

**Role of the built environment on older adults' physical activity:  
An evidence review**

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## **Summary**

- Canada's population is aging and chronic diseases are expected to rise, meaning an increased burden on our health care system
- It has been shown that the onset and severity of chronic diseases can be mitigated with physical activity, and physical activity at any age can contribute to healthy aging
- Physical activity tend to decrease with age, so there is a need to encourage physical activity to promote healthy aging and reduce the impact of chronic diseases
- The built environment has been shown to affect physical activity levels in older adults
- Main factors of the built environment that promote physical activity in older adults are high walkability, close proximity to destinations, good access to local parks and recreational facilities, and the presence of comfort features
- Other important factors include access to public transportation, the presence and condition of sidewalks, traffic-related issues, and aesthetics
- The results of this evidence review have important implications for public health, policy development, and urban planning in creating age-friendly communities

## **Introduction**

Currently, Canada and many other developed countries are observing an aging population and this is expected to continue for the next several decades. Older adults, defined as individuals aged 65 years and over, are the fastest-growing age group in Canada. In 2013, there were 5.4 million older adults in Canada and this number is expected to increase to 13 million older adults by 2056 (1). As a result, we can expect that by 2056, about 1 in 4 Canadians to be 65 years of age or over. As the population ages, more cases of chronic disease are expected and this will

increase the burden on the health care system (1). Chronic diseases include cancer, heart disease, lung disease, and diabetes. It has been shown that the onset and severity of chronic diseases can be mitigated with physical activity, and physical activity at any age can contribute to healthy aging.

However, most seniors are physically inactive and physical activity levels tend to decrease with age. In 2008, 57% of older adults in Canada were considered inactive based on self-reported participation in recreational physical activity (2). Walking is the most common type of physical activity reported by older adults (3). There are a number of external barriers in the built environment, such as lack of transportation and recreational facilities, which can discourage physical activity in older adults.

Approximately 92% of older adults live in private households and the majority live in urban areas (2). Since an increasing number of older adults are choosing to live at home in their communities, there is an important need for age-friendly communities. The physical environment of a community can affect the physical activity levels and health of its residents. The built environment consists of physical settings that are built by humans, for humans. These are places where people live, work, and play. This may include parks and recreational areas, business areas, transportation systems, and workplaces (4).

As a result, it is important to create communities that promote physical activity in older adults to help them maintain and improve their health. This will promote healthy aging while relieving pressure on the health care system. This evidence review will investigate potential facilitators and deterrents in the built environment that affect physical activity in older adults, and consider implications for policy development, urban planning, and public health.

## **Methods**

A literature review was conducted in English, peer-reviewed journals for articles relating to factors of the built environment and their impact on walking or physical activity in older adults. All papers initially identified by the search terms were screened by article title and/or abstract for relevance. Nineteen articles were found to be relevant. Details concerning the search terms, databases, inclusion and exclusion criteria, and key findings of each article can be found in the appendix.

## **Results and Discussion**

Many factors in the built environment were found to affect physical activity in older adults. Physical activity may include recreational physical activity, walking for transportation, and walking for recreation. The most common factors found throughout the literature are the walkability index, local parks and recreational facilities, destinations, sidewalks, public transportation, comfort features, street crossings and traffic, and aesthetics. These factors will be discussed in further detail below.

### *Walkability index*

The walkability index is a measure of the proximity and access to destinations in a neighbourhood. It is calculated from four components: residential density (number of residential units per acre), commercial density (amount of area designated for commercial use), land use mix (degree of mixing of different land uses such as residential and commercial), and street connectivity (number of street intersections) (5). As well, street connectivity was often mentioned along with shorter block lengths. Most studies found a positive association between walkability and physical activity among older adults (6-13). Van Holle and colleagues (12) and

King and colleagues (8) found a positive association between neighbourhoods with higher walkability and walking for transportation. However, a review by Van Cauwenberg and colleagues (14) found mixed results for an association between walkability and total physical activity.

#### *Local parks and recreational facilities*

Some studies found that proximity and access to parks and recreational facilities were positively associated with physical activity in older adults (6,11,15,16). The presence of parks and recreational facilities promoted leisure-time physical activity as well as walking for recreation (15). A literature review conducted by Kerr and colleagues (16) found that availability of local parks most affected walking for recreation, whereas recreational facilities most promoted total physical activity in older adults. Li and colleagues (11) also found that green and open spaces for recreation were positively associated with walking, though this was at the neighbourhood-level, while proximity to recreational facilities affected walking at the individual level.

#### *Proximity to destinations*

Destinations refer to shops and services such as the bank, grocery store, post office, mall, library, gym, restaurants, community centres, and places of worship. Many studies found a positive association between the number and proximity of destinations and physical activity in older adults. Some studies looked at the density of destinations in a neighbourhood, and found a higher density of destinations was associated with increased walking for transportation (8,17). Other studies found a positive association between density of destinations and physical activity and walking, though no type of activity was specified (11,18,19). Proximity and access to

destinations was also positively associated with walking (16,20). Van Cauwenberg and colleagues (17) found that urban older adults were 32% more likely to walk for transportation daily when compared to suburban older adults. This may be due to the tendency for destinations to be in closer proximity in urban areas, though the researchers did not look at this specifically.

#### *Presence and condition of sidewalks*

Through speaking with stakeholders, Hanson and colleagues (7) found that having clear streets and sidewalks was perceived to be the most important factor to older adults' walking, as well as the most feasible factor to implement. Kerr and colleagues (16) found that the availability of sidewalks was associated with increased levels of walking and physical activity, while Van Cauwenberg and colleagues (20) found that well-maintained paths promoted walking for transportation. Uneven sidewalks and the absence of sidewalks were common concerns among older adults who participated in a study by Chaudhury and colleagues (21).

#### *Public transportation*

Van Cauwenberg and colleagues (17) found that older adults' satisfaction with public transportation was positively associated with walking for transportation. Higher density neighbourhoods reported better access to public transportation (21), which might suggest that higher density neighbourhoods can promote physical activity via access to public transportation.

#### *Comfort features*

Comfort features include benches, public toilets, handrails, ramps, and curb cuts. They may make it easier or more comfortable for older adults to move about outdoors. Leisure-time physical activity was positively associated with the presence of sitting facilities and public toilets

(15). On the other hand, benches and curb cuts were positively associated specifically with walking for transportation (14,22). Comfort features, such as benches, handrails, and marked changes in surfaces and heights, were among the most important factors to older adults and among the most feasible to implement (7).

#### *Traffic-related issues*

Busy, noisy, and speeding traffic was negatively associated with leisure-time physical activity (15) and walking for transportation (20). As well, higher density neighbourhoods reported more negative factors associated with traffic such as busy streets, high traffic volume, and unsafe intersections (21).

#### *Aesthetics*

Aesthetically appealing paths and destinations was also important factors for physical activity in older adults. They promote both walking for recreation (16) and walking for transportation (14,20). Interestingly, Van Cauwenberg and colleagues (14) found the separation between the sidewalk and traffic, and the evenness of sidewalks to be significant for physical activity, although it appeared that the presence of vegetation and benches was more important to older adults.

#### *Other findings of interest*

Nagel and colleagues (23) found no association between the built environment and the odds of walking. However, they found that a higher number of commercial establishments and high-volume streets were positively associated with total walking time in older adults who already walk. This somewhat contradicts other findings that busy streets were a deterrent for

walking (15,20,21), although it is logical that commercial establishments might be located on busier streets.

### *Strengths and limitations of the literature review*

The review was not limited to any specific type of study, so observational studies, literature reviews, and other study types were included. However, most of the studies were cross-sectional studies, from which can be difficult to infer causality from observed associations. Also, geographical scale was measured differently among studies. For instance, some studies asked older adults questions about their neighbourhood, without any specifications, whereas others looked only at factors within a certain distance from the older adult's place of residence. This variation in geographical scale can make it hard to compare findings.

### *Gaps in research, policy, and knowledge*

There were few Canadian studies investigating the association between the built environment and physical activity in older adults. Although infrastructure in other developed countries are similar to that in Canada, Canada faces some unique issues that need further investigation. For example, Canada tends to have long winter seasons which can severely impact older adults' decision to walk outside due to issues such as ice, snow, and uncleared paths. As well, no studies could be found that looked at older immigrants and how they might uniquely be affected by the built environment, such as a desire for cultural or religious facilities nearby.

Older adults were often lumped into one category, instead of being subdividing into different age categories. Van Cauwenberg and colleagues (24) suggested that age could be a moderator variable in the relationship between built environment and physical activity. This is



important since 'younger' older adults may have different needs and preferences for their built environment compared to 'older' older adults.

Although many studies investigated land use mix and its effect on physical activity, it may be valuable to look into how planning policies and zoning practices might directly affect neighbourhood walkability. Also, Michael and colleagues (19) found that there was little to no agreement between perceived and objective characteristics of the environment. More investigation is needed, since it could affect the comparability of studies and urban planning.

## **Conclusion**

The built environment has an important role in facilitating physical activity among older adults. The evidence review showed that the main factors promoting physical activity in older adults were high walkability, close proximity to destinations, good access to local parks and recreational facilities, and the presence of comfort features. It is also important to consider access to public transportation, the presence and condition of sidewalks, traffic-related issues, and aesthetics when designing and upgrading neighbourhoods to become age-friendly places.

For policy development and urban planning, consideration of an aging population is a must. More mixed land use should be considered to allow shops and services to be closer to areas where older adults live. To update existing neighbourhoods, sidewalks should be well-maintained to prevent tripping hazards and street crossings can be improved to allow adequate time for older adults to cross. As well, installing more benches, ramps, and public toilets will encourage older adults to be physically active.

Although this review concentrated on the physical aspects of the built environment, it would be worth looking into the social aspects as well. A few studies have shown that the social

environment may play a significant role along with the physical environment (7,13,20,22). It may be important to consider places for social interaction when building new neighbourhoods, though more research is needed in this area.

About a quarter of Canadians are expected to be aged 65 years and over in 2056 and most of them will live in urban areas. The built environment can be created or modified to promote physical activity in older adults. Therefore, it is an extremely important issue affecting public health, policy development, and urban planning. Age-friendly communities require careful thought and planning in order to encourage physical activity and healthy aging in Canadians for the years ahead.

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## **Appendix**

### *Literature search details*

The literature search employed the following electronic databases/indices:

- ScienceDirect; <http://www.sciencedirect.com/>
- Primo (University of Guelph); <http://primo.tug-libraries.on.ca.subzero.lib.uoguelph.ca/>
- Google Scholar; <https://scholar.google.ca/>

### *Search terms and date ranges*

Text word searches of article titles listed in the databases/indices above were conducted by using search terms related to the built environment and its effects on the physical activity of seniors. The following search terms were used in various combinations: built environment, physical activity, exercise, seniors, older adults, elderly.

The literature search was restricted to articles published from 2005-2015.

### *Inclusion/exclusion criteria*

The literature search was restricted to articles written in English. The articles were not restricted to any particular countries, though only articles that had been conducted in developed countries were selected since the infrastructure would be comparable. As well, articles that looked only at rural areas were excluded from the study. The article must be focused on older adults who are at least 65 years of age, or had included a group of participants aged 65 and over. Articles were excluded if the participants had mobility issues or could not walk unassisted.

*Article summaries*

<b>Reference, Type of Study</b>	<b>Type of Study, Location, Participant details</b>	<b>Comments/ Key Findings</b>
Hanibuchi et al. (6), cross-sectional study	8 municipalities in Japan, including urban, suburban, and rural areas; 9414 older adults aged 65 years and over	<ul style="list-style-type: none"> <li>• Researchers investigated residential density, street connectivity, number of local destinations, and access to recreational spaces on the physical activity of Japanese older adults</li> <li>• Number of local destinations used as a measure for the land use mix; destinations included the bank, bookstore, café, clothing store, community centre, convenience store, dentist, electrical appliance shop, fast-food store, hairdressing salon, hospital, laundry, library, municipal office, pharmacy, post office, and supermarket</li> <li>• Found that the number of destinations, when categorized into quartiles, showed positive association with frequency of sports activities</li> <li>• Researchers conclude that population density and the presence of parks or green spaces were positively associated with increased sports activity, which was more pronounced in male older adults</li> <li>• Researchers found that total walking time was not affected by population density or presence of parks and green spaces</li> </ul>
Hanson et al. (7), mixed methods study included concept mapping	Received input on important factors according to 75 stakeholders (individuals and organizations with relevant interest or expertise); British Columbia, Canada	<ul style="list-style-type: none"> <li>• Researchers used concept mapping as a way to determine the importance and feasibility of various factors of the built environment that are perceived to be important to older adults' outdoor walking</li> <li>• Most important and feasible factors included clear streets and sidewalks, well-lit streets and parks, access to public transportation, places to socialize with others (community centres, fitness centres), presence of benches and sidewalks, good quality sidewalks, crosswalks with good visible and audible signals; timing of pedestrian traffic lights, clearly marked changes in surfaces and heights, presence of handrails, walking routes to destinations and aesthetically pleasing locations, availability and safety of walking paths away from main roads</li> <li>• Researchers conclude that walkable neighbourhoods with destinations in close</li> </ul>

		proximity may promote more active lifestyle in older adults
King et al. (8), observational study	Seattle-King County, Washington and Baltimore, Maryland-Washington DC regions; 719 adults aged 66 years and over	<ul style="list-style-type: none"> <li>• Researchers investigated the walkability of a neighbourhood and its effect on transport activity and moderate to vigorous physical activity levels</li> <li>• Walkability involves mixed land use and a connected street network that supports walking to destinations; Walkability index based on 4 components: net residential density, retail floor area ratio (building square footage divided by land square footage), land-use mix, and intersection density</li> <li>• Walkability index predicts destination-based forms of walking</li> <li>• Older adults in more walkable neighbourhoods reported 22-40 more minutes/week (400% more) of transport activity than older adults in less walkable neighbourhoods</li> <li>• Older adults in more walkable neighbourhoods performed about 17 more minutes/week (33% more) of moderate and vigorous physical activity than those in less walkable neighbourhoods</li> </ul>
Frank et al. (9), cross-sectional study	Atlanta, USA; 1970 older adults aged 65 years and over	<ul style="list-style-type: none"> <li>• Researchers investigated the relationships between neighbourhood design, walking, and physical activity</li> <li>• Walkability index (residential density, street connectivity, retail density, land-use mix) used to determine walkability</li> <li>• Only older adults living in the highest tertile of neighbourhood walkability were significantly more likely to walk, compared to those in less walkable neighbourhoods</li> <li>• Researchers suggested policies should allow shops and services to be closer to areas of senior residency and higher density of senior housing within a kilometer from retail stores</li> </ul>
Berke et al. (10), cross-sectional study	King County, Washington, USA; 936 older adults aged 65 to 97 years	<ul style="list-style-type: none"> <li>• Researchers investigated if older adults living in more walkable neighbourhoods are more active than those living in less walkable neighbourhoods</li> <li>• Researchers found that higher walkability scores were significantly associated with walking for exercise in older men and women</li> </ul>
Li et al. (11), cross-sectional study	Portland, Oregon, USA; 577 older adults aged 65	<ul style="list-style-type: none"> <li>• Researchers investigated factors of the built environment on walking activity at the neighbourhood and individual level</li> <li>• Neighbourhoods with high density of places of employment, high household density,</li> </ul>



	years and over	<p>more street intersections, and green and open spaces for recreation were associated with more frequent walking activity</p> <ul style="list-style-type: none"> <li>• At the individual level, proximity to recreational facilities was positively associated with walking</li> </ul>
Van Holle et al. (12), cross-sectional study	Ghent, Belgium; 438 older adults aged 65 years and over	<ul style="list-style-type: none"> <li>• Researchers investigated the associations between walkability and objective (measured with accelerometer) and self-reported physical activity in older adults</li> <li>• Walkability index calculated using data on residential density, street connectivity, and land-use mix diversity</li> <li>• Researchers found a positive association between neighbourhood walkability and self-reported weekly minutes of walking for transportation</li> <li>• Showed negative relationship between walkability and objectively-measured physical activity; Researchers suggested that older adults living in low walkable neighbourhoods may stay indoors more often and do more lower-intensity (in both duration and physically challenging sense) activities such as chores than those living in high walkable neighbourhoods</li> <li>• Walkability was not associated with recreational physical activity</li> </ul>
Carlson et al. (13), observational study	Baltimore, Maryland-Washington, DC and Seattle-King County, Washington in the USA; 718 older adults aged 65 years and over	<ul style="list-style-type: none"> <li>• Researchers investigated the effects of psychosocial measures, objective environment measures, and perceived environment measures on older adults' physical activity level measured as average minutes per week of moderate to vigorous physical activity (MVPA)</li> <li>• Psychosocial measures included self-efficacy for physical activity, barriers, and social support</li> <li>• Objective environment measures included walkability (residential density, retail floor area ratio, intersection density, land use mix), and number of local parks and private recreation facilities</li> <li>• Perceived environment measures included neighbourhood aesthetics and presence of walking/cycling facilities</li> <li>• Concluded that physical activity minutes were greater when both psychosocial and environmental factors supported physical activity for older adults</li> </ul>

		<ul style="list-style-type: none"> <li>• Concluded that walkability, social support, and self-efficacy were most related to physical activity</li> </ul>
Van Cauwenberg et al. (14), cross-sectional study	Urban and suburban areas in Belgium; 60 older adults aged 65 and over	<ul style="list-style-type: none"> <li>• Researchers investigated the association between physical environmental factors and the invitingness to walk for transportation through asking older adults to evaluate photographs through a forced-choice task and a rating task on preference</li> <li>• Researchers concluded that comfort (through benches) and pleasantness (through vegetation) was positively associated with invitingness to walk for transportation</li> <li>• Separate analyses for evenness of sidewalks and separation between sidewalk and traffic were significant, but these were no longer significant after adjusting for other factors, suggesting they are not as important as the presence of vegetation and benches</li> </ul>
Cerin et al. (15), cross-sectional study	Hong Kong; 484 older adults aged 65 years and over	<ul style="list-style-type: none"> <li>• Researchers investigated factors of the built environment on older adults' ability to engage in leisure-time physical activity (LTPA) in an ultra-dense city</li> <li>• Found that level of recreational walking in Hong Kong older adults was much higher than walking levels found in Western studies, possibly due to low crime levels, high accessibility to facilities, pedestrian infrastructure, and cultural views on benefits of physical activity</li> <li>• Concluded that factors facilitating LTPA included parks, neighbourhood aesthetics, sitting facilities and public toilets, and indoor/covered walking areas</li> <li>• Concluded that factors negatively affecting LTPA included signs of crime and perceptible pollution (noisy streets, exhaust fumes, unpleasant odours)</li> </ul>
Kerr et al. (16), literature review	Review included studies published up to end of 2010, that included older adults	<ul style="list-style-type: none"> <li>• Researchers conducted a review to describe the relationship between the built environment, walking, and health in older adults</li> <li>• Three different types of physical activity: transportation walking, recreation walking, total physical activity</li> <li>• For transportation walking, accessibility to destinations is important</li> <li>• For recreation walking, safety, aesthetics, and parks are important</li> <li>• For total physical activity, recreation facilities are most important</li> </ul>

		<ul style="list-style-type: none"> <li>• Walking in the neighbourhood is the most common type of physical activity for older adults</li> <li>• Availability of sidewalks, pleasant scenery, and footpaths are strongly correlated with increased rates of walking and physical activity</li> <li>• Researchers suggest improved street connectivity and access to destinations, improved street crossings (louder signals, sufficient time to cross), traffic calming (narrower roads, lower speed limits), sidewalks in good condition and with curb cuts or curb extensions, more resting places, handrails on steep slopes</li> </ul>
Van Cauwenberg et al. (17), cross-sectional study	135 municipalities in Belgium; 48 879 older adults aged 65 years and over	<ul style="list-style-type: none"> <li>• Used peer research to investigate relationship between urban, semi-urban, and rural areas of residence and walking and cycling for transportation and recreation</li> <li>• Urban older adults were 32% and 43% more likely to walk for transportation daily compared to semi-urban and rural older adults, respectively; Researchers suggested this may be due to closer proximity of shops and services in urban areas</li> <li>• More neighbourhood shops was positively associated with more walking for transportation in urban, semi-urban, and rural older adults, expect for rural older adults aged 75 years and over</li> <li>• Satisfaction with public transport positively related to walking for transportation</li> </ul>
Gauvin et al. (18), observational study	Montreal, Laval, and Sherbrooke in Quebec, Canada; 521 older adults aged 67 years and over	<ul style="list-style-type: none"> <li>• Researchers investigated whether the proximity of local services and amenities was associated with more frequent walking in older adults living in urban areas, over a 3-year period</li> <li>• Services and amenities that facilitated walking among older adults included banks, libraries, bookstores, theatres/movie theatres, places of worship, cultural community centres for older adults, physical activity places with and without instruction, pharmacies, grocery chains, shopping centres, corner stores, specialty food stores, cafes/bistros, restaurants, fast-food restaurants, and parks</li> <li>• Older adults were separated into quartiles based on proximity to these services and amenities, with 1<sup>st</sup> quartile being the closest and 4<sup>th</sup> quartile being the furthest</li> <li>• Older adults in the 1<sup>st</sup> and 2<sup>nd</sup> quartiles were more likely to walk often compared to</li> </ul>

		<p>older adults in the other quartiles</p> <ul style="list-style-type: none"> <li>• Researchers conclude that higher density of services and amenities leads to higher levels of walking in local residents</li> </ul>
Michael et al. (19), randomized walking intervention	Portland, Oregon, USA; 582 older adults aged 65 years and over	<ul style="list-style-type: none"> <li>• Researchers investigated the degree of agreement between perceived and objective characteristics of the environment, and the relation of each type of measurement to walking in older adults</li> <li>• Researchers concluded that perceived and objective measurements of the environment showed low degree of agreement, except for the presence of a mall which was positively associated with neighbourhood walking in both measurements</li> </ul>
Van Cauwenberg et al. (20), walk-along interviews	Ghent, Antwerp, and Halle in Belgium; 57 older adults aged 65 years and over	<ul style="list-style-type: none"> <li>• Researchers performed a qualitative study to determine perceived environmental influences on walking for transportation</li> <li>• Found that good access to shops and services, well-maintained walking facilities, aesthetically appealing places, streets with little traffic, and places for social interaction promoted walking for transportation</li> <li>• Busy and speeding traffic negatively affected older adults' walking for transportation</li> </ul>
Chaudhury et al. (21), cross-sectional study	Metro Vancouver, British Columbia, Canada and Metro Portland, Oregon, USA; 66 older adults aged 65 years and over	<ul style="list-style-type: none"> <li>• Researchers compared differences in the built environment between high density and low density neighbourhoods, and their impact on the physical activity of older adults</li> <li>• Important amenities to have close to home included the bank, grocery store, post office, mall, library, gym or recreation centre</li> <li>• Safety and security, accessibility, and comfort of movement were important factors related to physical activity</li> <li>• Paved, flat, wide walking surfaces with good lighting and accessible seating facilitated walking; Absence of sidewalks and tripping hazards such as uneven sidewalks were common barriers to walking</li> <li>• Higher density neighbourhoods reported more negative factors such as traffic concerns (busy streets, high traffic volume and speed, unsafe intersections and crosswalks, dangerous drivers)</li> <li>• Higher density neighbourhoods reported better access to public transportation</li> </ul>

		<ul style="list-style-type: none"> <li>• Comfort of movement was facilitated by availability of seating, railings, handrails, ramps, safe stairs, and water fountains</li> <li>• In both high and low density neighbourhoods, barriers and facilitators of the physical environment and access to community centres were important</li> </ul>
King (22), cross-sectional study	Denver, Colorado, USA; 190 older adults aged 65 years and over	<ul style="list-style-type: none"> <li>• Researchers investigated if the built environment and older adults' perceptions of neighbourhood walkability were associated with self-reported physical activity</li> <li>• Presence of curb cuts and crosswalks and more retail destinations were significantly associated with higher frequency of walking for errands</li> <li>• Neighbourhoods with fewer walkability variables had highest physical activity levels and also higher perceptions of safety and social cohesion, suggesting social environment may play a bigger role in promoting physical activity than the built environment itself</li> </ul>
Nagel et al. (23), cross-sectional study	Portland, Oregon, USA; 546 older adults aged 65 years and over	<ul style="list-style-type: none"> <li>• Researchers investigated the association between objectively measured characteristics of the neighbourhood (automobile traffic volume, sidewalk coverage, intersection frequency, public transportation access, number and type of retail stores and other establishments) and walking activity of older adults</li> <li>• Researchers concluded that there was no association between the built environment and the odds of walking or not walking</li> <li>• However, in older adults who already walk, a higher number of commercial establishments and a higher percentage of high-volume streets were significantly associated with increased total walking time</li> </ul>
Van Cauwenberg et al. (24), systematic review	31 articles published in English between January 2000 and March 2010, focused on older adults aged 65	<ul style="list-style-type: none"> <li>• Articles were required to meet the following criteria: investigation of the relationship between any objective or perceived characteristic of the physical environmental and total physical activity, recreational physical activity, total walking and cycling, recreational walking or transportation walking</li> <li>• Found mixed results for association between walkability and total physical activity; 2 studies found non-significant association and one study found older adults living in a residential neighbourhood were more physically active than older adults living in a</li> </ul>

	years and over	<p>commercial or mixed neighbourhood</p> <ul style="list-style-type: none"> <li>• Found mixed results for association between access to services and total physical activity</li> <li>• Researchers suggest age might be a moderator in the association between physical environmental and physical activity; Found less positive association for older adults aged 76 years and over compared to older adults aged 66-75 years, suggests specific physical features such as ramps, sufficient crossing times and presence of specific recreational facilities such as swimming pools and tennis courts are more relevant for older adults aged 76 years and over</li> <li>• Researchers discussed a lack of prospective studies, need for standardization of geographical scale, lack of information on possible moderators, and inconsistent non-significant and positive associations for environmental factors and physical activity, but noted this may reflect different methodologies rather than a lack of a significant association</li> </ul>
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