

## Evidence Summary Title:

# Urban design and land use transportation policies and practices to increase physical activity: Evidence and implications for public health

Review Quality Rating: **10 (strong)**

## Review on which this evidence summary is based:

Heath G.W., Brownson R.C., Kruger J., Miles R., Powell K.E., Ramsey L.T., & the Task Force on Community Preventive Services (2006). **The effectiveness of urban design and land use and transport policies and practices to increase physical activity: A systematic review.** *Journal of Physical Activity and Health*, 3 (Suppl 1), S55-S76.

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*This is an evidence summary written to condense the work of the authors of this systematic review, referenced above. The intent of this summary is to provide an overview of the findings and implications of the full review. For more information on individual studies included in the review, please see the review itself.*

## Review content summary

This systematic review of 12 studies of mainly cross-sectional and controlled before-after design aimed to determine the effectiveness of environmental and policy interventions to increase physical activity. Study populations were urban and suburban communities of varying socioeconomic status and ethnic diversity. All communities were in North America. To be included, studies were: identify inclusion criteria. Interventions described in this review included: 1) community-scale urban design and land use policies and practices to increase physical activity, 2) street-scale urban design and land use policies to increase physical activity, and 3) transportation and travel policies and practices. Intervention effectiveness was measured through physical activity behaviour. Authors reported that two interventions were effective: community-scale and street-scale urban design and land use policies and practices.

## Comments on this review's methodology

This is a methodologically strong systematic review. A focused clinical question was clearly identified. Appropriate inclusion criteria were used to guide the search. A comprehensive search was employed using health, social, psychological, and educational databases; reviewing reference lists of primary studies; handsearching key relevant journals; reviewing grey literature sources; contacting key informants (based on personal communication, G. Heath, January 19, 2007). The search was not limited by language. Primary studies were assessed for methodological quality using the Community Guide's checklist. The methods were described in sufficient detail so as to allow replication and two reviewers were involved in quality appraisal (personal communication, G. Heath, January 19, 2007). Any discrepancies in appraisal results were rectified by discussion. The results of this review were transparent. Results were clearly presented in graphical form so as to allow for comparisons across studies. Heterogeneity was assessed. Appropriate analytical methods (fixed effects, random effects) were employed to enable the synthesis of study results.

## Why this issue is of interest to public health

Interventions to increase physical activity and decrease sedentary behaviour are often included among public health programs. According to the Canadian Community Health Survey only 49% of Canadians are active enough to achieve health benefits<sup>1</sup> and physical inactivity is associated with obesity and related chronic diseases (e.g., cardiovascular, endocrine, pulmonary, orthopaedic, and gastroenterological<sup>2</sup>). Further, the health care costs associated with obesity-related mortality and morbidity are significant and increasing. As a result, the Canadian Population Health Initiative [CPHI] has identified reducing obesity and improving related health behaviours as public health priorities in Canada<sup>3</sup> Research related to the relationships between aspects of the built environment and physical activity, obesity, and chronic disease is limited. Public health must continue to look outside of the health sector in order to make an impact on health enhancing physical activity and chronic diseases. Interventions that decrease the use of cars and increase more active modes of transportation are required.

## Evidence and implications

Evidence points are not in order of the strength of evidence

What's the evidence?	Implications for practice and policy:
<b>1. Community-scale urban design and land use policies and practices (12 studies)</b> 1.1. In geographic areas of several square kms or more, urban design and land use policies and practices that support	<b>1. Community-scale urban design and land use policies and practices</b> 1.1. Public health programs aimed at increasing physical activity should include and/or promote community-scale

<p>physical activity (e.g., grid street design or pedestrian-friendly designs) resulted in increased physical activity as compared with other designs (e.g., cul-de-sac design and those considered less friendly to pedestrians)</p> <p>1.1.1. The median increase in physical activity across interventions was 161%. The true population-wide treatment effect ranged from 43%-177%.</p> <p>1.2. Interventions included infrastructure projects to improve continuity and connectivity of streets, sidewalks, and bike lanes; and zoning regulations and roadway design standards that promote walking to and from specific locations in the community and co-location of residential, commercial, and school properties.</p>	<p>urban design and land use policies and practices.</p> <p>1.2. Specifically, such programs should include/promote:</p> <p>1.2.1. Zoning regulations, building codes, and roadway design standards</p> <p>1.2.2. Policies that promote proximate placement of residential, commercial, and school properties</p> <p>1.2.3. Improved connectivity of streets and sidewalks</p> <p>1.2.4. Increased population density while preserving green spaces</p> <p>1.3. Public health should collaborate with urban planners and developers on developing such programs</p> <p>1.4. Public health professionals should participate on community planning committees to advocate for such programs.</p>
<p><b>2. Street-Scale Urban Design and Land Use Policies and Practices (6 studies)</b></p> <p>2.1. In small geographic areas, generally limited to a few blocks, street-scale urban design and land use policies to support physical activity was found to be effective in increasing levels of physical activity.</p> <p>2.1.1. The median increase in physical activity across the programs was 35%. The true population-wide treatment effect ranged from 16%- 62%.</p> <p>2.2. Interventions involved building codes, roadway design standards, and environmental changes that included redesigning streets and sidewalks to promote access, aesthetics, and safety (e.g., improved ease and safety of street crossing, traffic calming measures, sidewalk continuity, improved lighting)</p>	<p><b>2. Street-Scale Urban Design and Land Use Policies and Practices</b></p> <p>2.1. Public health programs aimed at increasing physical activity levels should include and promote street-scale urban design and land use policies and practices.</p> <p>2.2. Specifically, such programs should include</p> <p>2.2.1. Redesigned streets (e.g., creating/renovating playgrounds, forming squares, one-way streets, traffic calming, and bicycle lanes)</p> <p>2.2.2. Improved lighting</p> <p>2.2.3. Enhanced aesthetics</p> <p>2.3. Public health should collaborate with urban planners and developers on developing such practices</p> <p>2.4. Public health professionals should participate on community planning committees to advocate for such practices.</p>
<p><b>3. Transportation and Travel Policies and Practices (1 study)</b></p> <p>3.1. The results of the one study included in this review revealed that transportation and travel policies and practices are not effective in promoting physical activity (specifically choosing to walk to school rather than be driven)</p> <p>3.2. Interventions included policy measures such as roadway design standards, expanding public transportation services, subsidizing public transportation, providing bicycle lanes and racks, and increasing the cost of parking</p>	<p><b>3. Transportation and Travel Policies and Practices</b></p> <p>3.1. Transportation and travel policies and practices should not be used alone to promote physical activity</p>
<p><b>4. Methodological Issues with the Primary Studies in the Review</b></p> <p>4.1. incomplete outcome measures of physical activity</p> <p>4.2. cross-sectional study design (therefore, potential for selection bias)</p> <p>4.3. outcome measures limited to behavioural differences rather than behavioural change</p> <p>4.4. grouping of community-level interventions prevents understanding of relative importance of specific interventions</p> <p>4.5. inability to generalize to rural communities</p> <p>4.6. lack of follow-up</p>	<p><b>4. Implications for Future Research</b></p> <p>4.1. Rigorous program evaluations and high quality research studies should be conducted that</p> <p>4.1.1. determine the effectiveness (and relative effectiveness) of various community design, land use, and transportation policies and practices to increase physical activity in urban, suburban, and rural communities</p> <p>4.1.2. determine the sustainability and cost effectiveness of such interventions</p>
<p><b>5. Cost Benefit or Cost-effectiveness Information</b></p> <p>5.1. No cost related information was included in the review</p>	<p><b>5. Cost Benefit or Cost-effectiveness Information</b></p> <p>5.1. Future research should assess cost benefit or cost-effectiveness of the interventions</p>
<p><b>General Implications</b></p> <ul style="list-style-type: none"> <li>Community-scale and street-scale urban design and land use regulations, policies, and practices can be effective in increasing walking and bicycling.</li> <li>High quality research is needed to determine the effectiveness of transportation and travel policies and programs to physical activity.</li> </ul>	
<p><b>Legend:</b> CI – Confidence Interval; OR – Odds Ratio; RR – Relative Risk</p> <p>**For definitions please see the <a href="http://www.healthevidence.org/glossary.aspx">healthevidence.org glossary of terms</a></p>	

## References used to outline issue

- Canadian Fitness and Lifestyle Research Institute. (2004). *Local opportunities for physical activity and Sport: Trends from 1999-2004*. Ottawa, ON: Author. Retrieved from <http://www.cflri.ca/eng/statistics/surveys/pam2004.php>

2. Raine, K.D. (2004) *Overweight and obesity in Canada: A population health perspective*. Canadian Institute for Health Information. Ottawa, ON. Retrieved from [http://secure.cihi.ca/cihiweb/products/CPHIOverweightandObesityAugust2004\\_e.pdf](http://secure.cihi.ca/cihiweb/products/CPHIOverweightandObesityAugust2004_e.pdf)
3. Canadian Population Health Initiative. (2004 *Improving the Health of Canadians*. Canadian Institute for Health Information [CIHI], Ottawa, ON. Retrieved from [http://secure.cihi.ca/cihiweb/products/IHC2004rev\\_e.pdf](http://secure.cihi.ca/cihiweb/products/IHC2004rev_e.pdf)

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### Other quality reviews on this topic

- Egan, M., Petticrew, M., Ogilvie, D., & Hamilton, V. (2003). New roads and human health: A systematic review. *American Journal of Public Health*, 93(9), 1463-1471.
- Kahn, E.B., Ramsey, L.T., Brownson, R.C., Heath, G.W., Howze, E.H., Powell, K.E., Stone, E.J., Rajab, M.W., & Corso, P. (2002). The effectiveness of interventions to increase physical activity: A systematic review. *American Journal of Preventive Medicine*, 22(4 Suppl. 1), 73-107.
- Hillsdon, M., Foster, C., & Thorogood, M. (2005). Interventions for promoting physical activity. *Cochrane Database of Systematic Reviews*, Issue 1 Art. No.: CD003180.pub2. DOI: 10.1002/14651858.CD003180.pub2.
- Ogilvie, D., Egan, M., Hamilton, V., & Petticrew, M. (2004). Promoting walking and cycling as an alternative to using cars: Systematic review. *BMJ*, 329, 763-768.

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### Related links

- Active Healthy Kids Canada Report Card [http://www.activehealthykids.ca/ecms.ashx/ReportCard2009/AHKC-Longform\\_WEB\\_FINAL.pdf](http://www.activehealthykids.ca/ecms.ashx/ReportCard2009/AHKC-Longform_WEB_FINAL.pdf)
- Campbell, R., & Wittgens, M. (2004). Better Environmentally Sound Transportation: The Business Case for Active Transportation The Economic Benefits of Walking and Cycling. Ottawa: Go for Green [http://www.goforgreen.ca/at/Eng/PDF/at\\_business\\_case.pdf](http://www.goforgreen.ca/at/Eng/PDF/at_business_case.pdf)
- Coalition for Active Living <http://www.activeliving.ca>
- Guide to Community Preventive Services (the Community Guide): Recommendations of the US Task Force on Community Preventive Services, Centers for Disease Control and Prevention <http://www.thecommunityguide.org>
- Physical Activity Unit, Public Health Agency of Canada <http://www.phac-aspc.gc.ca/hp-ps/hl-mvs/pag-gap/index-eng.php>

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### Suggested citation

Robeson, P., Dobbins, M. (2009). Urban design and land use transportation policies and practices to increase physical activity: Evidence and implications for public health. Hamilton, ON: McMaster University. Retrieved from: [http://www.healthevidence.org/documents/byid/16887/Heath2006\\_EvidenceSummary\\_EN.pdf](http://www.healthevidence.org/documents/byid/16887/Heath2006_EvidenceSummary_EN.pdf)

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