



The role of primary health care in primary and secondary prevention of diabetes

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Executive summary

Policy context

In Australia, diabetes represents a major burden in both human and financial terms, drawing heavily on limited health care resources including trained staff and carers. In contrast to many other health conditions, evidence suggests that many aspects of the burden imposed by diabetes could be avoided through preventive measures. Type 1 diabetes mellitus (T1DM) is a genetically linked autoimmune disease and there is currently no known prevention. However, the risk for complications associated with T1DM can be reduced by optimal management of blood glucose levels. Type 2 diabetes mellitus (T2DM) accounts for over 85 per cent of all diabetes in Australia. Obesity is a major contributor to the development of T2DM and weight loss has been shown to reduce the incidence of T2DM in people with impaired glucose tolerance (IGT). Therefore, primary prevention of T2DM has generally focused on weight loss and lifestyle interventions, while secondary prevention to reduce the risk of diabetes-related complications centres on use of pharmacotherapy in addition to diet and lifestyle interventions to manage surrogate markers of complication risk e.g. blood glucose levels, blood pressure, and lipid levels. The aim of this research is to examine diabetes programmes reporting outcome data and used in general practice settings to identify and proactively manage individuals at high risk for developing diabetes; or where diabetes is diagnosed, at risk for development of, or deterioration in, diabetes-related complications. Comparison of programme structure with published evidence is used together with outcome data to assess programmes.

Key findings

Based on our review of the literature we found that for **primary prevention of diabetes**:

- T1DM
 - There is currently no evidence-based method to prevent T1DM; thus current guidelines do not recommend screening or preventive treatment outside of defined clinical studies
 - Current ongoing efforts to identify prevention measures for T1DM are generally based on preserving pancreatic beta cell function and this has shown some promise in small sub-cohorts of patients with a family history of T1DM
 - Ongoing trials in the Australian setting include TrialNet.
- T2DM
 - T2DM can be prevented through sustained weight loss in people who are overweight or obese, adequate physical activity, reduced fat intake and increased fibre intake

- Adherence to a Mediterranean diet has also been consistently associated with a significant reduction in the risk of developing T2DM despite minimal weight loss but this has not been adopted in current prevention programmes in Australia
- The AUSDRISK diabetes score is used to identify high risk individuals in T2DM prevention programmes in Australian primary health care (PHC) settings
- Intervention programmes aimed at reducing the incidence of T2DM largely draw on targets defined in the Finnish Diabetes Prevention randomised controlled trial (RCT) study, which included the following targets:
 - sustained weight loss of five per cent or more
 - increased physical activity to at least four hours per week
 - improved dietary patterns
- Based on RCTs, weight loss of five per cent or more is associated with a 58 per cent reduction in incidence of T2DM
- Most diabetes prevention programmes in the clinical setting are based on lifestyle interventions but to date these have not demonstrated weight loss comparable to that achieved in RCTs
- Currently most programmes implemented in the clinical setting lack sufficient follow-up time to observe any impact on incidence of T2DM
- Cost-effectiveness analyses based on outcomes from the US Diabetes Prevention Programme (DPP) and Finnish Diabetes Prevention Study (DPS) RCTs may over-estimate the effectiveness of lifestyle interventions compared with 'real-world' interventions
- Lay community members may be as effective at motivating weight loss as PHC professionals and this is likely to have a major impact on the scalability and economic sustainability of diabetes interventions
- Australian prevention programmes demonstrating moderate but significant improvement in outcomes in the PHC setting include the *Life! Taking action in diabetes (Life!)* programme and the *Sydney Diabetes Prevention Programme (SDPP)*
- International programmes demonstrating significant improvement in outcomes include the UK-based *Counterweight* and US-based *SHINE* programmes
- Ongoing trials in the Australian setting, but currently lacking outcome data, include the *Mothers After Gestational Diabetes in Australia (MAGDA)* diabetes prevention programme trial for gestational diabetes mellitus (GDM) prevention, and the international *PREvention of diabetes through lifestyle Intervention (PREVIEW)* study for T2DM prevention.

Based on our review of the literature we found that for **secondary prevention of diabetes complications**:

- General practice-based programmes are particularly important for people with T2DM, and for those with T1DM and unable to readily access diabetes specialist services (e.g. rural and remote residents)
- Both T1DM and T2DM secondary prevention centres on modifying surrogate markers for risk of diabetes complications: achieving good glycaemic, blood pressure and lipid control
- Systematic reviews have identified key components of effective T2DM diabetes management programmes as:
 - **Team changes.** *Changes to the structure or organisation of the primary health care teams e.g. upskilling for GPs, or adding nurse specialists in diabetic care*
 - **Patient education.** *Interventions designed to promote greater understanding of the disorder or to teach specific prevention or treatment strategies.*

- **Case management.** Any system for coordinating diagnosis, treatment, or routine management of patients by a person or multidisciplinary team in collaboration with, or supplementary to, the primary-care clinician.
- **Facilitated relay of information to primary clinician.** Clinical information collected from patients and transmitted to clinicians by means other than the existing medical record e.g. referral systems, patient passports
- All of the programmes identified in the current review included team changes and patient education, with some of the most promising programmes including social or mental health professionals in those teams
- Programmes demonstrating significant improvement in outcomes for people with T1DM and/or T2DM in the rural Australian PHC setting include the *Rural Australian Diabetes – Inspiring Control Activity & Lifestyle (RADICAL)* and the Point of Care Testing (PoCT) *Mallee Track* programmes
- Australian programmes demonstrating significant improvement in outcomes for people with T2DM include the integrated primary-secondary care for complex diabetes model, and the *Northern Alliance HARP* programme
- The Canadian *St Josephs integrated care* model has demonstrated significant improvement in glycaemic control after just six months
- Ongoing trials in the Australian setting, but currently lacking published outcome data, at the time of writing include the *Diabetes Care Project*, which is due to be completed in 2014.

Policy considerations

Primary prevention of T1DM is not possible currently, but ongoing research is required to assess the feasibility of pancreatic preservation through dietary and environmental control.

Primary prevention of T2DM has been demonstrated under controlled trial conditions. However, implementation of lifestyle interventions in PHC clinical settings has failed to achieve similar levels of improvement in established, surrogate markers for diabetes risk. Longer term studies are required in the clinical setting to assess the impact of these more modest improvements in weight and physical activity on the incidence of T2DM, as well as the impact of alternative strategies such as pharmacotherapy and surgery on modifying the surrogate markers. There is some evidence to suggest that delivery of primary prevention interventions by lay-people achieves similar outcomes to delivery by PHC professionals, this is likely to have a major impact on scalability and economic feasibility of lifestyle modification programme delivery.

Cost analyses in the clinical setting are often centred on model based projections utilising data from RCTs, but this is likely to overestimate cost-effectiveness because ‘real-world’ outcomes are more modest. Inclusion of in-trial/programme economic analyses should be encouraged in the future to gain a more accurate assessment of the cost of delivering lifestyle modification programmes. In response to the more modest improvements observed in clinical settings among those at risk for T2DM, it has been controversially suggested that in the US, national policies aimed at reducing overall consumption of food in the general population might have greater benefit than lifestyle programmes specifically targeting those at risk for diabetes. In view of the strong link between T2DM and obesity this suggestion has some merit, but would depend on the scalability and cost of broad-based lifestyle modification programmes, and/or the potential of other measures to achieve a general reduction in food consumption.

Secondary prevention of diabetes-related complications in T1DM and T2DM in the PHC setting has shown considerable success based on modification of surrogate markers of risk (HbA1c, blood pressure, lipid levels). Programme structure varies in line with patient needs and clinical setting, and

this is consistent with calls for individualised patient-centred care to achieve optimal management of diabetes. It is unlikely that a single or limited number of programmes will meet the needs of all Australians with diabetes. However, programmes reporting significant impact are generally based on care provided by multidisciplinary teams (including social and/or mental health professionals) and targeted education of patients and professional staff. The expanded team of care providers will attract increased salary costs but these may be offset by improved glycaemic control and hence reduced cost of complications such as diabetic foot amputation, cardiovascular disease and renal disease.

Methods

A thorough (non-systematic) review of Australian and international literature was undertaken to search academic and grey literature sources for relevant material published between 2008 and September 2014. The databases searched included PubMed, Google Scholar, Scopus, PHCRIS PHC search filter; and publicly accessible websites of relevant companies and organisations including Diabetes Australia, Royal Australian College of General Practitioners, Australian Institute of Health and Welfare. Two specific programme areas were targeted in this review:

- **Primary prevention** of diabetes among those without diagnosed diabetes
- **Secondary prevention** of incident or progression of diabetes-related complications among those with diagnosed diabetes.

Where possible, a distinction was made between diabetes type: T1DM, T2DM, gestational diabetes mellitus (GDM); and where possible on the basis of target population (e.g. general, Indigenous, high-risk populations). International programmes were only included if they were directly applicable to the Australian setting (i.e. Canadian, UK or New Zealand programmes).

For more information, see the full report.