

**Summary Statement Title:**

**Interventions for preventing obesity in children: Evidence and implications for public health**

**Review Quality Rating: 9 (strong)**

**Review on which this summary statement is based:**

Summerbell, C.D., Waters, E., Edmunds, L.D., Kelly, S., Brown, T. & Campbell, K.J. (2005). **Interventions for preventing obesity in children.** *Journal Cochrane Database of Systematic Reviews*, Issue 3. Art. No: CD00187.pub2. DOI: 10.1002/14651858.CD00187.pub2.

*Note: The Cochrane review that this summary statement is based on has been updated. This summary statement summarizes the above-cited version of this review, not the updated version. An updated summary statement will be provided as soon as possible.*

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*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 22 controlled trials aimed to determine the effectiveness of interventions designed to prevent obesity in childhood through diet, physical activity, and/or lifestyle changes and social support. Participants studied were: describe study population. To be included studies were: identify inclusion criteria. Interventions described in this review included: list interventions. Outcomes measured include: list outcomes. Authors report that studies that focused on combining dietary and physical activity approaches did not significantly improve body mass index (BMI). A few studies that focused on either diet or physical activity showed a small but positive impact on BMI status, but this effect was restricted to girls in some studies. This review is the updated version of one, with the same title, conducted in 2002.<sup>1</sup>

**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 and psychological databases; reviewing reference lists of primary studies; reviewing grey literature sources that include: the Effective Public Health Practice Project, the Community Guide to Preventive Services, and other relevant websites; 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 analysis, and rates of 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 by discussion. The results of this review were transparent. Results were clearly presented in narrative form so as to allow for comparisons across studies. Heterogeneity was not assessed. Appropriate analytical methods (fixed effects, random effects) were not employed to enable the synthesis of study results. It was not possible to statistically combine the studies due to variation in the design, quality, target population, theoretical underpinnings, and outcome measures.

**Why this issue is of interest to public health**

The Canadian Population Health Initiative [CPHI] recognized obesity as a widespread public health problem in Canada as well as a major contributing factor to Canada's burden of disease<sup>2</sup>. Health consequences for youth related to obesity include risks to the cardiovascular, endocrine, pulmonary, orthopaedic and gastroenterological systems and impediments to the development of healthy lifestyles and body image<sup>3</sup>. Morbidity and quality-of-life effects of obesity are similar to those caused by smoking, poverty, and problem drinking<sup>4</sup>. Further, the health care costs associated with obesity-related mortality and morbidity are significant and increasing. CPHI, based on effectiveness evidence related to the prevention of obesity among children and youth, recommended breastfeeding, regular school-based physical education, comprehensive school health programs, reduced television viewing time and community-wide interventions as effective solutions to the problem of obesity<sup>2</sup>.

**Evidence and implications**

Evidence points are in order of the strength of evidence

What's the evidence?	Implications for practice and policy:
<p><b>1. Physical activity interventions vs. control (2 long term; 4 short term studies)</b> 1.1. The results of this review were mixed regarding the</p>	<p><b>1. Physical activity interventions vs. control (2 long term; 4 short term studies)</b> 1.1. Caution should be taken when considering the</p>

<p>effectiveness of physical activity interventions implemented on their own in preventing obesity, reducing BMI, or increasing moderate to vigorous physical activity in children and youth..</p> <ol style="list-style-type: none"> <li>1.2. Results differed for males and females (5 studies)</li> <li>1.3. The two long term studies reported positive findings at various intervals but failed to report on the statistical significance of longer term results.</li> <li>1.4. The outcome measures varied across studies as did the effect of interventions on these outcome measures.</li> <li>1.5. Most of the studies included in this analysis are likely underpowered to observe a statistically significant difference between groups. It is also likely that the dose of the intervention (i.e., frequency, duration, and intensity) is inadequate to promote changes in health behaviours. Many of the studies had unit of allocation errors (allocation by institution but analysis by child) and other methodological concerns.</li> </ol>	<p>development of obesity prevention programs with only physical activity interventions.</p> <ol style="list-style-type: none"> <li>1.2. Physical activity interventions need to be of sufficient intensity, frequency, and duration to achieve the desired outcomes.</li> <li>1.3. Physical activity interventions should be theory-based, school-based, have multiple components, involve younger children, and involve trained staff.</li> <li>1.4. Physical activity interventions may be need to be developed differently for girls and boys.</li> <li>1.5. Program evaluations should include measures of outcomes based on gender and longer term follow-up.</li> <li>1.6. High quality research studies regarding the effectiveness of physical activity interventions need to be undertaken. Research questions may involve determining the optimal dose effect of physical activity interventions. These studies should       <ol style="list-style-type: none"> <li>1.6.1. be of sufficient power (e.g., large enough sample size) to detect statistically significant results</li> <li>1.6.2. involve randomization concealment</li> <li>1.6.3. measure physical activity outcomes based on gender</li> <li>1.6.4. include both short term and long term data collection and analysis phases</li> <li>1.6.5. avoid unit of allocation errors</li> <li>1.6.6. involve interventions with a sufficient dose (frequency, duration, intensity)</li> </ol> </li> </ol>
<p><b>2. Dietary interventions vs. control (2 long term)</b></p> <ol style="list-style-type: none"> <li>2.1. Two studies evaluating the impact of a nutrition only intervention found no change in the percentage of children overweight, BMI, or dietary intake. Evaluated interventions included comprehensive behavioural weight control programme, aimed at increased fruit and vegetable intake, delivered to the parents, and classes aimed at soft drink reduction delivered by trained personnel with the assistance of teachers, and curriculum changes.</li> <li>2.2. It is highly likely that these studies did not have a large enough sample to observe a statistically significant difference between groups if one existed. It is also likely that the dose of the intervention (frequency, duration and intensity) is inadequate to promote changes in health behaviours.</li> </ol>	<p><b>2. Dietary interventions vs. control (2 long term)</b></p> <ol style="list-style-type: none"> <li>2.1. Caution should be taken when considering the development of obesity prevention programs with only dietary interventions.</li> <li>2.2. Program evaluations of dietary interventions aimed at obesity prevention should be undertaken.</li> <li>2.3. High quality research studies regarding the effectiveness of dietary interventions need to be undertaken. Research questions may involve determining the optimal dose effect of these interventions. Studies should be of sufficient power (e.g., large enough sample size) to detect statistically significant results, should involve randomization concealment, and should include both short term and long term data collection phases.</li> </ol>
<p><b>3. Combined dietary &amp; physical activity interventions (6 long term; 8 short term)</b></p> <ol style="list-style-type: none"> <li>3.1. The results are mixed regarding the effectiveness of combined physical activity and nutrition interventions in: reducing the percentage of children and youth that are overweight or obese, BMI, skinfold thickness, and dietary fat intake. Evaluated interventions included school-based or community-based physical activity, dietary, school curriculum changes, school environmental changes (e.g., meal changes, family involvement, and trained staff).</li> <li>3.2. Results differed for males and females (2 studies) One study found a statistically significant impact on the percentage of overweight girls but not boys, and significant reduced triceps skinfold thickness. Another study found a significant change in fitness measures, although a change in BMI was not observed. One additional study reported improvements in BMI and fitness measures but did not achieve statistical significance.</li> <li>3.3. In 3 studies, interventions did have a significant impact on TV viewing (reducing the amount of time children and youth spent watching television or the number of children who spent more than 2 hours per day watching television).</li> <li>3.4. The outcome measures varied across studies as did the effect of interventions on these outcome measures. These measures included:       <ol style="list-style-type: none"> <li>3.4.1. Anthropometric measurements: BMI, triceps skinfold,</li> </ol> </li> </ol>	<p><b>3. Combined dietary &amp; physical activity interventions (6 long term; 8 short term)</b></p> <ol style="list-style-type: none"> <li>3.1. Given the limited evidence related to the effectiveness of multifaceted interventions in preventing obesity in children, any program implemented should be of sufficient duration to determine both short and long term impacts, and be well evaluated using valid measures of dietary intake, physical activity levels, and body fat measures.</li> <li>3.2. Longer term studies may be needed in order to provide interventions of sufficient duration to modify weight status.</li> <li>3.3. Studies should involve a multifactorial theoretical systems approach involving interventions at individual, family, classroom and school, and community levels</li> <li>3.4. Different programs may be needed for girls and boys.</li> <li>3.5. While interventions that were found to be effective often had similar components to those effective ones, successful interventions appeared to involve a sufficient dose (intensity, frequency, and duration); had a sample size that allowed the study to have sufficient power to determine significance; were theory-based; involved coordinated, multifaceted, multilevel (including environmental changes) interventions; were of higher methodological quality; and involved appropriate outcomes and measures. Programs aimed at and effectiveness research studies related to obesity prevention among children and youth should be developed to incorporate these features.</li> </ol>

<p>sum of four skinfold, waist circumference, waist to hip ratio, serum HDL,</p> <p>3.4.2. Population level measurements: rates of overweight/obesity</p> <p>3.4.3. Dietary measures: fruit and vegetable intake, self reported 24 hour dietary recall,</p> <p>3.4.4. Behavioural measures: meals in front of TV, time spent TV viewing,</p> <p>3.4.5. Activity and fitness measures: self reported physical activity, shuttle run tests, lower back flexibility</p> <p>3.4.6. Personal measures: self esteem, self reported knowledge, perception of self worth</p> <p>3.4.7. Stage of change</p> <p>3.5. A few studies also reported a significant change in the provision of high fat foods in schools. These studies involved environmental changes at the school level (training school cafeteria staff).</p> <p>3.6. It is highly likely that these studies did not have a large enough sample to observe a statistically significant difference between groups if one existed. It is also likely that the dose of the intervention (frequency, duration and intensity) is inadequate to promote changes in health behaviours.</p>	
<p><b>4. Dietary interventions vs. Physical activity interventions</b></p> <p>4.1. No study addressed the differences in the impact each of these intervention types.</p>	<p><b>4. Dietary interventions vs. Physical activity interventions</b></p> <p>4.1. Research is required to determine the relative effectiveness in reducing measures of body fat of dietary and physical activity 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>Studies that focused on combining dietary and physical activity approaches did not significantly improve BMI, but some studies that focused on physical activity approaches showed a small but positive impact on BMI status.</li> </ul>	
<p><b>Legend:</b> CI – Confidence Interval; OR – Odds Ratio; RR – Relative Risk</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

- Canadian Population Health Initiative. (2004). *Improving the Health of Canadians* Canadian Institute for Health Information [CIHI], Ottawa, Ontario.
- Raine, K.D. (2004) *Overweight and obesity in Canada: A population health perspective*. Canadian Institute for Health Information. Ottawa, Ontario.
- Ball, G.D.C., & McCargar, L.J. (2003). Childhood obesity in Canada: a review of prevalence estimates and risk factors for cardiovascular diseases and type 2 diabetes. *Canadian Journal of Applied Physiology*. 28, 117-140.

## Other quality reviews on this topic

- Ciliska, D., Miles, E., O'Brien, M.A., Turl, C., Tomasik, H. H., Donovan, U., & Beyer, N. (1999). The effectiveness of community interventions to increase fruit and vegetable consumption in people four years of age and older. *EPHPP*, 1-45. <http://old.hamilton.ca/phcs/ephpp/Research/Full-Reviews/98-99/Fruit-&-Vegetable-review.pdf>
- Dobbins, M., Lockett, D., Michel, I., Beyers, J., Feldman, L., Vohra, J., & Micucci, S. (2001). The effectiveness of school-based interventions in promoting physical activity and fitness among children and youth: A systematic review. *EPHPP*, 1-103. <http://old.hamilton.ca/phcs/ephpp/Research/Full-Reviews/Physical-Activity-Review.pdf>
- Flynn, M. A., McNeil, D. A., Maloff, B., Mutasingwa, D., Wu, M., Ford, C., & Tough, S. C. (2006). Reducing obesity and related chronic disease risk in children and youth: A synthesis of evidence with 'best practice' recommendations. *Obesity Reviews*, 7(Suppl. 1), 7-66.
- Hardeman, W., Griffin, S., Johnston, M., Kinmonth, A. L., & Wareham, N. J. (2000). Interventions to prevent weight gain: A systematic review of psychological models and behaviour change methods. *International Journal of Obesity*, 24 (2), 131-143.
- Micucci, S., Thomas, H., & Vohra, J. (2002). The effectiveness of school-based strategies for the primary prevention of obesity and for promoting physical activity and/or nutrition, the major modifiable risk factors for type 2 diabetes: A review of reviews. *EPHPP*, 1-55. <http://old.hamilton.ca/phcs/ephpp/Research/Full-Reviews/Diabetes-Review.pdf>
- Thomas, H., Ciliska, D., Micucci, S, Wilson-Abra, J, & Dobbins, M. (2004). Effectiveness of physical activity enhancement and obesity prevention programs in children and youth. *EPHPP*, 1-206. <http://old.hamilton.ca/phcs/ephpp/Research/Summary/2004/HealthyWeightsFull2004.pdf>

## Related links

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- Canadian Institute of Health Information. (2003). Obesity in Canada: Identifying Policy Priorities: Proceedings of a roundtable. CIHI, Ottawa, ON. [www.cihr-irsc.gc.ca/e/documents/CPHI\\_proceed\\_e.pdf](http://www.cihr-irsc.gc.ca/e/documents/CPHI_proceed_e.pdf)
- The Public Health Agency of Canada promotes an increase in physical activity and healthy eating through the Canadian Heart Health Initiative ([www.phac-aspc.gc.ca/ccdpc-cpcmc/cvd-mcv/index\\_e.html](http://www.phac-aspc.gc.ca/ccdpc-cpcmc/cvd-mcv/index_e.html)) and the Canadian Diabetes Strategy ([www.phac-aspc.gc.ca/ccdpc-cpcmc/diabetes-diabete/english/strategy/index\\_comp.html](http://www.phac-aspc.gc.ca/ccdpc-cpcmc/diabetes-diabete/english/strategy/index_comp.html)).
- The Registered Nurses Association of Ontario (RNAO) has developed Best Practice Guidelines for the Primary Prevention of Childhood Obesity <http://www.rnao.org/Page.asp?PageID=828&ContentID=811>

## Suggested citation

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Dobbins, M., Robeson, P. (2006). Interventions for preventing obesity in children: Evidence and implications for public health. Hamilton, ON: McMaster University. Retrieved July 14, 2009, from *health-evidence.ca*: [http://www.health-evidence.ca/documents/15329/Summerbell\\_2005\\_Summary\\_Statement\\_-\\_English.pdf](http://www.health-evidence.ca/documents/15329/Summerbell_2005_Summary_Statement_-_English.pdf)

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