

Summary Statement Title:

Interventions to promote walking: Evidence and implications for public health

Review Quality Rating: 10 (strong)

Review on which this summary statement is based:

Ogilvie, D., Foster, C.E., Rothnie, H., Cavill, N., Hamilton, V., Fitzsimons, C.F., & Mutrie, N. (2007). **Interventions to promote walking: A systematic review.** *British Medical Journal*, 334(7605), 1204-1213.

Review author contact information:

David Ogilvie, Fellow, Medical Research Council Social and Public Health Services Unit, Glasgow, G12 8RZ, d.ogilvie@mrc.gla.ac.uk

This is a summary statement 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 19 randomized controlled trials and 29 controlled before-and-after trials aimed to determine the effectiveness of walking interventions on walking behaviour and change to health among individuals and populations. Participants studied were of any age, but trained athletes or sports students were excluded. To be included, studies were controlled before-and-after experimental or observational trials, with the comparator being no intervention, attention control and/or minimal-intervention. Interventions were delivered at the level of the individual (brief advice, supported use of pedometers, telecommunications), household (marketing) or groups. Studies could include any fiscal, environmental, legislative or policy interventions. Outcomes measured included overall physical activity, fitness, risk factors for disease, health, and well being. Authors reported that walking interventions (brief advice face to face, remote support, group approaches, pedometers and community-based strategies) could increase walking among targeted participants by 30-60 minutes a week on average, in the short-term. Future research should investigate the long-term effects of walking intensity and frequency on behavioural, physiological, biochemical, anthropometric or clinical outcomes.

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 and contacting key informants. The search was not limited by language. Primary studies were assessed for methodological quality using research design, study sample, sources of bias, data collection and follow-up/attrition. The methods were described in sufficient detail so as to allow replication and two reviewers were involved in quality appraisal. Any discrepancies in appraisal results were rectified through discussion. The results of this review were transparent. Results were clearly presented in graphical form so as to allow for comparison across studies. Significant heterogeneity across studies prevented a meta-analysis to be conducted.

Why this issue is of interest to public health

Chronic diseases are the leading cause of mortality in Canada, as more than two-thirds of deaths result from either cardiovascular disease, cancer, type 2 diabetes or respiratory causes.¹ These chronic diseases share common preventable risk factors such as physical inactivity, unhealthy diet, stress and tobacco use.¹ Physical activity appears to reduce the risk of over 25 chronic conditions² and provides various physical and mental health benefits³. Unfortunately, less than half of the Canadian population participates in the minimal amount of physical activity required to obtain the health benefits.⁴ Physical inactivity costs the Canadian health care system at least \$2.1 billion annually in direct health care costs⁵ and the estimated annual economic burden is \$5.3 billion.⁶ Canada's Physical Activity Guide³ encourages walking for those getting started with building physical activity into their life. Walking at a moderate pace of 5 km/hour expends sufficient energy to meet the definition of moderate intensity physical activity.⁷ Compared with many forms of physical activity, walking is a popular, familiar, convenient, and cost-free form of activity that can be incorporated into everyday life and sustained into old age.^{8,9} Walking therefore may be an effective strategy to improve population physical activity levels and therefore decrease people's risk of chronic diseases, associated morbidity and mortality, and economic burden.

Evidence and implications

Evidence points are not in order of the strength of evidence.

What's the evidence?	Implications for practice and policy:
<p>1. Walking [27 studies – 17 Randomized Controlled Trials (RCT), 10 Controlled trials(CT)]</p> <p>1.1. Brief advice to individuals (5 RCTs, 1 CT)</p> <p>1.1.1. At 6 weeks follow-up, participants who received face to face brief advice on walking reported an increase in walking compared with controls. (2 of 2 studies, 1 RCT [+26.9 min/week, p=0.001], 1 CT [+13 min/week, p<0.025])</p> <p>1.1.2. At follow-up longer than 6 weeks, the results were mixed, with self reported significant increases in walking (4 RCTs)</p> <p>1.1.2.1. In 2 studies, participants who received face-to-face brief advice were more likely to report increases in walking as compared with controls. (1 RCT [+88 min/week, 95% CI 8-168], 1 RCT [+1 session/week, p<0.05])</p> <p>1.1.2.1. In 2 studies, no impact on walking in comparison with controls was reported (1 RCT [non-significant but precise data not reported], 1 RCT [+0.1 min/week, p=0.41]).</p> <p>1.2. Remote support to individuals (3 RCTs)</p> <p>1.2.1. In 3 studies, participants who received remote support for walking (telephone or internet) were more likely to report increases in walking compared with controls. (1 RCT [+61.7 min/week, p<0.05], 1 RCT [+50 min/week, p<0.02], 1 RCT [+4.6 min/week, p<0.01])</p> <p>1.3. Group-based approaches (3 RCTs, 3 CTs)</p> <p>1.3.1. There were mixed results for group based approaches (lay mentored meetings, led walks, educational settings) on walking.</p> <p>1.3.1.1. In 3 studies, participants who received group based approaches were more likely to report increases in walking as compared to controls. (1 RCT [+73 min/week, 95% CI 1-137], 1 RCT [effect size 0.2, p<0.05], 1 RCT [+420 kcal/week or +7.3 miles/week, p=0.01])</p> <p>1.3.1.2. In 3 studies, group-based approaches had no impact on walking as compared to controls (2 RCTs [non-significant but precise data reported], 1 RCT [-0.2 session/fortnight, p=0.67])</p> <p>1.4. Pedometers (6 RCTs, 1 CT)</p> <p>1.4.1. At 6 weeks follow-up, there were mixed results about the effect of pedometers coupled with supporting measures (e.g. education, reminders, self-help booklets, goal-setting advice, individual counselling), on reported walking (pedometer step counts). (1 RCT, 1 CT)</p> <p>1.4.1.1. In 1 study, pedometers coupled with supporting measures had no impact on walking in comparison to controls (1 RCT [non-significant but precise data not reported]), while another study showed a significant impact on walking (1 CT [+2591 steps/day, p=0.03]).</p> <p>1.4.2. At 3 months follow-up, participants that received pedometers, coupled with supporting measures, were more likely to report increases in walking as compared with controls (2 of 2 studies, 1 RCT [+57.5 min/week, p=0.03], 1 RCT [+54 min/week, p=0.002]).</p>	<p>1. Walking</p> <p>1.1. Public health programs that aim to promote walking should include:</p> <p>1.1.1. Brief advice to individuals, combined with booster sessions;</p> <p>1.1.2. Remote support to individuals;</p> <p>1.1.3. Pedometers coupled with supporting measures , and combined with booster sessions or other walking interventions; and</p> <p>1.1.4. A mass media component</p>

<p>1.4.3. At follow-up longer than 3 months, pedometers coupled with supporting measures did not have an impact on walking:</p> <p>1.4.3.1. At 24 weeks follow-up, 2 studies showed pedometers, coupled with supporting measures, had no impact on walking compared to controls (1 RCT [non-significant but precise data not reported], 1 RCT [+1367 steps per day, $p=0.17$]) and at 12 months follow-up, 1 study also showed no impact (1 RCT [non-significant but precise data not reported]).</p> <p>1.5. Community-level approaches (5 CTs)</p> <p>1.5.1. There were mixed results on the effect of community-level approaches on population levels of walking.</p> <p>1.5.1.1. In 3 studies, community level approaches (e.g. community walking events/clubs, newsletters, health promotion) had no impact on walking compared to controls (1 CT [-1.4 min/week, $p=0.91$], 2 CTs [non-significant but precise data not reported])</p> <p>1.5.1.2. In 2 studies, participants that received mass media campaigns were more likely to report increases in walking as compared with controls (1 CT [+75 min/week, $p<0.01$], 1 CT [+4.9% walking in previous fortnight, $p=0.001$]).</p>	
<p>2. Walking as a mode of transport (21 studies – 2 RCTs, 19 CTS)</p> <p>2.1. Targeted promotion of active travel (1 RCT, 13 CTs)</p> <p>2.1.1. In 1 study, participants that received targeted promotion of active travel (community to work) were more likely to report increases in walking compared to controls. (1 RCT, [+64 min/week, $p<0.05$])</p> <p>2.1.2. 13 controlled trials did not report whether the results they observed were statistically significant. (13 CTs)</p> <p>2.2. School travel initiatives (3 CTs)</p> <p>2.2.1. Participants that received school travel initiatives did not self report a significant increase in walking compared with controls.</p> <p>2.2.1.1. In 2 studies, school travel initiatives had no impact on walking compared to controls (1 CT [OR for not using car 0.98, 95% CI 0.61-1.59], 1 CT [non-significant but precise data not reported])</p> <p>2.2.1.2. In 1 study, participants who received school travel initiatives were more likely to report increases in walking as compared with controls. (1 CT, [net effect 555 m/trip, 95% CI 315-795])</p> <p>2.3. Miscellaneous transport initiatives (4 CTs)</p> <p>2.3.1. Three studies reported no effect of active transport strategies (sustainable transport campaign, car sharing club, cycling to work campaign) on walking or cycling rates. (3 CTs)</p> <p>2.3.2. In 1 study, an employer directive to subsidize employees who chose not to commute by car significantly increased walking to work compared to controls. (1 CT [+1.1% in walking share of trips, $p<0.01$])</p>	<p>2. Walking as a mode of transport</p> <p>2.1. Public health programs should advocate for more rigorous research on the effects of modes of transport on walking behaviour.</p> <p>2.2. Public health programs should not implement modes of transport interventions alone to increase walking behaviour.</p>
<p>3. Physical activity and health (26 studies – 16 RCTs, 10 CTs)</p> <p>3.1. Physical activity (11 RCTs, 9 CTs)</p> <p>3.1.1. Most studies did not report that walking resulted in a significant increase in overall physical activity at follow-up. (13 of 20 studies)</p> <p>3.2. Fitness (4 RCTs)</p> <p>3.2.1. In 4 studies, a walking intervention had no effect on</p>	<p>3. Physical activity and health</p> <p>3.1. Public health should advocate for more rigorous research on the effects of walking on short- and long-term physical activity and health.</p> <p>3.2. If the sole goal of a walking promotion program is improved physical health status, the evidence does not support implementation of walking promotion programs. If</p>

<p>improved fitness (improved functional lung capacity (VO² max), one-mile walking time, and exercise tolerance compared to controls. (4 RCTs)</p> <p>3.3. Disease risk factors (5 RCTs)</p> <p>3.3.1. In 5 studies, a walking intervention had no impact on disease risk factors (i.e. body mass index, lipid profile, blood pressure, heart rate, body weight) (length of follow-up was not reported) compared to controls. (5 RCTs)</p> <p>3.4. Self-reported health (2 RCTs)</p> <p>3.4.1. There are mixed results about the impact of walking on self-reported health (well-being, quality of life, mood) between intervention and control groups.</p> <p>3.4.1.1. In 1 study, participants that received a walking intervention were more likely to report higher health-related scores as compared with controls. (1 RCT [p=0.02, p=0.04, p=0.04])</p> <p>3.4.1.2. In 1 study, a walking intervention had no impact on health-related scores compared to controls. (1 RCT)</p>	<p>change in physical health status is not, however, the goal of implementing walking programs, then public health should consider implementing these programs.</p>
<p>4. Adverse effects (0 studies)</p> <p>4.1. No information on adverse effects was reported in the review.</p>	<p>4. Adverse effects</p> <p>4.1. Future research should investigate adverse effects of the interventions.</p>
<p>5. Methodological Issues with the Primary Studies in the Review</p> <p>5.1. The majority of studies were not randomized. As such:</p> <p>5.1.1. There is increased risk for selection bias; and</p> <p>5.1.2. One cannot determine a causal relationship between the interventions and increases in walking</p> <p>5.2. Variation in interventions and outcome measures</p> <p>5.3. Use of self-reported measures for walking (implications on bias)</p> <p>5.4. Poor reporting of detailed information related to: allocation concealment; attrition; assessment of reliability and validity; study participants; study methods; assessment and interpretation; blinding; long-term follow-up; intervention dose and booster sessions</p>	<p>5. Program Evaluation and Research</p> <p>5.1. Rigorous program evaluation and research is required to determine:</p> <p>5.1.1. Adequate intervention dose (frequency, intensity, duration);</p> <p>5.1.2. Intervention characteristics that may suit certain risk factor sub-groups;</p> <p>5.1.3. The effect of combining walking interventions;</p> <p>5.2. And involving:</p> <p>5.2.1. Valid measures of walking and other outcomes;</p> <p>5.2.2. Homogeneous outcome indicators;</p> <p>5.2.3. Long term follow-up; and</p> <p>5.2.4. Randomized controlled trials</p>
<p>6. Cost Benefit or Cost-effectiveness Information (6 studies)</p> <p>6.1. Meaningful data could not be synthesized relating to cost-effectiveness.</p>	<p>6. Cost Benefit or Cost-effectiveness Information</p> <p>6.1. Future research should rigorously assess cost benefit or cost-effectiveness of the interventions.</p>
<p>General Implications</p> <ul style="list-style-type: none"> • The review showed that some interventions to promote walking are effective at increasing walking among a variety of participants in the short-term. Specifically, providing brief face-to-face advice along with booster sessions, telephone or internet support, pedometers with supporting measures, and mass media may increase walking behaviour. • The more robust studies in this review showed that provision of a walking intervention can increase walking by up to 30 to 60 minutes per week on average. However, despite increases in walking behaviour, there were no subsequent effects on measures of physical activity and physical health status. • Future research should use high-quality rigorous and validated methods to study the adequate dose of walking interventions and the optimal intervention components on increasing and maintaining walking behaviour in the long term. • Cost-effectiveness studies are needed to determine the most feasible approaches to increasing and sustaining walking and physical activity levels among individuals and populations. 	
<p>Legend: CI – Confidence Interval; OR – Odds Ratio; RR – Relative Risk; RCT – Randomized Controlled Trial; CT – Controlled Trial (non-randomized)</p> <p><i>**please see the health-evidence.ca glossary of terms (found under 'How to Use This Site') for definitions</i></p>	

References used to outline issue

1. The Secretariat for the Intersectoral Healthy Living Network. (2005). *The integrated Pan-Canadian healthy living strategy*. Ottawa, ON. Retrieved from http://www.phac-aspc.gc.ca/hl-vs-strat/pdf/hls_e.pdf
2. Warburton, D.E.R., Katzmarzyk, P.T., Rhodes, R.E., & Shephard, R.J. (2007). Evidence-informed physical activity guidelines for Canadian adults. *Applied Physiology, Nutrition, and Metabolism*, 32(Suppl2), S16-S68.

3. Public Health Agency of Canada, Canadian Society for Exercise Physiology. (1998). *Canada's physical activity guide to healthy active living*. Ottawa, ON. Retrieved from <http://www.phac-aspc.gc.ca/hp-ps/hl-mvs/pag-gap/pdf/guide-eng.pdf>
4. Public Health Agency of Canada. (2008). *Chronic disease risk factor atlas*. Ottawa, ON. Retrieved from <http://www.phac-aspc.gc.ca/cd-mc/atlas/index-eng.php>
5. Katzmarzyk, P.T., Gledhill, N. & Shephard, R.J. (2000). The economic burden of physical inactivity in Canada. *Canadian Medical Association Journal*, 163(11), 1435–1440.
6. Katzmarzyk, P.T. & Janssen, I. (2004). The economic costs of physical inactivity and obesity in Canada: an update. *Canadian Journal of Applied Physiology*, 29(1), 90-115.
7. Mutrie, N., & Hannah, M.K. (2004). Some work hard while others play hard. The achievement of current recommendations for physical activity levels at work, at home, and in leisure time in the west of Scotland. *International Journal of Health Promotion and Education*, 42, 109-17.
8. Morris, J., and Hardman, A. (1997). Walk to health. *Sports Medicine*, 23, 306-332.
9. Ainsworth, B., Haskell, W., Whitt, M., Irwin, M., Swartz, A., Strath, S., et al. (2000). Compendium of physical activities: an update of activity codes and MET intensities. *Medicine and Science in Sports and Exercise*, 32(9suppl), S498-S516.

Other quality reviews on this topic

- Ogilvie, D., Egan, M., Hamilton, V, & Petticrew, M. (2004). Promoting walking and cycling as an alternative to using cars: systematic review. *British Medical Journal*, 329(7469), 763-767).
- Lubans, D.R., Morgan, P.J., & Tudor-Locke, C. (2009). A systematic review of studies using pedometers to promote physical activity among youth. *Preventive Medicine*, 48(4), 307-315.

Related links

- Health Canada. Healthy Living – Physical Activity <http://www.hc-sc.gc.ca/hl-vs/physactiv/index-eng.php>
- Public Health Agency of Canada, Canadian Society for Exercise Physiology. (1998). *Canada's Physical Activity Guide to Healthy Active Living* <http://www.phac-aspc.gc.ca/hp-ps/hl-mvs/pag-gap/intro-eng.php>
- Alberta Centre for Active Living – Walking / Pedometers <http://www.centre4activeliving.ca/resources.cgi?s=16;d=1>
- Canadian Fitness and Lifestyle Research Institute <http://www.cflri.ca/index.html>

Suggested citation

Phuong, P., Robeson, P., & Dobbins, M. (2010). Interventions to promote walking: Evidence and implications for public health. Hamilton, ON: McMaster University. Retrieved from http://www.health-evidence.ca/documents/17214/Ogilvie_2007_Summary_Statement_-_English.pdf

The opinion and ideas contained in this document are those of the summary statement author(s) and health-evidence.ca. They do not necessarily reflect or represent the views of the author's employer or other contracting organizations. Links from this site to other sites are presented as a convenience to health-evidence.ca internet users. Health-evidence.ca does not endorse nor accept any responsibility for the content found at these sites.

The production of this summary statement was funded with support from the Public Health Agency of Canada. The views expressed herein do not necessary represent the views of the Public Health Agency of Canada.