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Population health approaches to prevent type II diabetes: Evidence and implications for public health

Review on which this evidence summary is based:
Shiell, A., Spilchak, P., Ladhani, N., Hawe, P., & Lorenzetti, D (2008). *A systematic review of population health approaches to prevent type II diabetes: Report to the Public Health Agency of Canada*. Calgary, AB: Population Health Intervention Research Centre (PHIRC).

Review Focus

P General population

I Population health interventions focused on preventing Type II diabetes or its related risk factors through policy or changes in the social or physical environment

C Usual care

O *Primary Outcomes:* prevention of type II diabetes or reducing the associated risk factors (i.e. unhealthy weight, inadequate physical activity, and poor nutrition)

Review Quality Rating: 9 (strong) *Details on the methodological quality are available here.*

Considerations for Public Health Practice

Conclusions from Health Evidence	General Implications
This well done review includes primary studies ranging from strong to weak methodological quality. This evidence summary only presents the evidence for strong and moderate studies. **School-based interventions** compared to usual care led to: • no statistically significant effects on physical activity, nutrition, BMI, fruit and vegetable intake, energy from fat, total serum cholesterol, and VO_2 Max (***among the most rigorous studies***) • statistically significant improvements in triglycerides, physical activity, systolic and diastolic blood pressure, percentage body fat, smaller increase in BMI, and waist circumference among boys **Community-based interventions** compared to usual care led to: • statistically significant increase in self-reported physical activity **Worksite-based interventions** compared to controls led to: • statistically significant increase in smoking cessation rates	The most current, rigorous evidence does not support school-based interventions to reduce Type II diabetes or its risk factors. Findings from less rigorous studies do support the use of school-based interventions to reduce Type II diabetes risk factors. Community-based interventions are currently recommended for increasing physical activity. Worksite-based interventions are recommended for increasing smoking cessation rates. There is limited, good quality evidence, therefore results should be applied cautiously to public health practice, and any associated public health programs need to evaluate the impact of these interventions.

Evidence and Implications

What's the evidence?	Implications for practice and policy
1. School based Interventions (5 RCTs of high quality, 6 quasi-experimental of moderate quality) Among studies of *moderate* methodological quality, a statistically significant impact was observed on	**1. School-based Interventions** • Given evidence is mixed (rigorous studies generally report no effect, lower quality studies report significant effects), school-based interventions may

• Triglycerides, blood pressure, percentage body fat, participation in rigorous physical activity, waist circumference, and(less of an increase in BMI compared to usual care. • Some effects observed among girls only and others among boys only. Among studies of *rigorous* methodological quality • No impact on physical activity, diet, total serum cholesterol, VO_2 Max, or BMI.	not be an effective public health strategy for reducing Type II diabetes and its risk factors. • Given some interventions affect boys and girls differently, careful consideration of the different facilitators and barriers to physical activity among boys and girls is needed, if these interventions are implemented.
2. Community-based Interventions (1 study of moderate quality) • One studies of *moderate* methodological quality observed statistically significant impact on self-reported physical activity.	**2. Community-based Interventions** • Community-based interventions are supported for increasing physical activity. Results should be interpreted cautiously as physical activity was measured through self-report, which may overestimate the true treatment effect. • These findings must be re-evaluated as more rigorous evidence emerges.
3. Worksite-based Intervention (1 study of moderate quality) • One study of *moderate* methodological quality found a statistically significant increase in smoking cessation rate (OR 1.38; 95% CI 1.05-1.81).	**3. Worksite-based Intervention** • Worksite-based interventions are recommended for increasing smoking cessation rates. • These findings must be re-evaluated as more rigorous evidence emerges.
Legend: P – Population; I – Intervention; C – Comparison group; O – Outcomes; CI – Confidence Interval; OR – Odds Ratio; RR – Relative Risk ***For definitions see the healthevidence.org glossary http://www.healthevidence.org/glossary.aspx*	

Why this issue is of interest to public health in Canada

Type II diabetes is a significant public health problem in Canada. Excess blood glucose levels can lead to the dysfunction of organs, such as the kidneys, eyes, nerves, heart and blood vessels, which may result in death.[1] Type II diabetes represents about 90-95% of the total diabetic population.[2] In Canada, approximately 2 million Canadians aged 1 and older (1 in 16 people) are living with diabetes.[2] Projections indicate that by 2012 almost 2.8 million Canadians will be living with diabetes – an estimated annual percent increase of about 6% per year with an overall increase of about 25% from 2007.[2] The risk of type II diabetes increases with age, obesity, and physical inactivity.[2] In higher income countries minority ethnic groups often suffer a higher prevalence of type II diabetes compared to the local population.[3]

1. Public Health Agency of Canada. (2003). *Diabetes in Canada: Second edition*. Retrieved from http://www.phac-aspc.gc.ca/publicat/dic-dac2/english/01cover-eng.php
2. Public Health Agency of Canada. (2009). *Report from the National Diabetes Surveillance System: Diabetes in Canada, 2009.* Ottawa, Her Majesty, the Queen in Right of Canada. Retrieved from http://www.phac-aspc.gc.ca/publicat/2009/ndssdic-snsddac-09/pdf/report-2009-eng.pdf
3. Hawthorne, K., Robles, Y., Cannings-John, R., & Edwards, A. G. (2008). Culturally appropriate health education for Type 2 diabetes in ethnic minority groups: A systematic and narrative review of randomized controlled trials. *Diabetic Medicine, 27,* 613-623.

Other quality reviews on this topic are available on www.healthevidence.org

Suggested citation

Dobbins, M., McRae, L., & Tirilis, D. (2012). Population health approaches to prevent type II diabetes: Evidence and implications for public health. Hamilton, ON: McMaster University. Retrieved from http://www.healthevidence.org/documents/byid/20974/Shiell2008_EvidenceSummary_EN.pdf