

“Walkable Communities” Literature Review: What Do We Know?



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Demographics on Transportation Use:

- ❖ 6.6% of Canadians walk to work while 1.2% bicycle.¹
- ❖ There is a high degree of willingness among Canadians to walk or ride a bike instead of driving, with 82% willing to walk more and 66% willing to cycle more given safe and convenient facilities. The high levels of active transportation use in Sweden indicate that Canadian weather is not a barrier to achieving high levels of active transportation use.²
- ❖ Over 1/4th of trips in Canadian cities is less than 2 miles long – a distance easily covered by bike.³
- ❖ 85% of Canadians walk for leisure, while 58% walk “at least sometimes” to a routine destination with an average distance of 3.2 km.
- ❖ Low-income households walk twice as much as more affluent households.
- ❖ Average bicycle commuter in Canada and the U.S. is a 39-year old male professional with a household income of \$45,000 per year who rides 10.6 months per year. Nearly one in five are females.⁴
- ❖ The average Canadian commuter spends 48 minutes on a typical weekday going to and from work. 23% spend more than 60 minutes and 10% spend more than 90 minutes.
- ❖ In Ontario, 48% of seniors have no car. Older pedestrians on average walk .9 metres per second compared to 1.2 metres per second for the 25-64 year old age group. Traffic lights are programmed for the average walker and not the elderly or disabled to cross.
- ❖ A threshold of 7,000 to 8,000 persons per square mile is required to make transit, walking and cycling an effective and attractive alternative to the automobile.⁵
- ❖ 90% of all automobile trips are by single occupancy vehicles.

Health Benefits of Walkable Communities:

- ❖ An analysis of studies in 6 communities found that on average, residents in highly-walkable neighbourhoods took twice as many walking trips as people in less walkable neighbourhoods. Most of the increase was due to walking for errands or to go to work.⁶

¹ Campbell, R., Margaret Wittgens, The Business Case For Active Transportation: The Economic Benefits of Walking and Cycling, Go For Green, March 2004.

² Ibid., 2004.

³ Pucher, John, and Ralph Buehler, Cycling Trends and Policies in Canadian Cities, World Transport Policy and Practice, March 2005.

⁴ Active Community Environments Initiative, How Land Use & Transportation Systems Impact Public Health: An Annotated Bibliography, Working Paper #2, 2000.

⁵ Go For Green, Linkages: Built Environment, Well-Being And Active Living, prepared for Active Living and the Environment Program, Fitness Canada, 1994.

⁶ Saelens, B.E., Sallis, J.F., & Frank, L.D., Environmental Correlates of Walking and Cycling: Findings From the Transportation, Urban Design and Planning Literatures, Annals of Behavioural Medicine, 2003.

- ❖ Those able to walk to a place in less than 10 minutes are most likely to be active.⁷
- ❖ Living within walking distance is defined as a 20-minute walk from home to a park, biking or walking trail or department, discount or hardware store. This study found that neighbourhood surroundings for walking **are** associated with increased physical activity in older women.⁸
- ❖ People who live in neighbourhoods with a mix of shops and businesses within easy walking distance have a 35% lower risk of obesity.⁹
- ❖ Land-use mix has the strongest association with obesity.
- ❖ The Center for Disease Control has determined that creating and improving places to be active can result in a 25% increase in the percentage of people who exercise at least 3 times a week.¹⁰
- ❖ Each additional hour spent in a car per day is associated with a 6% increase in the likelihood of obesity. Conversely, each additional kilometre walked per day was associated with a 4.8% reduction in the likelihood of obesity.¹¹
- ❖ A “Safe Routes to School Program” in California, that included both safety improvements and encouragement, increased the number of children walking to school by 64% in 2 years and increased bicycling by 114%.¹²
- ❖ More children walk to school where there are sidewalks.¹³
- ❖ ‘Grid’ street networks can increase biking and walking by reducing trip distances, offering alternative pathways and slowing automobile traffic.¹⁴
- ❖ Research on walking suggests that simply adding sidewalks in these areas will not create walkable communities. The LUTRAQ Project (Making the Land Use Transportation Air Quality Connection) established a correlation between pedestrian modal share and four Pedestrian Environmental Factors (PEF’s): ease of street crossings, sidewalk continuity, street connectivity, and topography.¹⁵
- ❖ Perception of availability of places to walk is related to better self-rated health. The most important places to walk are (in order) work, community centre, park and daycare. Respondents who reported one or no places to walk were significantly less healthy than person who said they had five or more places to walk.¹⁶

⁷ Powell et al., *Places to Walk: Convenience and Regular Physical Activity*, American Journal of Public Health, September 2003.

⁸ King, W.C., et al., *The Relationship Between Convenience of Destinations and Walking Levels in Older Women*, American Journal of Health Promotion, September-October 2003.

⁹ Frank, L.D., Andresen, M.A., & Schmid, T.L., *Obesity Relationships With Community Design, Physical Activity, and Time Spent in Cars*, American Journal of Preventive Medicine, 2004.

¹⁰ Center For Disease Control, “*Creating or Improving Access to Places for Physical Activity is Strongly Recommended to Increase Physical Activity*”, Guide to Community Preventive Services, 2004.

¹¹ Ibid.

¹² Staunton, C.E., Hubsmith, D., & Kallins, W., “*Promotion Safe Walking and Biking to School: The Marin County Success Story*”, American Journal of Public Health, 2003.

¹³ Ewing, R., Schroeder, W., & Greene, W., “*School Location and Student Travel: Analysis of Factors Affecting Mode Choice*”, Transportation Research Record, 2004.

¹⁴ Frank, L.D., & Engelke, P.O., “*The Built Environment and Human Activity Patterns: Exploring the Impacts of Urban Form on Public Health*”, Journal of Planning Literature, 2001.

¹⁵ City of Portland, Portland Pedestrian Master Plan, City of Portland Office Of Transportation, Engineering and Development Pedestrian Transportation Program, June 1998.

¹⁶ Rohrer, J., Pierce JR Jr., Denison A., “*Walkability and Self-Rated Health in Primary Care Patients*,” BMC Family Practice, December 2004.

- ❖ Residents of sprawling counties are likely to walk less during leisure time, weigh more, and have greater prevalence of hypertension than residents of compact counties.¹⁷
- ❖ Residents of high-walkability neighbourhoods report higher residential density, land use mix, street connectivity, aesthetics and safety. They had more than 70 minutes of physical activity and had lower obesity prevalence than did residents of low-walkability neighbourhoods.^{18 19 20 21}

Injuries:

- ❖ The use of traffic calming & separation design techniques combined with public education and law enforcement makes roads safer for pedestrians.
- ❖ Low-income is the single most important predictor of all paediatric injuries (MVA, pedestrian injuries)...pedestrian & bicycle injuries 4 to 9 times greater in low-income areas vs. more affluent neighbourhoods.
- ❖ The research suggests that the risk of collision per pedestrian dropped with a rise in the numbers of people bicycling or walking...when drivers see more pedestrians out and about, they drive more slowly and attentively.²²
- ❖ Traffic speed is a key determinant of pedestrian injury risk for children and that speed humps, used to lower traffic speeds in residential areas, are associated with lower odds of children being injured within neighbourhoods and being struck by cars in front of their homes.²³
- ❖ Preliminary research is showing that children living in suburban neighbourhoods and on cul-de-sacs are more active outdoors. These results suggest the possibility that suburban neighbourhoods are more effective in promoting physical activity in children than traditional neighbourhoods and that cul-de-sacs are more effective than through streets. This seems to be have the opposite for parents.²⁴
- ❖ Traffic Calming of Residential Neighbourhoods includes²⁵:
 - Laws (limit 30 km per hour)

¹⁷ Ewing, R., Schmid T., Killingsworth R., Zlot A., Raudenbush S., "Relationship Between Urban Sprawl and Physical Activity, Obesity and Morbidity," American Journal of Health Promotion, Sept – Oct. 2003.

¹⁸ Saelens, B.E., Sallis, J.F., Black, J.B., Chen D., "Neighbourhood-Based Differences in Physical Activity: An Environment Scale Evaluation," American Journal of Public Health, September 2003.

¹⁹ Saelens, B.E., Sallis, J.F., Frank, L.D., "Environmental Correlates of Walking and Cycling: Findings From the Transportation, Urban Design, and Planning Literatures," Annals of Behavioural Medicine, Spring 2003.

²⁰ Frank, L.D., Sallis, J.F., Chapman, J., Saelens, B.E., "Linking Objectively Measured Physical Activity with Objectively Measured Urban Form: Findings from SMARTRAQ," American Journal of Preventive Medicine, February 2005.

²¹ Handy, Susan, *Community Design and Physical Activity: What Do We Know?—And What DON'T we Know?*, University of California Davis, May 2004.

²² Traffic Safety Centre, *Can Pedestrian-Friendly Planning Encourage Us to Walk?* Online Newsletter, Volume 2, Number 1, Spring 2004.

²³ Handy, Susan, *Community Design and Physical Activity: What Do We Know?—And What Don't We Know?*, University of California Davis, May 2004.

²⁴ Ibid., p. 5.

²⁵ Pucher, J. et al., *Promoting Safe Walking & Cycling to Improve Public Health: Lessons From The Netherlands and Germany*, American Journal of Public Health, September 2003.

- Physical barriers such as raised intersections & crosswalks, traffic circles, road narrowing, zigzag routes, curves, speed humps & artificial dead ends created by mid-block street closures
- Traffic calming gives pedestrians, bicyclists & playing children as much right to use residential streets as motor vehicles
- In Germany & the Netherlands traffic calming is area-wide & not for isolated streets – this ensures faster traffic gets displaced to arterial routes designed to handle it & not simply shifted from one local road to another.
- Risk of pedestrian death in crashes rises from 5% at 20 mph to 45% at 30 mph and 85% at 40 mph²⁶
- A comprehensive review of traffic calming impacts of Denmark, Great Britain, Germany & the Netherlands found that traffic injuries fell by an average of 53% in traffic-calmed neighbourhoods. In short, traffic calming greatly reduces the danger of traffic deaths & injuries in residential neighbourhoods.

Changes in Urban Design (Definitions & Keys to Success):

- ❖ Land Use – Density and mix/diversity are positively correlated with walking
- ❖ Accessibility – The distance from destinations or facilities – Significantly correlated with physical activity
- ❖ Design – The design features and aesthetic characteristics of neighbourhoods has a limited correlation with physical activity due to the small number of studies
- ❖ Transportation Infrastructure – A significant correlate of both walking and non-motorized travel; other correlated measures include: proportion of streets with sidewalks and the percentage of road network having a grid pattern; additional evidence suggests that the condition of sidewalks is important to physical activity.
- ❖ Sprawl is defined by a series of characteristics: low densities; separation of land uses; leapfrog development; strip retail development; automobile-dependent development; development at the periphery of an urban area at the expense of its core; employment decentralization; loss of peri-urban, rural agriculture, and open space; and fragmented governmental responsibility and oversight.²⁷
- ❖ Making transportation safer, quicker, more comfortable and more attractive (e.g., bridges, cycle paths, under paths, more direct routes to town centres) increase cycling while decreasing accident rates.
- ❖ Residential developments almost always include cultural centres, shopping & service establishments that can easily be reached by foot or bike
- ❖ Both residential & commercial developments have sidewalks & bicycle paths to serve non-motorists
- ❖ Parking lots almost never surround buildings – they are built next to or behind buildings, thus permitting easy access to pedestrians & bicyclists
- ❖ When an obstacle must be traversed (e.g., river, railroad, highway) they provide safe & attractive pedestrian & bicyclist crossings.

²⁶ Pucher, J., et al., *Promoting Safe Walking & Cycling to Improve Public Health: Lessons from the Netherlands and Germany*, American Journal of Public Health, September 2003.

²⁷ Bray, Riina, Vakil, Catherine, Elliott, David, Report on Public Health and Urban Sprawl in Ontario: A Review of the Pertinent Literature, Environmental Health Committee, Ontario College of Family Physicians, January 2005.

Building Walkable Communities Improves A Community By:

1. Affordable modes of transport
2. Cyclists and walkers on the street discourage crime
3. Exposing residents to the street enhances awareness of the environment
4. Improving access to employment, education & social services
5. Improving productivity, lower absenteeism
6. Increase the physical activity levels of residents
7. Promoting community cohesion and a heightened sense of neighbourhood
8. Reducing health care costs
9. Reducing infrastructure costs (adding bicycle lanes costs about \$50,000 per kilometre, adding car lanes costs \$1 million per kilometre or more).
10. Reducing road congestion, and improve safety by calming auto traffic
11. Replacing short distance auto trips that damage the environment
12. Social, spiritual and cultural benefits

Evaluation Information:

Benchmarks With Indicators²⁸
BENCHMARK 1: Municipal Long-Range Plan The municipality has a long-range bicycle and pedestrian plan.
Indicators
<ul style="list-style-type: none">• The minimum requirement for having a plan as a document entitled bicycle plan, bicycle and pedestrian plan, or similar; a chapter or section on bicycling and walking in the Official Plan.• The Official Plan or bicycle/pedestrian plan has specified measurable objectives which to evaluate whether or not is meeting the goals of the plan.
BENCHMARK 2: Accommodates Bicycles The Ministry of Transportation routinely includes accommodations for bicycles in all highway projects.
Indicators
<ul style="list-style-type: none">• The plan routinely includes bicycle accommodations in all projects, unless there are exceptional circumstances present.• The plan conforms to USDOT/FHWA Design Guidance Language (Is there a Canadian/provincial equivalent?)

²⁸ Bill Wilkinson and Bob Chauncey, "Are We There Yet?: Assessing the Performance of State Departments of Transportation on Accommodating Bicycles and Pedestrians," The Benchmarking Project, February 2003.

Benchmarks With Indicators²⁸

BENCHMARK 3: Accommodates Pedestrians

The Ministry of Transportation includes sidewalks in all highway projects in urban areas.

Indicators

- Sidewalks are included in all new provincial highway projects in urban areas (except where pedestrians are prohibited).
- Sidewalks are included in most provincial highway reconstruction projects in urban areas.
- Sidewalks are generally included in provincial highway projects in urban areas.

BENCHMARK 4: Special Programs

This topic does not lend itself to an objectives measure of performance other than whether there are any special programs under way.

Indicators

- The municipality has some form of an Active And Safe Routes to School Program.
- The municipality is directly involved in the funding, planning and/or execution of the Active And Safe Routes to School Program.
- Other Initiatives Include: training engineers, designers and planners on bicycle and pedestrian issues; creating safety brochures; improving agency plans, policies and procedures; building trails; improving links to transit; creating province-wide bike routes; creating maps; and the like.

Bibliography

ACES: Active Community Environments Initiative, "**How Land Use & Transportation Systems Impact Public Health: An Annotated Bibliography**", Working Paper #2.

Beldon Russonello & Stewart: Research and Communications, **2004 American Community Survey: National Survey on Communities**, Conducted for Smart Growth America and National Association of Realtors, October 2004.

Bray, Riina, et al., **Report on Public Health and Urban Sprawl in Ontario: A Review of the Pertinent Literature**, Environmental Health Committee, Ontario College of Family Physicians, January 2005.

Brownson, R.C., et al., "*Environmental & Policy Determinants of Physical Activity in the United States*," **American Journal of Public Health**, December 2001.

Centre for Disease Control & Prevention, "*Creating or Improving Access to Places for Physical Activity is Strongly Recommended to Increase Physical Activity*," **Guide to Community Preventive Services**, www.thecommunityguide.org/pa/default.htm .

Cervero R., et al., "*Reviewing the Evidence. Walking, bicycling and urban landscapes: evidence from the San Francisco Bay area*," **American Journal of Public Health**, September 2003.

City of Calgary, **Ideas For Planning Greenways & Trails for Healthy Lifestyles – City of Calgary**, May 2002.

City of Portland, "*Portland: Pedestrian Master Plan*," **Office of Transportation, Engineering and Development, Pedestrian Transportation Program**, June 1998.

Craig, C.L., et al., "*Exploring the Effect of the Environment on Physical Activity: A Study Examining Walking to Work*," **American Journal of Preventive Medicine**, August 2002.

Ewing, R., et al., "*Relationship Between Urban Sprawl and Physical Activity, Obesity and Morbidity*," **American Journal of Health Promotion**, 2003.

Ewing, R., et al., "*School Location and Student Travel: Analysis of Factors Affecting Mode Choice*", **Transportation Research Record**, 2004.

Frank, L.D., et al., "*Linking Objectively Measured Physical Activity With Objectively Measured Urban Form: Findings From SMARTRAQ*," **American Journal of Preventive Medicine**, February 2005.

Frank, L.D., et al., "*Obesity Relationships With Community Design, Physical Activity, and Time Spent in Cars*", **American Journal of Preventive Medicine**, August 2004.

Frank, L.D., et al., "*The Built Environment and Human Activity Patterns: Exploring the Impacts of Urban Form on Public Health*", **Journal of Planning Literature**, 2001.

Geller, A., "*Smart Growth: A Prescription for Liveable Cities*," **American Journal of Public Health**, September 2003.

Gilbert, Richard, et al., **Child and Youth-Friendly Land Use And Transport Planning Guidelines**, The Centre for Sustainable Transportation, April 27, 2005.

Go For Green, **Linkages: Built Environment, Well-Being And Active Living**, prepared for Active Living and the Environment Program, Fitness Canada, 1994.

Go For Green, **Making The Case for Active Transportation**, Fact Sheets #1-6, Fall 2000.

Go For Green, **The Business Case for Active Transportation: The Economic Benefits of Walking and Cycling**, March 2004.

Handy, Susan, "**Community Design and Physical Activity: What Do We Know? – and What DON'T we Know?**", University of California Davis, May 2004.

Hoehner, C.M., et al., "*Perceived and Objective Environmental Measures and Physical Activity Among Urban Adults*," **American Journal of Preventive Medicine**, February 2005.

Huston, S.L., et al., "*Neighbourhood Environment, Access to Places For Activity, and Leisure-Time Physical Activity in a Diverse North Carolina Population*," **American Journal of Health Promotion**, September-October 2003.

King, W.C. et al., "*The Relationship Between Convenience of Destinations and Walking Levels In Older Women*," **American Journal of Health Promotion**, September-October 2003.

Leyden, K., "*Social Capital & the Built Environment: The Importance of Walkable Neighbourhoods*," **American Journal of Public Health**, September 2003.

Local Government Commission – Centre for Liveable Communities, **The Economic Benefits of Walkable Communities**, 2000.

Morris, Marya, **Rethinking Community Planning and School Siting To Address The Obesity Epidemic**, American Planning Association, Prepared for the NIEHS Conference on Obesity and the Built Environment: Improving Public Health Through Community Design, May 2004.

Powell, Kenneth E., et al., "*Places to Walk: Convenience & Regular Physical Activity*," **American Journal of Public Health**, September 2003.

Pucher, J. et al., "*Cycling Trends & Policies in Canadian Cities*," **World Transport Policy & Practice**, March 2005.

Pucher, J. et al., "*Promoting Safe Walking & Cycling to Improve Public Health: Lessons From The Netherlands & German*," **American Journal of Public Health**, September 2003.

Reid, E., et al., *“Urban Sprawl as a Risk Factor in Motor Vehicle Occupant and Pedestrian Fatalities,”* **American Journal of Public Health**, September 2003.

Rohrer, J., Pierce JR Jr., Denison A., *“Walkability and Self-Rated Health in Primary Care Patients,”* **BMC Family Practice**, December 2004.

Saelens, B.E., et al., *“Environmental Correlates of Walking and Cycling: Findings from the Transportation, Urban Design and Planning Literatures,”* **Annals of Behavioural Medicine**, #25, 2003.

Saelens, B.E., et al., *“Neighbourhood-Based Differences in Physical Activity: An Environment Scale Evaluation,”* **American Journal of Public Health**, September 2003.

Staunton, C.E., et al., *“Promotion of Safe Walking and Biking to School: The Marin County Success Story,”* **American Journal of Public Health**, 2003.

Takano, T., et al., *“Urban Residential Environments and Senior Citizens’ Longevity in Mega city Areas: the Importance of Walkable Green Spaces,”* **Journal of Epidemiology in Community Health**, December 2002.

Traffic Safety Centre, *“Can Pedestrian-Friendly Planning Encourage Us to Walk?”* **Online Newsletter**, Volume 2, Number 1, Spring 2004.

Transportation Research Board Institute of Medicine, *“Does The Built Environment Influence Physical Activity?: Examining The Evidence”*, Special Report 282, 2005.

Wilkinson, B. et al., **Why Transportation is a Health Issue**, August 2002.

Wilkinson, B. et al., **“Are We There Yet?”: A Benchmarking Project Assessing the Performance of State Departments of Transportation on Accommodating Bicycles and Pedestrians**, National Center For Bicycling and Walking, February 2003.