CASE FOR ACTION-
PROPOSAL TO NHMRC
A comprehensive type 2 diabetes prevention program

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Submitted by the Research Translation Faculty Diabetes Mellitus Steering Group (September 2014)
The National Health and Medical Research Council (NHMRC) Research Translation Faculty (the Faculty) was established as a key advisory forum in 2012. The primary work of the Faculty for the 2013-15 Triennium has been to help NHMRC accelerate the translation of research by identifying the most significant gaps between research evidence and health policy and practice in each of the major health areas in the NHMRC Strategic Plan, and to propose to NHMRC possible action it could consider taking to address that gap – these are called Cases for Action. In April and May 2013, fourteen Faculty steering groups were established as NHMRC working committees to each oversee the development of a Case for Action.

The Faculty’s Diabetes Mellitus Steering Group is comprised of a range of experts and includes primary (1˚) and secondary (2˚) representatives of NHMRC Health Care Committee (HCC) and Prevention and Community Health Committee (PCHC). Further information is available at: www.nhmrc.gov.au/research/research-translation/research-translation-faculty/research-translation-faculty-steering-groups.

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**Declaration of interests**

The declarations of interests of Steering Group members, authors and contributors are available at Appendix 2.

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## NHMRC Research Translation Faculty

### Diabetes Mellitus Case for Action

**Title:** A Comprehensive Type 2 Diabetes Prevention Program  
**Submitted to NHMRC for consideration:** September 2014

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1. Rationale

**Diabetes – the growing prevalence**

Type 2 diabetes is predicted to become the number one burden of disease in Australia in the next five years [1]. Best estimates are that around 1.7 million Australians currently have diabetes (all types) [2] and the number of new cases is increasing by 280 every day [3]. Approximately 85% of this is type 2 diabetes.

**Seriousness and Impact**

Type 2 diabetes is a serious and complex metabolic condition that can lead to a range of complications if not well managed. Early diagnosis, optimal treatment and effective ongoing monitoring and self management reduce the risk of diabetes-related complications, which include [1]:

- Heart attacks and strokes: up to four times more likely in people with diabetes
- Blindness: diabetes is the leading cause of preventable blindness in adults
- Kidney failure: three times more common in people with diabetes
- Amputations: 15 times more common in people with diabetes.
- Depression, anxiety and distress: occurring in over 30% of all people with diabetes.

Diabetes accounts for an estimated one-third of all preventable hospital admissions in Australia with longer than average bed stays. Diabetes can reduce a person’s life expectancy by up to 6 years.

While over recent decades prevalence rates of severe complications in people with diabetes have been decreasing in parallel with improved management and possibly earlier diabetes diagnosis, the rates of heart attack, stroke, amputation and end-stage kidney failure in people with diabetes remain well above those occurring in the general population.

**The economic and personal burden of diabetes**

The economic and social cost of diabetes is increasing dramatically. The most recent estimates put the total cost to the nation at $14.6 billion per year [4]. This includes healthcare costs, lost productivity, personal and family costs. If trends continue, the diabetes cost to Australian governments alone will be $30 billion by 2025.

Diabetes is associated with a number of serious and expensive co-morbidities including obstructive sleep apnea, fatty liver leading to cirrhosis, and erectile dysfunction. Australian surveys show that 22-35% of adults with diabetes experience moderate to severe depressive symptoms, while 14-19% experience moderate to severe anxiety symptoms [5]. These all add to the socio-economic cost of diabetes.

The growing personal, national social and economic burden of diabetes underscores the importance of interventions to prevent diabetes and to delay or prevent its complications.
Consequently diabetes prevention should be an essential component of future public health strategies for Australia.

**Pre–diabetes**

Impaired glucose tolerance (IGT) and impaired fasting glucose (IFG) are well recognized categories of intermediate glucose metabolism. These are not disease states but rather risk factors associated with a high risk of developing diabetes and an increased risk of cardiovascular disease. The incidence of diabetes is 10-20 times greater in those with IGT or IFG compared with people with normal glucose tolerance [6]. These categories are commonly collectively referred to as “pre-diabetes”, a term which has attracted some criticism because not all will people with IGT and/or IFG will develop diabetes. Nevertheless the term is useful in conveying diabetes risk to the general community and interventions in people with pre-diabetes have been demonstrated to substantially reduce their risk of progression to diabetes (see below).

At least 2 million Australians are estimated to have pre-diabetes and are consequently at high risk of developing type 2 diabetes [7]. Without intervention approximately one in three of these people will go on to develop type 2 diabetes within 10 years. Rates of progression to diabetes are higher in women with a past history of gestational diabetes and in certain ethnic subgroups.

Modifiable risk factors, particularly being overweight/obese and weight gain, unhealthy diet, and physical inactivity, are driving the development of type 2 diabetes in more than two-thirds of all cases.

**Type 2 Diabetes – evidence for prevention**

*Randomised Controlled Trials*

Curbing the increasing prevalence of type 2 diabetes depends on stopping people developing diabetes. Despite strong evidence that type 2 diabetes in high risk individuals can be prevented, Australia does have not a National Diabetes Prevention Program.

Over the past decade there have been a number of randomized controlled trials (RCTs) in a number of countries and populations, which have clearly demonstrated that the development of type 2 diabetes can be prevented or delayed by a number of interventions. Many trials have demonstrated that structured lifestyle behaviour change programs can reduce the progression from pre-diabetes to type 2 diabetes by up to 58% [8-11]. The US Diabetes Prevention Program (US DPP) reported that the lifestyle intervention approach to type 2 diabetes prevention was more effective than treatment with metformin [11] while another showed them to be equally effective [10]. The preventive effect of the lifestyle intervention has a lasting impact up to 20 years following the active intervention [12-14].

Importantly, the lifestyle behaviour changes for diabetes prevention are similar to those for cardiovascular disease and other chronic disease prevention and therefore benefits are not one dimensional.
As noted above, the medication metformin can also prevent type 2 diabetes in high risk individuals [10,11]. While it has not been as effective as a lifestyle modification program in some studies, metformin may be an appropriate and effective intervention for some people. Similar to lifestyle intervention, the effect of metformin is durable [15]. New data from the US DPP (presented during the 2014 American Diabetes Association meeting) show that metformin can reduce or delay the development of diabetes for up to 15 years, reducing diabetes prevalence by 18% compared with 31% at the end of the RCT. The corresponding reduction for lifestyle intervention was 27% after 15 years compared with 58% at the end of the RCT.

Other medications have also been shown to reduce the risk of developing diabetes, but are either not popular in Australia (acarbose) [16] or have been associated with side effects (thiazolidinediones) [17].

Lifestyle modification programs alone are less successful in preventing diabetes in the severely obese. In this situation, bariatric surgery has been shown to reduce the development of diabetes, both in the short and longer term. The Swedish Obese Subjects (SOS) study, a non-randomised comparative study, included subjects who underwent bariatric surgery (banding 19%, vertical banded gastroplasty 69%, or gastric bypass 12%) and obese matched controls who received usual care. Participants were 37 to 60 years of age and had a BMI ≥ 34 in men and ≥ 38 in women. During a 15 year follow-up period, the incidence of type 2 diabetes was 28.4 cases per 1000 person-years in the control group and 6.8 per 1000 person-years in the bariatric surgery group, an 87% reduction with surgery [18].

**Diabetes prevention and delay**

The US DPP has shown that with longer term follow-up approximately 50% of individuals in lifestyle modification programs or taking metformin will develop diabetes but the results confirm that diabetes is not inevitable in people at high risk. In addition the development of diabetes is delayed in people who develop it. For lifestyle modification, as well as the 27% less diabetes over the 15 years of the trial, there was a 1.1-year shorter duration of diabetes over the same time course in people who developed diabetes. For metformin, the 18% less diabetes was accompanied by a 0.6-year shorter duration of diabetes in people who developed diabetes [15]. In the Finnish DPS, lifestyle reduced the development of diabetes by 33% over 13 years and postponed the development of diabetes by 5 years in people who developed diabetes [19]. Both the reduction and delay in diabetes would have an important public health impact since population ageing is one of the most important drivers of the increasing number of people with diabetes.

**Cost effectiveness**

A number of studies have demonstrated the cost-effectiveness of interventions to prevent diabetes [20-27]. For example Palmer and Tucker [23] modeled the findings of the US DPP from a 3rd-party payer perspective in Australia. They reported lifetime incremental direct costs of $1217 per subject for metformin versus control and cost savings of $289 for lifestyle intervention versus control and concluded that prevention of type 2 diabetes in this high risk group represented good value for money, and is even cost savings for the lifestyle intervention. The most recent data from the US DPP found that, in the US setting, metformin was cost saving
while the intensive lifestyle intervention was reasonably cost-effective at $10,760 per quality-adjusted life-year (QALY) gained compared with placebo [15]. Table 1 represents a qualitative comparison of some prevention interventions against these parameters.

### Table 1: Considerations in Diabetes Prevention Strategies

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Reach</th>
<th>Cost</th>
<th>Cost effective</th>
<th>Available/scalable</th>
<th>Known potential side effects</th>
<th>Evaluation/evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group Lifestyle change intervention (face to face)</td>
<td>√</td>
<td>Low</td>
<td>√</td>
<td>√</td>
<td>-</td>
<td>√</td>
</tr>
<tr>
<td>Group Lifestyle change intervention (web based)</td>
<td>√</td>
<td>Low</td>
<td>?</td>
<td>√</td>
<td>-</td>
<td>Limited</td>
</tr>
<tr>
<td>Individual intervention (face to face)</td>
<td>√</td>
<td>Moderate</td>
<td>?</td>
<td>?</td>
<td>-</td>
<td>√</td>
</tr>
<tr>
<td>Individual intervention (phone)</td>
<td>√</td>
<td>Low</td>
<td>?</td>
<td>?</td>
<td>-</td>
<td>Limited</td>
</tr>
<tr>
<td>Individual intervention (web based)</td>
<td>√</td>
<td>Low</td>
<td>?</td>
<td>√</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Individual clinical intervention – Medication</td>
<td>√</td>
<td>Low</td>
<td>√</td>
<td>√</td>
<td>Low</td>
<td>√</td>
</tr>
<tr>
<td>Bariatric surgery</td>
<td>X</td>
<td>High</td>
<td>√</td>
<td>X</td>
<td>Moderate</td>
<td>√</td>
</tr>
</tbody>
</table>

However some interventions have poor economic credentials (eg orlistat) and could not be recommended on the basis of a cost-effectiveness ratio of less than $50,000/DALY averted [21].

*Community-based translational programs*
The demonstration that a range of cost-effective interventions across different populations can prevent or delay the development of diabetes, led onto the next challenge of translating these findings into community-based programs.

A number of projects have reported the feasibility of community-based programs across a range of settings [28,29]. These projects are effective in inducing weight loss and a reduction of diabetes in the order of 30%. Lifestyle modification programs which achieve a relatively small reduction in weight have been shown to successfully reduce diabetes risk. A recent systematic review and meta-analysis examined the effectiveness of translational diabetes prevention programs promoting lifestyle change to prevent type 2 diabetes in real world settings [27] and concluded that pragmatic diabetes prevention programs which achieve a 2 Kg weight loss are effective. This degree of weight loss has been achieved consistently across Australian programs.

A range of approaches has been used to implement lifestyle modification programs with similar effectiveness. A systematic review and meta-analysis of US-based studies applying the findings of the US DPP lifestyle intervention for people at high risk for diabetes in real-world settings showed that change in weight was similar regardless of whether the intervention was delivered by clinically trained professionals, lay educators or using electronic media assisted approaches [29]. This is relevant for the scalability and economic sustainability of diabetes prevention interventions.

Commercial weight loss programs have also been shown to be effective. A recent randomized study compared counseling using the CDC National Diabetes Education Program material with similar a counseling session and a 2 year membership to Weight Watchers. At 12 months the Weight Watchers group achieved significantly greater weight loss (5.8 v 0.6 kg) and reductions in HbA1c (0.28 v 0.18%).

Such programs have been scaled up into national programs. Experience in the US and Finland demonstrate the feasibility and effectiveness of national diabetes prevention programs [29-34]. Appendix 1 contains a summary of these programs.

**The Australian Context**

A number of translational studies have been conducted in Australia. The Greater Green Triangle Diabetes Prevention Project was a small study which demonstrated the feasibility of lifestyle modification programs in primary health care and achieved reductions in risk factors approaching those observed in clinical trials [36]. The Sydney Diabetes Prevention Program recruited 1250 high risk individuals into a lifestyle modification program delivered by face-to-face groups (90%) or via individually by telephone (10%) and achieved a 2.2kg weight reduction over 12 months [37]. The Victorian *Life!* program is the largest Australian program [38,39]. The last peer reviewed published data [38] reported that of the over 29,000 who had contacted the helpline for information, 14,819 had been referred to program and 8,412 had attended a program. The weight loss achieved translates into an estimated average risk reduction of diabetes of 30%. This experience demonstrates that the interventions in the randomized
controlled trials can be translated into effective community-based prevention programs in the Australian setting.

As a result of the COAG National Reform Agenda funding decision in 2007, a national diabetes prevention program was established in Australia in mid-2008. The program included a number of process initiatives including the adoption of a national diabetes screening tool (AUSDRISK) [40], the development of a group-based lifestyle modification program, an accreditation program for health professionals delivering the lifestyle intervention, and provision of funding for group lifestyle programs. Unfortunately the program was discontinued in November 2011, mainly related to a low rate of recruitment into the program. On review, while the program had a sound theoretical base, there were significant limitations of (and learnings from) the implementation strategy.

Since then, the experience of the national programs in the US and Finland, and the Victorian Life! program have addressed many of these limitations and have demonstrated the feasibility of implementing an effective large scale program to prevent type 2 diabetes in the high risk population including building a prevention workforce with the potential of benefits beyond diabetes risk reduction. For example, the Life! program has achieved sustainable, steady state recruitment through an integrated social marketing strategy that used multiple referral pathways through community awareness raising initiatives, media campaigns and targeted engagement. The referral pathways developed by the Life! program included a call to action response (consumer referral through advertising/collateral and events); primary care (recruitment by health professionals – GP’s, Medicare Locals, pharmacists, practice nurses); workplaces (engagement activities and targeted recruitment of high risk workers); facilitator/provider (recruitment in the local community through local provider referral pathways and face-to-face recruitment at community events; Aboriginal health (recruitment through Aboriginal health workers/centres).

Since 2008, the social marketing campaigns have been designed to create awareness of the seriousness and risk of type 2 diabetes; promote systematic risk assessment and identification of high risk individuals in the target population. Mass media campaigns communicated risk awareness and prompted interested individuals to request further information and a free risk assessment by calling a 24-hour telephone help line (13 RISK), visiting the Life! program website or completing and returning coupons advertised in key print media. All calls-to-action have been designed to collect the individual’s contact details for the purpose of sending more information about type 2 diabetes prevention and to engage the individual with a ‘call back’ service from the central referral team.

The below graph illustrates the number of call to action responses (CtAR) during periods of Life! social marketing campaigns from 2008 to 2011, the response spikes (green) suggest that targeted advertising practices are an efficient strategy for generating referrals [41].
Australia has extensive experience in leading the way in large scale approaches to address preventable illness. The most prominent and successful is the national and international leadership in tobacco control including Quit and the combination of social marketing, evidence based interventions, regulatory and policy initiatives, monitoring and evaluation. This has been a highly effective model which has delivered health and economic benefit for Australians.

**2. Proposed Action Plan**

A comprehensive approach to type 2 diabetes prevention requires targeting people at high risk of developing diabetes complemented by a whole of community/population health approach including policy, structural and environmental factors to reduce the proportion of people shifting from low risk to high risk.

This proposal focuses on the high risk population but also acknowledges the need to consider population factors. The proposed comprehensive approach outlined in this CFA is an important step towards a national type 2 diabetes prevention program.

**2.1 High Risk Population Approach**

**Risk stratification:**
This CFA focuses on people aged 40-70 years at high risk of developing diabetes initially determined by the AUSDRISK tool [40]. Two other groups will also be a focus - Aboriginal and Torres Islanders 18 years and older; and women with a previous history of GDM under age 40. Risk assessment will ensure that people from high risk ethnic groups are also targeted. An AUSDRISK risk score of ≥ 15 was proposed as the cut-point for high risk in the 2009 NHMRC guidelines [42]. Subsequently the score for high risk was lowered to ≥ 12. Since then
considerable experience has accumulated on risk assessment in the Australian context, and it is now timely to review these data to determine the most appropriate combination of risk score and blood testing for risk assessment, taking into consideration reach, efficacy and cost-effectiveness. This is currently a priority among Australian diabetes prevention researchers and this review will be undertaken in the coming months and the outcome will inform this prevention program.

Screening for high risk should take place in a range of settings - primary care, workplace, pharmacy, other community facilities and via the internet and through social media. High risk people should then be individually assessed and triaged according to individual needs.

**Figure 2: Pathway into national type 2 diabetes prevention program**

**Comprehensive approach to intervention:**
To date community-based diabetes prevention programs have largely used a single intervention delivered by a single method. To have the biggest impact a broad-based more comprehensive and personalized approach with multiple intervention pathways for prevention is required as opposed to a “one size fits all” approach.

Lifestyle: The majority of high risk individuals would begin with a lifestyle program offered in a variety of settings: face-to-face groups, webinar groups, individual telephone coaching, and commercially available programs (e.g. weight watchers) according to individual preference but ensuring equitable access.

Medications: Others might be better suited to treatment with metformin, either initially if they are unable to do the required physical activity, or if they fail to respond to the lifestyle program.
Surgery: Some would be considered for bariatric surgery, especially if they have intractable obesity and co-morbidities.

**Key elements of the program:**

The model for a comprehensive national type 2 diabetes prevention program (NDPP) is based on the international experience gained in the US and Finland and the Victorian Life! program. The model is designed to specifically address the implementation limitations of the previous national prevention program. The proposed model includes six key elements:

1. **Marketing risk messages and a call to action**

   Contemporary marketing techniques should be utilised through campaigns based on social marketing principles, health promotion theories and principles of best practice such as the Ottowa Charter (including local communication and engagement strategies) to raise awareness of personal diabetes risk while also improving broader health literacy.

   A comprehensive targeted social marketing campaign, modeled on the proven success and 30 plus years experience in tobacco control (Quit) and road accident campaigns should be used to deliver a message to the high risk target groups about the seriousness of type 2 diabetes and the need to act to prevent it. The campaigns should include a clear call to action encouraging those over 40 years of age to consider their diabetes risk by contacting a national “Riskline” (13 RISK), accessing the NDPP website, visiting their pharmacist or other allied health practitioner, or visiting their GP to directly assess their risk of type 2 diabetes.

   The essential components of the marketing strategies include:
   
   - Mass media campaigns incorporating TV, radio, and print advertising and targeting particular segments at different times
   - A telephone response line - the Riskline (13RISK), similar to the Quitline, is essential to capture responses from individuals and families when they first respond to advertising and risk messages and start them immediately on a pathway to prevention.
   - Promotion of pharmacy as an easily accessible place for structured risk assessment and referral to prevention pathways
   - Promotion to health professionals with a particular focus on Medicare Locals/Primary Health Networks, pharmacies, primary health care providers such as community health centres and private health practitioners
   - Community engagement activities including a presence at high profile local events such as community shows and health events
   - Online and social media strategies, anchored by a NDPP website and promotion through social media such as Facebook and Twitter

2. **Systematic identification of high risk individuals across a broad range of settings**

   Promote systematic risk assessment for type 2 diabetes across the community using the Australian type 2 diabetes risk tool (AUSDRISK) in people aged 40-70 years, Aboriginal and Torres Strait Islander people aged 18 years and over and women with a previous history of gestational diabetes by:
• Utilising accessible, existing community settings such as pharmacy and other community venues
• Workplaces for health risk assessment via health checks including AUSDRISK
• Systematic referral of all people with a high risk score for clinical assessment with integrated assessments of diabetes, absolute cardiovascular risk, and kidney health risk.

Using non-invasive risk stratification tools such as AUSDRISK followed by a screening blood test (fasting plasma glucose, HbA1c or an oral glucose tolerance test) is the most cost-effective method for screening [43] and is the approach which has been adopted by other national programs [30,35] and in translational programs within Australia [44].

The integrated clinical assessment by a general practitioner is required as soon as possible to confirm the screening results and exclude the possibility of undiagnosed diabetes. Some people will be identified with existing type 2 diabetes and they should be offered diabetes management co-ordinated by their GP, supported by education to best manage their condition and registration with the National Diabetes Services Scheme (NDSS).

3. Intervention based on the most appropriate individual pathway for prevention

Based on the evidence outlined above, it is proposed to offer people at high risk but without diabetes a tailored prevention intervention. Success depends on the availability of the broadest range of interventions. Depending on the state of their health, their location, their work commitments, their socio-economic status and their preference, people will be candidates for particular streams of intervention. This approach specifically addresses a significant limitation of the previous national prevention program which offered only a group lifestyle program.

Options for the lifestyle program currently include face-to-face groups and individual telephone counseling. However group programs can also be delivered by interactive webinars and easily adapted for other settings including commercial providers such as Weight Watchers.

Other available and proven options, particularly for those unable or unwilling to participate in a lifestyle modification program, include metformin and bariatric surgery.

Culturally appropriate intervention pathways and programs for Aboriginal and Torres Strait Islander people at high risk of type 2 diabetes is a key component. The Victorian Road to Good Health course, built on culturally relevant messages and resources and a group-based holistic healthy lifestyle program, delivered by Aboriginal Health Workers and services and involving the whole family demonstrates significant progress towards a modified program of interventions suitable for Aboriginal and Torres Strait Islander people. Interventions to prevent diabetes in this setting could include particular national and state based roles for Aboriginal leaders in health in the indigenous community, as well as the local Aboriginal health care workers, and among the methods utilised, could include a focus on the application of traditional Indigenous lifestyles to help prevent diabetes. In addition, the infrastructure of medical services and community controlled heath organisations for Indigenous Australians offer considerable opportunities for diabetes prevention.
When considering potential intervention options for a national roll out of a comprehensive diabetes prevention package, a range of factors require consideration including reach, cost and cost effectiveness, availability and scalability, potential side effects and evidence. While cost effectiveness is critical particularly in the current fiscal environment, as the ACE Prevention Study articulated, when deciding on the best bundle of interventions, “policy relevance is greatly improved if cost-effectiveness information is combined with information on broader issues that routinely impinge on healthcare decisions, such as affordability, equity of access, feasibility of implementation, reach and size of impact and quality of the evidence base” [27].

4. A prevention workforce

There is already an established national quality controlled training program for diabetes prevention in Australia. The Primary Care Collaborative and Medicare Locals / Primary Health Networks are also mechanisms by which training could be offered. A comprehensive national program aims to create a network capable of delivering outcomes across Australia and across a range of settings.

A prevention workforce of health professionals trained and certified in diabetes risk assessment and prevention should be developed in each state and territory. Suitable health professionals can be drawn from a range of fields including nursing, dietetics, physiotherapy, exercise physiology, pharmacy, psychology, and aboriginal health workers.

This process can be informed by the Life! program delivery model [38] whereby prevention service providers had a service agreement that specified program standards and ensured that the programs were delivered by trained and certified facilitators. The role of the service provider was to manage the day to day functions of delivering the course, including engaging facilitators and ensuring that courses that are delivered meet program accreditation standards. Prevention Service Providers were drawn from community health agencies, Medicare Locals, private allied health and nursing providers and selected based on their location and capacity to deliver the program. This ensured that prevention courses were delivered in areas of high need and offered at a variety of times and locations to maximise access.

This is also an essential component of the US CDC national diabetes prevention program [30].

5. Evaluation

There are a number of existing mechanisms through which reach, effectiveness and cost of the program can be evaluated. Evaluation of outcomes and quality assurance should be integrated within the program design and evaluation feedback mechanisms should be in place to keep stakeholders informed on the program.

To ensure that outcomes are tracked, fidelity of the program maintained, and improvements made to delivery, a centralised web-based database should be developed to capture all relevant data from program participants. This process is essential to help ensure initial diabetes risk stratification and thus effectiveness of personalised intervention, all in a de-identified grouped and sub-grouped data reporting format. Each state based or territory organisation involved in the coordination of the program should be able to access these data to monitor their key performance indicators and other outcome measures which should be determined
and reviewed in the evaluation process and should contribute to continuous quality improvements. A key element is a continuous quality improvement program based on evaluation of local activities and identifying areas for potential improvement.

Impact assessment should be based on the RE-AIM (Reach, Efficacy/Effectiveness, Adoption, Implementation, and Maintenance) evaluation framework for complex implementation programs to analyse the reach, effectiveness, adoption and implementation of the intervention. The main outcomes would be the impact on diabetes prevalence (a reduction or at least a slowing in the increase) over time determined through repeated Australian Health Surveys. Process indicators should include participation rates in and access to the program, and changes in key risk factors for diabetes (weight, physical activity, dietary behaviour). Cost and cost-effectiveness analyses should also be undertaken. A key to the costing and cost-effectiveness analyses is the use of effective data linkage on a national basis to capture broad reaching impacts on a large-scale population. This initiative could be linked to NHMRC activities through the National data reference committee.

Changes in risk factors should be apparent within 2 years of initiating the program and it is projected that the impact on diabetes prevalence could be seen after 10 years. Follow up of at least 10 years would be required to demonstrate an impact on diabetes related complications and societal economic burden.

6. Co-ordination

This should use and build on existing infrastructure and organizational arrangements including the Commonwealth, State and Territory governments, local health services, local government, Medicare Locals / Primary Health Networks, Diabetes Australia, Aboriginal and Torres Strait Islander organisations and providers, pharmacy and Multicultural Health groups and private sector providers.

Different levels of co-ordination would be required for successful implementation of the program.

At a national level a National Steering Committee should be established to provide effective leadership and engagement across sectors. Membership should include leaders from key groups including consumers, diabetes prevention researchers, health professionals, and government.

A project management team should be formed to provide advice and information to the National Steering Committee and to oversee planning, program development, implementation and budget of the NDPP.

The group should be supported by a number of working groups to support the development, implementation and evaluation of key elements of the program including social marketing, facilitator training and program evaluation.

It is proposed that the NDPP would be co-ordinated and managed by Diabetes Australia (DA), similar to the role of DA Victoria in the Victorian Life! program. DA would establish a national
NDPP office to coordinate the operation of the program and oversee the NDPP call centres and website, data management and reporting.

A national model would involve state/territory based delivery partnership structures including state/territory health services, GP and primary care organizations/structures, non-government organizations and workplace employer organization structures. At a state and territory level, a steering committee would be required to integrate and co-ordinate the program with other activities. Regional hubs are an option to manage delivery at a state level and functions may include local social marketing campaigns, and provider and facilitator training and management.

Local level engagement and implementation is crucial to the success of a national prevention program. The local unit could be local government, local health district or primary health network, or preferably a combination of all three. Local implementation strategies are essential and can only be informed by the involvement of local stakeholders responsible for implementing the program.

**In summary**, the proposed national prevention program addresses significant implementation limitations of the previous Australian national diabetes prevention program including:

- A concerted awareness raising marketing campaign
- Extending the target group to a higher risk age range of 40-70 years rather than restricting to people aged 40-49 years
- Broadening the screening location beyond primary care to other easily accessible locations including pharmacy and the workplace
- Broadening the range of interventions beyond lifestyle only interventions
- Providing a wide range of lifestyle interventions beyond a group-based face-to-face program
- An integrated national co-ordination and implementation infrastructure

### 2.2 Whole of community/whole of population approach

This proposal focuses on the targeted high risk approach. However this would ideally be complemented by simultaneously considering and addressing some whole of community / population level interventions. The main target is to slow the growth of the obesity epidemic, the main driver of type 2 diabetes, and prevent low risk individuals moving into the high risk category.

Populations consist of individuals and population change depends on engaging a sufficient number of individuals to modify their risk factors for type 2 diabetes. While ultimately it is the personal responsibility of individuals to embrace advice to change their lifestyle, providing a supportive environment will help facilitate individual change.

A healthy environment to encourage and support individual responsibility for change might include:

- Improved food labelling to enable Australians to make healthier choices
- Reducing the marketing and promotion of unhealthy foods to Australian children
- Increasing the availability and consumption of healthy foods
• Ensuring children have easy access to water and healthy food options
• Increasing physical activity through incentives to promote active transport including more walking and more cycling; and expand school based approaches including physical education in schools and after school activity programs
• Reducing sedentary behaviours in the home environment through reduced screen time for children and families and in the workplace through effective workplace design and health promotion programs.
• Addressing socio-economic disadvantage with health impact

These initiatives should integrate with and link to national policy and to Commonwealth, State/Territory and local government initiatives in these areas.

**Barriers to comprehensive diabetes prevention**
Currently, the few diabetes prevention initiatives in Australia are occurring in an uncoordinated manner. National co-ordination and integration are likely to increase their reach and effectiveness, reduce duplication of effort and increase their national impact.

There are some specific issues in the implementation of this prevention program which should be addressed:

**Screening:**
Participation in a prevention program requires the exclusion of existing diabetes, which under current Australian guidelines requires an oral glucose tolerance test in a substantial number of people found to be at high risk based on the AUSDRISK tool [40]. This is a significant barrier to recruiting individuals into prevention programs. There are ways to overcome this barrier, for example, in one program [37] HbA1c was used as a diagnostic criterion for diabetes and incorporated into the screening and recruitment process streamlining and increasing referral rates. However, while HbA1c testing is currently reimbursed for ongoing management and monitoring of diagnosed diabetes, it is not reimbursed for use as a diagnostic tool in people with previously undiagnosed diabetes. Use as a diagnostic criterion for diabetes is currently under consideration by the Medical Services Advisory Committee.

**Metformin:**
Using metformin as an option in a comprehensive prevention program requires extending PBS indications given that it is not currently listed for use in pre-diabetes or diabetes prevention. However metformin is approved by the TGA for uses which encompass pre-diabetes and the cost of metformin is low.

**Bariatric surgery:**
Wider access to bariatric surgery requires Commonwealth and/or State/Territory intervention. While bariatric surgery is listed on the MBS the vast majority occurs in the private sector, leading to significant out of pocket costs. Despite effectiveness in preventing longer term costs to the health system, most State and Territory governments have withdrawn from or placed limits on provision of bariatric surgery in public hospitals. A co-ordinated national approach is needed in this area, linked to current initiatives to create a registry in bariatric surgery.
Access of specific target populations:
In addition to ensuring culturally appropriate programs for Aboriginal and Torres Strait Islanders discussed above, other high risk populations will also require tailoring of the program. This has been addressed in some Australian programs. For example the Sydney Diabetes Prevention Program provided programs for Mandarin-speaking Chinese people and Arabic-speaking people with specially designed programs implemented by trained health professionals who were native speakers of those languages [37].

Program Timeframe
The program consists of flexible components which can be scaled up over varying timeframes. The infrastructure from previous trials and the *Life!* program in Victoria form the basis of the proposed national program and could be effectively scaled up in a relatively short period. However a number of specific components need to be negotiated with stakeholders. Overall it is envisaged that a national roll out could be achieved in 3-4 years. For each individual site initiating the program, risk factor improvement would be evident within 2 years. Overall national impact on risk factor improvement across the program could be achieved within 5 years. Future Australian Health Surveys could document the effect on diabetes prevalence over 10 years.

A staged roll out could include:
Year 1: Stakeholder engagement; establishment of the organisational structure; refining the screening program and establishing screening sites; reformulation of the training program materials and protocols; establishment of an accreditation process; addressing barriers across other sectors of the health system (MBS, PBS); development of a social marketing program
Year 2: Initial implementation/roll out in a number of medicare locals / primary health networks in key states.
Year 3: Full roll out in key states
Year 4: Full national roll out

Note that evaluation, feedback and improvement would occur at each stage to integrate learnings and further develop the program.

3. Impact
There are over 2 million people in Australia who are at high risk of developing diabetes who could potentially benefit from a diabetes prevention program. The overall effect of the various prevention interventions tested in RCT’s is an approximate 50% reduction in the development of type 2 diabetes over 3 years and a benefit which has been maintained for up to 20 years [13]. Translation into community-based programs shows an approximate 30% reduction in risk with less intensive programs [38]. Longer term follow up has been associated with significant reductions in diabetic retinopathy [45] and a non-significant trend for reduced mortality [13]. Cost effectiveness has been shown for in-trial analyses and also longer term modeling. A
comprehensive type 2 diabetes national prevention program targeting people at high risk for diabetes, and including a broader healthy lifestyle message for the general community, thus has the capacity to reduce diabetes onset and its complications, improving prospective health outcomes for many in the Australian community and for Australia as a whole. In addition this program would have a beneficial impact on obesity and related diseases.

4. Potential role of the NHMRC

NHMRC Context: Diabetes is a national Health Priority area. Recently a National Diabetes Strategy Advisory Group was established and includes a senior representative from the NHMRC. This CFA would link closely with the prevention of type 2 diabetes plan in the new National Diabetes Strategy which is currently under development.

Alignment with the NHMRC strategic plan and priorities: This CFA will

• Create new knowledge through implementation research and evaluation
• Provide an extended evidence-base for research translation addressing a significant public health challenge
• Maximise benefits to Australia’s health and prosperity from the work of NHMRC

Evidence update: Consistent with the above, the proposed screening protocol in this CFA is based on the 2009 NHMRC guidelines for prevention of type 2 diabetes. This CFA provides the basis for NHMRC to lead the review and update of the 2009 guideline based on new Australian knowledge gained since the guidelines were endorsed.

CFA framework for action: This CFA is based on established frameworks for translation of evidence-based best practice which will generate new knowledge at each step. These include:

a) Synthesis of existing knowledge, especially in implementation
b) Implementation research during each stage of the development and roll out the program which will in turn inform each of the components of the RE-AIM framework (reach, efficacy/effectiveness, adoption, implementation and maintenance).
c) Organisation and program level facilitators and barriers for program scalability.

Relevance of NHMRC CFA process:
NHMRC support for selecting diabetes prevention as the CFA in diabetes has already acknowledged this activity as a vital public health challenge and draws attention to diabetes prevention as an important area for implementation research support through a variety of funding opportunities including the NHMRC, governments and other funding bodies.

Specific NHMRC actions recommended for this CFA include:

1. NHMRC to provide evidence-based advice to Commonwealth, state and territory departments of health in support of interventions to prevent diabetes. Opportunities for this include:
• Providing input to the Commonwealth Department of Health and the National Diabetes Strategy Advisory Group developing the new National Diabetes Strategy.
• Updating the recommendations in the 2009 NHMRC guideline on prevention of type 2 diabetes, including screening protocols and interventions.
• Supporting the case for a staged implementation of a national evidence-based diabetes prevention program. The group involved with developing this CFA is nationally and internationally recognized as established and active researchers in the broad field of diabetes prevention and has been instrumental in generating new knowledge to inform this comprehensive diabetes prevention program.

2. Support the case for Commonwealth and State / Territory funding for essential components of the program eg establishing the program infrastructure, the national risk line, some aspects of the marketing campaign.

3. Work with other relevant stakeholders to promote the evidence for and rationale for adoption and implementation of the program.

4. Provide representation for key roles within the organizational structure and governance of the program.

5. Provide advice on and be actively involved with the evaluation and data linkages required to monitor the program.
Acknowledgments:

This CFA was developed by:
Professor Stephen Colagiuri – Boden Institute, University of Sydney
Adjunct Professor Greg Johnson – CEO, Diabetes Australia; Adjunct Professor, Deakin University

In collaboration with a Proposal Development Committee consisting of:
Professor James A Dunbar – Deakin Population Health Strategic Research Centre, formerly Director
Greater Green Triangle University Department of Rural Health, Deakin University
Professor Andrew Palmer – Menzies Institute/University of Tasmania
Mr Mark Slattery – Director Health Networks, WA Health Department
Dr Amy Timoshanko – National Prevention Program Leader for Diabetes Australia
Ms Cynthia Kennedy – Policy and Advocacy Manager, Diabetes Queensland
References


Appendix 1

The US National Diabetes Prevention Program was establish under the auspices of the Center for Disease Control (CDC) to implement local evidence-based lifestyle change programs for people with pre-diabetes who are at high risk for type 2 diabetes [31]. It is a public-private partnership of community organizations, private insurers, health care organizations, employers, and government agencies. The inaugural partners of the program were the CDC, YMCA and UnitedHealth Group. It has four main pillars:

- Development and training of a workforce of lifestyle coaches to deliver the program [provided and co-ordinated through the Diabetes Training & Technical Assistance Center at Emory University]
- A national register of CDC accredited organizations which deliver the diabetes prevention program and collect data on the program. Accreditation is a 2-step procedure whereby organizations receive “pending recognition” status when it has agreed to use the CDC curriculum and the CDC reporting requirements and provides data reports every 6 months. Programs remain in “pending recognition” status for 24 months at which time “full recognition” is awarded to programs that meet the CDC performance requirements. CDC supports organizations with technical assistance
- Community-based intervention sites which include the YMCA (CDC funded) and UnitedHealth Care-funded sites. Since its inception a large range of sites are now operating, including Medicare and Medicaid funded programs.
- PR and health marketing to increase awareness of diabetes risk among those at risk and health care professionals.

Risk assessment is performed using a pre-diabetes risk questionnaire followed by blood testing with a fasting plasma glucose or HbA1c. A number of publications have documented the model and its implementation [30-34].

In 2000, Finland introduced a national diabetes program - Development Programme for the Prevention and Care of Diabetes (DEHKO 2000-2010) to prevent type 2 diabetes and diabetes-related complications [34]. The prevention program was based on the Finnish DPS and involved screening with the FINDRISK questionnaire, blood testing for diabetes / pre-diabetes and a lifestyle intervention program. In ten years, DEHKO constructed new action models for health care which were implemented throughout Finland. DEHKO was coordinated by the Finnish Diabetes Association which was also responsible for the national sub-projects of DEHKO. The reach and success of this community-based program in preventing diabetes has been documented with the risk of diabetes being reduced by 70% in the group who lost ≥5% weight and by 28% in the group who lost 2.5–4.9% weight compared with the group who maintained weight [34]. DEHKO officially ended in 2011, but continues as part of the national “One Life projects” – a joint national initiative in partnership with the Finnish Brain Association, the Finnish Diabetes Association and the Finnish Heart Association aimed at various health issues including diabetes.
# Appendix 2

Diabetes Mellitus Case for Action - Declarations of Interests

The declarations of interests of Steering Group members, authors and contributors to this Case for Action are listed below.

<table>
<thead>
<tr>
<th>Name and Role(s)</th>
<th>Interest(s) declared</th>
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</table>
| Prof Helena Teede          | **Employment**  
  - Employee and senior academic of Monash University – since 1997 funded by NHMRC fellowships and Monash University  
  - Employee of Monash Health.  
  **Board membership**  
  **Consultancy fees/honorarium**  
  - Novo Nordisk – educational organising committee 2013  
  - Sanofi – educational organising committee  
  - Practice: practising endocrinologist in private and public practice. Primary appointment at Monash Health.  
  **Grants**  
  - Funding: NHMRC, National Heart Foundation (NHF), Diabetes Australia Research Trust (DART), Department of Health-Victorian Government, International Diabetes Federation (IDF), Buckland, Perpetual Trustees, Lew Carty and Helen McPherson Trust, Brockhoff Trust, Cancer Australia  
  - Industry partnership with funds to the institution  
  - Industry funding – pharmaceutical trials funded on a per patient basis. |
| Prof Stephen Colagiuri     | **Board membership**  
  - Astra Zenica/BMS National Advisory Board; MSD National Advisory Board; Novo Nordisk International and National Advisory Board; Sanofi National Advisory Board; Servier International Advisory Board; Takeda National Advisory Board.  
  **Consultancy fees/honorarium; support for travel/accommodation; meals/beverages**  
  - Speaker engagements - honoraria, travel expenses, accommodation and meals received from: Astra Zenica/BMS; MSD; Novo Nordisk; Sanofi; Servier; Takeda.  
  **Grants**  
  - Chief Investigator, NHMRC Program Grant 2013-2017  
  - Chief Investigator, NHMRC Project grant  
  - Chief Investigator, NHMRC EU FP7 Health project. |
| Adj Prof Greg Johnson      | **Employment**  
  - Chief Executive Officer, Diabetes Australia. Diabetes Australia is a charitable NGO  
  - Diabetes Australia has direct interest in a broad range of diabetes prevention and management programs, advocacy, and research  
  - Previous CEO, of Diabetes Australia Victoria for 10 years (until March 2013), and in this role led the development of the Life! Program in Victoria, a state-wide diabetes prevention program funded by the Victorian Government  
  - Diabetes Australia is currently developing proposals for a National Diabetes Prevention Program modelled on the Life!Program in Victoria, and advocating for government and non-government funding.  
  **Grants**  
  - Investigator and/or on governance committees on a number of NHMRC funded projects including:  
    - Investigator, The Diabetes Renal Project (Monash University), and on the Steering Committee  
    - Associate Investigator, MAGDA (Mothers After Gestational Diabetes - Deakin University) and member of the project Board  
    - Associate Investigator, Melbourne Diabetes Prevention Study (Deakin University).  
  **Relationships and activities**  
  - I am involved in the following relationships and alliances - all non profit and none of which give me any direct financial or personal benefits:  
    - Member, Australian Chronic Disease Prevention Alliance (ACDPA) which includes |
### Appendix 2

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<tr>
<th>Name and Role(s)</th>
<th>Interest(s) declared</th>
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| **Adj Prof Greg Johnson** *continued* | Diabetes Australia, Cancer Council Australia, Heart Foundation, Stroke Foundation and Kidney Health Australia. ACDPA advocates for prevention of chronic disease and various policies and programs and research  
• Chair, Steering Committee, National Vascular Disease Prevention Alliance  
• Member, Steering Committee of the Obesity Policy Coalition. |

<table>
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<tr>
<th>Prof Stephen Twigg</th>
<th>Consultancy fees/honorarium</th>
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| • Steering Group member  
• Contributor | I am on/have been on the following Advisory Boards:  
• 2014-present Sanofi-Aventis International Advisory Board (Insulin glargine U300)  
• 2014-present Abbott Scientific Advisory Board (flash glucose monitoring)  
• 2014 Boehringer Ingelheim/Eli Lilly Alliance Advisory Board (Empagliflozin)  
• 2014 Janssen-Cilag Advisory Board (Canagliflozin)  
• 2013-Boehringer Ingelheim/Eli Lilly Alliance Advisory Board (Linagliptin)  
• 2011-2013 AstraZeneca Advisory Board (Onglyza/Dapagliflozin)  
• 2011-2012 Elixir Advisory Board (BMS and Astra Zeneca)  
• 2010-2013 Novo Nordisk Advisory Board (Victoza)  
• 2008-2013 Merck Sharpe & Dohme: Januvia (Sitagliptin)  
• 2009-2013 Novartis: Galvus (Vildagliptin)  
• 2010 SanofiAventis (Lixisenatide). |

**Grants**

Hold/held the following recent research grants, and have applied for NHMRC project Grant funding as a middle Chief Investigator, for funding in 2014:  
**NHMRC Project Grants**

• 2012-2014, Chief Investigator, Title: Role of Inflammation in Diabetic Cardiomyopathy  
• 2010-2013, Chief Investigator, Title: Diabetes exacerbates non-alcoholic steatohepatitis (NASH)  
• 2011-2013, Chief Investigator, Title: Preventing adverse effects of matrix metalloproteinases in diabetic wound healing  
• 2010-2012, Chief Investigator (CIE), Title: Unlocking genetic factors predicting Type 2 Diabetes complications for clinical practice: The FIELD Study  
• 2010-2012, Chief Investigator, Title: Key Role of Connective Tissue Growth Factor in Familial Cardiomyopathy and Heart Failure.  

**JDRFI and JDRFA subuty**

• 2011-2016, site Principal Investigator (PI) on REMOVAL, Chief Investigator of Australian additional sub-study. Title: Reducing Metformin Vascular Adverse Lesions in Type 1 Diabetes (REMOVAl) clinical trial  
• 2014: JDRF Clinical Research Network Feasibility study in type 1 diabetes and exercise.  

**Speeches/lectures**

Chair and meeting organiser:  
• 2014: Diabesity weekend national clinical conference (Astra Zeneca)  
• 2014: NSW Endocrinologist-Renal Specialist weekend (Servier)  
• 2012 Charles Perkins Centre Showcase Symposium  
• 2012 Charles Perkins Centre Special Luncheon Seminar, in collaboration with the Australia-Israeli Chamber of Commerce.  

**Research**

Domestic Invited Speaker:  
• 2013 'Diabetes Accelerates NAFLD' at the Baker International Diabetes Institute and DA-Vic Annual experts meeting  
• 2012 'Promise of Connective Tissue Growth Factor in Diabetic Wound Healing' Combined 3rd Australasian Wound and Tissue Repair Society and the 9th Australasian Society For Dermatology Research, Sydney.  

International Invited Speaker:  
• 2014 Keynote speaker at the New Zealand Society for the study of Diabetes Annual Scientific Meeting on growth factors in diabetes complications  
• 2013 'The Role and regulation of CCN proteins in Diabetes and Obesity', at the Federation of American Societies for Experimental Biology (FASEB) Vermont Summer Meeting, USA with meeting entitled 'Matricellular proteins in development, health and disease'
### Name and Role(s) | Interest(s) declared
--- | ---
**Prof Stephen Twigg**  
...continued |  
- 2012 'Type 1 diabetes and exercise' 9th International Diabetes Federation Western Pacific Conference and 4th AASD Scientific Meeting, Osaka, Japan  
- 2011 'Diabetes induces cirrhosis in a high fat fed Obesity Model' invited speaker international CCN meeting in Vancouver Canada.  

**Education**  
Advanced trainees:  
- 2013 Speaker at the Royal Australasian College of Physicians national Endocrinology Advanced Trainees interactive on-line lecture series, addressing the topic "Risk Stratification and Personalising Foot Care in People with Diabetes"  
- 2013 Organiser of the national Australian Diabetes Society, Practical Diabetes Foot Care session for advanced trainees in Endocrinology and General Medicine, Sydney  
- 2012 Medtronic Continuous Subcutaneous Insulin Therapy weekend Training Programme Module 1 (Medtronic) March and August  
- 2013 Invited Plenary Speaker at the National Diabetes Institute trans-Asia Meeting on Diabetes Complications in Kuala Lumpur.  

**Specialists Endocrinologists:**  
- 2013 Chair of Faculty of the 'Diabetes' two day Weekend meeting (Astra Zeneca)  
- 2012 'Individualising care in diabetes management to sustain targets' at the 21st Jakarta Diabetes Meeting, Indonesia and satellite meeting on clinical case studies.  
- 2012 'Optimising Metabolic Control through the MAP process' Key opinion leaders meeting, Hong Kong (Abbott Diabetes Care int.)  
- 2012 'Metformin: first line in type 2 diabetes care' Glucophage Elite Club Meetings in Shanghai and Guangzhou, Sino-American Shanghai Squibb Pharmaceuticals Ltd (SASS)  
- 2012 Invited speaker at Prof. Philip Clifton-Bligh Festschrift on 'Research in diabetes complications'  
- 2012 Educational sessions on 'diabetes research' and also clinical case studies, in the BMS Preceptorship (40 doctors from mainland China), Diabetes Centre, RPAH.  
- 2012 talk on 'diabetes research: diabetes and NAFLD' in Novartis Preceptorship to 6 doctors and diabetes educators from Asia (Thailand; India; Indonesia)  
- 2012 Diabetes Experts Forum Weekend, Steering Committee and Session Chairperson, (Sanofi-Aventis)  
- 2012 'Type 1 diabetes clinical care guidelines: Severe Hypoglycaemia' Directions in Diabetes Meeting (Eli Lilly).  

**Diabetes Educators:**  
- 2013 'Type 1 Diabetes and Exercise' (Australian Diabetes Educators Association Day, NovoNordisk sponsor).  

**General practitioners:**  
- 2013 'Individualising targets in diabetes care' evening talk to local GPs (Astra Zeneca)  
- 2012 Workshop development and facilitation. Active learning module topic 'Trouble shooting medical management of diabetic patients (how to manage travel, illness, lack of diabetes control)', Melbourne, Australia (Novartis Pharmaceuticals)  
- 2012 'Diabetes: An update 'Presentation, Sydney (Novartis Pharmaceuticals)  
- 2012 Two RPAH Diabetes Centre Webinars 'Prediabetes' and 'Blood glucose targets in Diabetes'  
- 2012 'Diabetes complication and management strategies to improve patient outcomes', Presentation, Sydney (MSD).  

**Expert testimony**  
- I have represented one Pharma (GSK) in expert testimony to the PBS in 2008 on triple oral therapy in diabetes.  

**Expert opinion**  
- 2012 Fred Hollows Foundation expert advisory group member for funds prioritising in diabetic eye disease  
- 2012 Australian Diabetes Council (ADC) Research Advisory Group member, providing advice on research priorities and grant assessment mechanisms to ADC Board.  

**Other**  
- 2011-present Diabetes Australia Representative (one of six) to the International Diabetes Federation (Honorary role)
<table>
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<tr>
<th>Name and Role(s)</th>
<th>Interest(s) declared</th>
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</thead>
</table>
| **Prof Stephen Twiggs...continued** | - 2002-2010 Australian Diabetes Society- elected to Executive Council by ADS members, with roles as President 2008-2010; Vice-President 2006-08; Honorary Treasurer 2002-2006.  
**NHMRC Clinical Care Guidelines Development in Diabetes**  
- 2009-2013 NHMRC Clinical Care Guidelines Development in Type 1 Diabetes, across the lifespan -Chair (adult); the Guidelines were accepted by NHMRC Australia and Federal Department of Health and Ageing in November 2011 and were communicated in 2012-present  
- 2007-2009 NHMRC National Evidence Based Guideline for Diagnosis, Prevention and Management of Chronic Kidney Disease in Type 2 Diabetes- member of expert group and writing panel  
- 2012-present Chair (Medical) of the Agency for Clinical Innovation (ACI) for NSW Department of Health  
- 2012-present Editor-in-Chief of the GP Educational Journal 'Endocrinology Today'  
- 2008-2012 Chair of Australian Diabetes Society and NDSS Diabetes and Driving Working Party  
- 2008-present Honorary member of the Kellion Diabetes Foundation Ltd Board of Governors which funds a DA grant annually and the annual Kellion Award Lecture. |
| **Prof Sophia Zoungas** | **Board Membership**  
- AstraZeneca Pty Ltd; Boehringer Ingelheim Pty Ltd; Bristol-Myers Squibb Australia Pty Ltd; Merck Sharp & Dohme (Australia) Pty Ltd; Novo Nordisk Pharmaceuticals Pty Ltd; Sanofi-aventis Group; AbbVie.  
**Consultancy fees/honorarium**  
- AstraZeneca Pty Ltd; Boehringer Ingelheim Pty Ltd; Bristol-Myers Squibb Australia Pty Ltd; GlaxoSmithKline Australia Pty Ltd; Merck Sharp & Dohme (Australia) Pty Ltd; Novartis Pharmaceuticals Australia Pty Ltd; Novo Nordisk Pharmaceuticals Pty Ltd; Sanofi-aventis Group; Servier Laboratories (Australia) Pty Ltd; MediMark Australia Education; Elixir Healthcare Education.  
**Grants**  
- NHMRC; Heart Foundation; Diabetes Australia Research Trust (DART); Australian Diabetes Society.  
**Other**  
- Contract work (through Institution): Bristol-Myers Squibb Australia Pty Ltd; Commonwealth Department of Health & Ageing.  
**Speeches/Lectures**  
**International Scientific meetings**  
2014  
- IDF-WPR Congress Singapore and Hong Kong - Invited symposium entitled “Optimising glycaemic control to improve renal and cardiovascular outcomes. Findings from ADVANCE-ON”  
- European Association for the Study of Diabetes, Vienna, Austria - Invited symposium entitled “ADVANCE-ON Post-trial Observational Study”  
- MSD Scientific Symposium, Seoul, South Korea: Invited presentation entitled “Have we underestimated hypoglycemia? Reducing the risk in patients with Type 2 Diabetes”.  
2013  
- 22nd World Diabetes Congress, Melbourne, Australia - Member of the Program Organising Committee, Basic and Clinical Science Theme; Invited presentation entitled “Diabetes and ESKD: Effects of Glycaemic control”  
- MSD Asia Pacific & Baker IDI Diabetes Workshop, Melbourne, Australia - Invited presentation entitled “Hypoglycaemia: the hidden problem and its implications”  
- PSEM Annual Convention, Manila & Cebu, Philippines - Plenary Lecture entitled “Intensive glucose control improves kidney outcomes in Type 2 diabetes”  
- Diabetes Stand Alone Scientific Symposium – Ho Chi Minh, Vietnam - Invited presentation entitled “Reducing the Risk of Hypoglycemia in Patients with Type 2 Diabetes”.  
2012  
- Diabetes Highlights 2012, Singapore - Invited presentation entitled “The Role of the
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| **Prof Sophia Zounagas**  
...continued | Kidneys in the management of T2DM”  
- The ABCD of glycemic control – toward prevention of diabetic complications, Pisa, Italy - Invited plenary presentation entitled “Too low, too dangerous?”  
- European Association for the Study of Diabetes, Berlin, Germany - Invited presentation entitled “What have we learnt from clinical trials?”  
- MSD Regional Cardiovascular - Metabolic Forum, Mongkok, Hong Kong - Invited presentation entitled “Avoiding hypoglycaemia in diabetes management”  
- MSD Asia Pacific Scientific Meeting and Speaker Forum, Bangkok, Thailand - Invited presentation entitled “Hypoglycaemia: the hidden problem and its implications”  
**National and Local Scientific meetings 2014**  
- Annual Scientific Meeting of the Australian Diabetes Society and the Australian Diabetes Educators Association, Melbourne, Australia - Invited presentation entitled “Australian National Diabetes Audit – Australian Quality Clinical Audit 2013”; Invited presentation entitled “Lessons from the Australian National Diabetes Audit (ANDA)”; Invited presentation entitled “Hypoglycaemia: Have we underestimated the problem in patients with Diabetes?”  
- Master Class Advanced Endocrine Trainees 2014, Melbourne, Australia - Invited presentation entitled “Understanding the effects of trials of glucose lowering drugs assessing cardiovascular outcomes.”  
**2013**  
- The 35th John Murtagh Annual Update Course for GPs, Melbourne, Australia - Invited presentation entitled “Advances in Glucose Lowering Therapy”  
- Annual Scientific Meeting of the Australian Diabetes Society and the Australian Diabetes Educators Association, Sydney, Australia - Invited presentation entitled “Developing and maintaining diabetes services across Australia in the new millennium”  
**2012**  
- Annual Scientific Meeting of the Australian Diabetes Society and the Australian Diabetes Educators Association, Queensland, Australia - Invited presentation entitled “Early insulin therapy for patients with type 2 diabetes; does it have a place”; Oral presentation entitled “ADVANCE-ON: A post-trial observational study”  
**Other (eg unpaid advisory roles)**  
- Yes (not specified). |
| **Prof Chen Chen**  
- Steering Group member | Employment  
- Professor of Endocrinology at The University of Queensland – 2008-2013 funded by an NHMRC fellowship  
- Professor at The University of Queensland – since 2014.  
**Board Membership**  
- Australian Endocrine Society Council member.  
**Affiliations**  
- US Endocrine Society  
- American Physiological Society.  
**Grants**  
- Currently funded by NHMRC, Australian Collaborative Grants, UQ Research grants, etc.  
- Will apply for NHMRC project grants throughout the period during which he is member of this Committee. |
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<tr>
<th>Name and Role(s)</th>
<th>Interest(s) declared</th>
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| Prof Kerin O’Dea  
- Steering Group member | **Board Membership**  
- Non-Executive Director on the Board of Directors for Outback Stores (2010-2013). This tenure commenced in July 2010 and is due to cease on July 15, 2013. Since July 2012, she has accepted standard remuneration of $30,000 p.a. She may be reappointed for a further 3 year term.  
- Grants  
  - Chief Investigator (CIA). NHMRC Program Grant, 'Improving chronic disease outcomes for Indigenous Australians: Causes, Interventions, System Change' (funded until 2015).  
  - Chief Investigator (CIF), NHMRC Partnership Grant 'Northern Territory Diabetes in Pregnancy Project' (funded until 2016)  
  - May apply for NHMRC grants throughout the period during which she is member of this Committee.  
- Speeches/lectures  
  - Prolific author and has an extensive list of publications relevant to the committee, over a period of 44 years  
  - Key invited addresses relevant to this committee in the last 3 years include:  
- Expert testimony  
  - Regular interviews on radio and television to discuss nutrition, diabetes, heart disease and Aboriginal Health.  
- Other (eg unpaid advisory roles)  
  - Addresses professional and community groups such as diabetes educators, medical practitioners, Aboriginal Health Workers and field staff, primary producers and lay groups on issues in preventive health, nutrition and Aboriginal health.  
| **Affiliations** |  
| **International** |  
- International Diabetes Epidemiology Group; American Society of Clinical Nutrition; American Diabetes Association  
| **National** |  
- Australian Diabetes Society; Australian Institute of Aboriginal and Torres Strait Islander Studies; Nutrition Society of Australia; Public Health Association of Australia; Australasian Society for the Study of Obesity; Australian Atherosclerosis Society; Australian Society for Medical Research.  
| **Activities** |  
- Member, Australian Academy of Sciences National Nutrition Committee, 2009; NHMRC Expert Commentator on Nutrition, 2008; Member, Food Security Review Steering Committee, Australian Red Cross, 2010; Member, Expert Network, Healthy Weight Guidelines, Department of Health and Ageing, 2010; Member, Expert Reference Panel: Prevention and Self Management, Australian Primary Care Collaboratives, 2009; Member, Scientific Advisory Committee, Melbourne Collaborative Cohort Study, 1989; Member, Scientific Advisory Committee, Obesity Prevention and Lifestyle initiative, Health Department, South Australia, 2009.  

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<th>Name and Role(s)</th>
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| **Prof Timothy Davis**  
- Steering Group member  
- Steering contact member | Consultancy fees/honorarium  
- Speaker fees  
- Abbott; Eli Lilly  
- Speaker fees and advisory board membership  
- Astra Zeneca; Boehringer Ingelheim; Bristol Meyer Squibb; GlaxoSmithKline; Merck Sharp and Dohme; Novartis; NovoNordisk; Sanofi Aventis  
- Advisory board membership  
- Janssen  
- Grants  
- Research funding: Eli Lilly; Merck Sharp and Dohme; NovoNordisk; Sanofi-aventis Holds NHMRC grants and intends applying for others during the period of steering group membership.  
- Support for travel/accommodation; meals/beverages  
- Provided as part of attendance at Advisory Board/Scientific meetings from: Abbott; Astra Zeneca; Boehringer Ingelheim; Bristol Meyer Squibb; GlaxoSmithKline; Janssen; Merck Sharp and Dohme; Novartis; NovoNordisk; Sanofi aventis  
- Received from NHMRC as part of attendance at Grant Review Panel meetings.  
- Speeches/lectures  
- Has published widely on diabetes in an Australian setting including health-economic aspects that may be relevant to the committee’s activities.  
- Other relationships or activities  
- Co-Lead of the WA Health Department’s Diabetes and Endocrinology Network which has interests which are aligned with those of the relevant committee of the NHMRC. |
| **Prof Ian Caterson**  
- Steering Group member  
- Prevention and Community Health Committee (PCHC) primary contact  
- National Committee (SCOUT) for obesity prevention | Employment  
- Director, Chronic Care and Deputy Clinical Stream Director, Aged Chronic Care and Rehabilitation, Sydney Local Health District. Has private medical practice rights in the Sydney Local Health District  
- Director, Boden Institute of Obesity Nutrition Exercise and Eating Disorders and Boden Professor of Human Nutrition, University of Sydney.  
- Grants  
- Member of a group at the University of Sydney holding an NHMRC Program Grant (2013 -17) and holds two NHMRC Project Grants  
- Has performed and still perform clinical trials of obesity treatment and prevention some of which have been funded by government, but others by the pharmaceutical industry. Current trials are funded by the NHMRC (3), NovoNordisk, Amylin Corporation, and the Egg Board.  
- Consultancy fees/honorarium  
- Serves on the steering committees of international trials (SCOUT and EXSCEL). Honoraria received for the latter.  
- Speeches/lectures  
- Talks given for NovoNordisk, Servier Laboratories, Pfizer and iNova pharmaceuticals in the last 3 years.  
- Board Membership  
- Serves on the scientific advisory board of the Sansom Institute for Health Research, University of SA, the board of the Children’s Medical Research Institute, and Chair the Executive Management Committee of the bariatric surgical register for the Obesity Surgery Society of Australia and New Zealand  
- Chair, Expert Obesity Committee for Australian National Preventive Health Agency (ANPHA)  
- Member, NHMRC Prevention and Community Health Committee. |
| **Prof Philip Clarke**  
- Steering Group member | Grant  
- Chief Investigator on a current NHMRC grant that relates to diabetes. Prof Timothy Davis (also a member of the Diabetes Mellitus Steering Group) is a fellow investigator on this grant. |
<table>
<thead>
<tr>
<th>Name and Role(s)</th>
<th>Interest(s) declared</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prof John Wakerman</strong></td>
<td><strong>Employment</strong></td>
</tr>
<tr>
<td></td>
<td>• Associate Dean Flinders NT, Flinders University.</td>
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<td></td>
<td><strong>Board Membership</strong></td>
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<td>• Deputy Chair, Central Australian Health Service Board</td>
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<td>• Member, Health and Hospitals Fund Board</td>
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<td>• Member, Australian Therapeutic Goods Advisory Council.</td>
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<tr>
<td><strong>Prof Samar Aoun</strong></td>
<td><strong>Employment</strong></td>
</tr>
<tr>
<td></td>
<td>• Professor of Palliative Care, and Associate Dean of Research, Faculty of Health</td>
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<td></td>
<td>Sciences, Curtin University.</td>
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<tr>
<td><strong>Prof Andrew Palmer</strong></td>
<td><strong>Financial interests</strong></td>
</tr>
<tr>
<td></td>
<td>• Received honoraria and consulting fees from Novo Nordisk, Sanofi Aventis, Johnson</td>
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<tr>
<td></td>
<td>and Johnson, Janssen, Amylin, Eli Lilly, Bristol Myer Squibb.</td>
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<tr>
<td></td>
<td><strong>Non-financial interests</strong></td>
</tr>
<tr>
<td></td>
<td>• Has provided pro bono expert advice to Diabetes Tasmania, Diabetes Australia and the</td>
</tr>
<tr>
<td><strong>Ms Cynthia Kennedy</strong></td>
<td><strong>Non-financial interests</strong></td>
</tr>
<tr>
<td></td>
<td>• Employed by Diabetes Queensland and do work for Diabetes Australia writing policy</td>
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<tr>
<td></td>
<td>submissions.</td>
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<tr>
<td><strong>Prof James Dunbar</strong></td>
<td></td>
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<td></td>
<td>• 2008-2011 Director of Evaluation and Development, Life! Program.</td>
</tr>
<tr>
<td><strong>Mr Mark Slattery</strong></td>
<td>Nil interests to declare.</td>
</tr>
<tr>
<td><strong>Dr Amy Timoshanko</strong></td>
<td>Nil interests to declare.</td>
</tr>
</tbody>
</table>