeing-framework/

11. First Nations Health Authority. Traditional Wellness Strategic Framework. First Nations Health Authority; 2014. Available from:https://www.fnha.ca/WellnessSite/Wellness-Documents/FNHA_TraditionalWellnessStrategicFramework.pdf

12. Government of Canada. Age-Friendly Communities Evaluation Guide: Using Indicators to Measure Progress. Government of Canada; 2015. Available from:https://www.canada.ca/en/public-health/services/health-promotion/aging-seniors/friendly-communities-evaluation-guide-using-indicators-measure-progress.html

13. Peel Region. Affordable Housing Active Design Guidelines and Standards. 2014. Available from:https://www.drkarenlee.com/resources/peel

14. Public Health Agency of Canada. The Chief Public Health Officer Reports on the State of Public Health in Canada 2017: Designing Healthy Living. 2017. Available from:https://www.canada.ca/en/public-health/services/publications/chief-public-health-officer-reports-state-public-health-canada/2017-designing-healthy-living.html

International Documents:

15. California Health in All Policies Task Force. Healthy Communities Framework. California Department of Public Health, the Strategic Growth Council, and the Public Health Institute; 2020. Available from:https://sgc.ca.gov/programs/healthandequity/docs/20200922-Healthy_Communities_Framework.pdf

16. City of New York. Active Design Guidelines: Promoting Physical Activity and Health in Design. City of New York; 2010. Available from:http://www.drkarenlee.com/resources/adg

17. City of New York. Active Design: Shaping the Sidewalk Experience. City of New York; 2013. Available from:https://www.nyc.gov/site/planning/plans/active-design-sidewalk/active-design-sidewalk.page

18. City of New York, Department of Transportation. Measuring the street: New Metrics for 21st Century Streets. City of New York. 2012. Available from:https://nacto.org/wp-content/uploads/2015/04/measuring_the_street_nyc_dot.pdf

19. Designed to Move. Active Cities: A Guide for City Leaders. 2015. Available from:http://www.drkarenlee.com/resources/who-citiesforhealth

20. International WELL Building Institute. WELL Community Certification. WELL. Available from:https://www.wellcertified.com/certification/community/

21. Johns Hopkins Center for Injury Research and Policy, NYC Department of Health and Mental Hygiene, Society for Public Health. Active Design Supplement: Promoting Safety. Version 2. 2013. Available from:http://www.drkarenlee.com/resources/safety

22. Nicoll G, Lee K, Dubose J. Active Design: Affordable Designs for Affordable Housing. City of New York; 2014. Available from:https://www.drkarenlee.com/resources/housing

23. University of Minnesota. "What is Community Wellbeing?" Taking Charge of Your Wellbeing. Available from:https://www.takingcharge.csh.umn.edu/what-community-wellbeing

24. U.S. Green Building Council. Leadership in Energy and Environmental Design (LEED) Location and TransportationCredits [Internet]. Available from:https://www.usgbc.org/credits?Category=%22Location+%26+transportation%22

25. U.S. Green Building Council. Leadership in Energy and Environmental Design (LEED) Innovation Credit: Design for Active Occupants [Internet]. Available from:https://www.usgbc.org/credits/new-construction-schools-new-construction-retail-new-construction-healthcare-commercial-in-3?return=/credits/new-construction/v2009/innovation-catalog

26. U.S. Green Building Council. Leadership in Energy and Environmental Design (LEED) Sustainable Site Credits [Internet]. Available from:https://www.usgbc.org/credits/?Version=v4.1&Rating+System=New+Construction&Category=%22Sustainable+sites%22

27. What Works Centre for Wellbeing. What is Community Wellbeing? 2017. Available from:https://whatworkswellbeing.org/resources/what-is-community-wellbeing-conceptual-review/#:~:text=Community%20wellbeing%20is%20the%20combination,flourish%20and%20fulfil%20their%20potential

28. World Health Organization. "Age-Friendly Cities Framework." Age-Friendly World. Available from:https://extranet.who.int/agefriendlyworld/age-friendly-cities-framework/#:~:text=The%20eight%20areas%20of%20urban,community%20support%20and%20health%20services

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Outdoor Public Stairs with Riser Mural
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Road Bridge with Multi-Use Trail for Pedestrians and Cyclists
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Open Street Event with Inflatable Climbing Wall
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