A discussion document for the development of a diabetes prevention strategy for Culturally and Linguistically Diverse (CALD) populations in Australia

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for
Diabetes Australia Victoria and the *Life!* Taking Action on Diabetes program

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"Delivering effective health care to a culturally diverse population is undoubtedly significantly more complex, difficult, time consuming and expensive than providing services to a single culture population. However, this problem is not insurmountable and can be addressed through strategies and approaches that recognise, respect and celebrate cultural diversity" von Hofe B et al (1).

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1. EXECUTIVE SUMMARY

Type 2 diabetes mellitus (T2DM) is one of the major current health issues worldwide. Almost all countries are facing an increase in the prevalence of diabetes. Diabetes prevention programs are being promoted to reduce this burden. China, India, Finland, the United States and Australia have demonstrated the usefulness of such programs.

As migration between countries increases, migration flux has changed the profile of prevalence rates for diabetes. Increases in the culturally and linguistically diverse (CALD) populations are adding to the complexity of issues faced when trying to prevent T2DM. Factors such as dietary habits, literacy levels, English proficiency and cultural health beliefs are additional concerns that need to be considered for CALD communities.

Victoria is known as one of the most multicultural states in Australia, with over 25% of the population born overseas. Therefore, to develop and implement diabetes prevention programs for CALD populations, identification of specific CALD groups at high risk or prevalence of diabetes compared with the Australian-born population, is required.

This discussion document puts forward the most recent data available on CALD populations and diabetes in Victoria. It also addresses the major gaps in evidence related to these communities, which then raises the question of **how to best integrate the needs of CALD communities into diabetes prevention programs, such as the *Life!* Taking Action on Diabetes**.

The main findings of this discussion document are:
- There is a lack of good data sources on the needs of Victorian, or other Australian CALD communities, for CALD specific diabetes prevention programs. The absence of data makes it difficult to decide which CALD communities to target. In consultation with the Department of Human Services (DHS), more work will be done on which CALD communities to target, before a strategy is submitted in September.
- Only one randomised controlled trial for diabetes prevention with CALD communities has been conducted. The trial in the US included Chinese and South Asian groups, but the resources deployed were unrealistic for a routine public health intervention.
- There are no examples of evaluated Australian diabetes education and management programs for CALD communities, with outcome measures that are comparable to the Greater Green

Triangle Diabetes Prevention Program. However there are useful experiences from overseas and the Greater Green Triangle UDRH team members are visiting US and UK sites in October.

- Amongst the literature a Cochrane review of 11 randomised controlled trials of culturally tailored diabetes education programs for CALD communities showed poorer outcomes than Greater Green Triangle Diabetes Prevention Program.

- There is very limited information about how the HAPA model and the underlying psychosocial theories perform in different cultures. Individual versus collective and internal versus external locus of control could be two major cultural differences when applying *Life!* Taking Action on Diabetes to some CALD communities.

- Pragmatically, participants who select themselves for the *Life!* program can be presumed to have decided the benefits for themselves. The *Life!* evaluation framework is able to identify how these participants perform in reducing the risk of diabetes by comparison with others.

- This leaves substantial numbers of people in CALD communities without a culturally appropriate diabetes program. Here the level of evidence about types of interventions is inadequate for policy formation. Convincing evidence can be generated through a randomised controlled trial which would be one of the first in the world.

2. BACKGROUND

Type 2 diabetes mellitus (T2DM) is recognised as one of the major current health issues in modern society (2, 3), where approximately half the risk of developing this condition is attributable to the environment and the remainder is related to genetics (3). T2DM is one of the leading chronic diseases in Australia with 3.6% (700,000 people) being diagnosed in 2004-2005. However, there are still many cases of undiagnosed diabetes. The statistics indicate that for each diagnosed case of diabetes there is one undiagnosed case (4). In Victoria the prevalence of T2DM has increased substantially in recent years (5) as shown in Figure 1.

2001   **2006**

🟩 0-2% people with diabetes 🟧 2-4% people with diabetes 🟥 4-10% people with diabetes
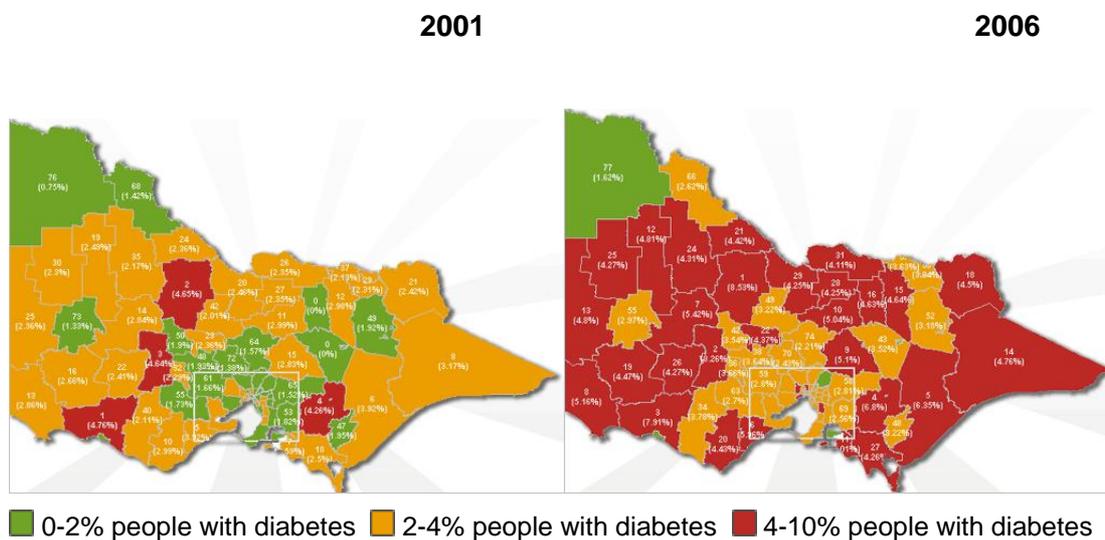
Figure 1. Prevalence of Diabetes for the Victorian population by Local Government Areas in 2001 and 2006 (*Diabetes Australia Victoria, 2006*)

The Greater Green Triangle University Department of Rural Health (GGT UDRH) developed a Diabetes Prevention Program (GGT DPP) for use in Australian primary health care settings with English speaking groups (6). This GGT DPP was based on the Finnish Diabetes Prevention Study (DPS) (7) and the Good Ageing in Lahti Region (GOAL) Lifestyle Implementation Trial (8). Both of these interventions used a lifestyle, behaviour change approach in primary health care settings to prevent T2DM for those at high risk. The intervention goals for both studies were to reduce body weight, reduce dietary and saturated fat, increase physical activity and dietary fibre (7). The DPS showed a relative risk reduction of 58% after a mean intervention period of three years. This result has been sustained during the three years follow up intervention with a 43% relative risk reduction for T2DM (9).

Similar results using the same approach were obtained in the GGT DPP. These included a mean weight reduction of 2.52 kg and waist circumference by 4.17 cm and a risk reduction for T2DM of 40%. Therefore, this study provided evidence that a type 2 diabetes prevention programme using lifestyle intervention is feasible in primary health care settings in Australia (6).

With the success of the GGT DPP, the Victorian Department of Human Services (DHS) funded Diabetes Australia Victoria (DA Vic) and GGT UDRH to develop and implement the *Life!* Taking Action on Diabetes program (*Life!*). *Life!* is an evidence based, behaviour change program that will provide an opportunity for 25,000 Victorians over 50 years of age and at high risk of T2DM to substantially delay or prevent the development of type 2 diabetes. This lifestyle behavior change program consists of six group sessions, attended over a period of eight months. The *Life!* program goals are:

1. No more than 30% energy from fat
2. No more than 10% energy from saturated fat
3. At least 15g/1000 kcal fibre
4. 30 min/day moderate intensity physical activity
5. 5% reduction in body weight

The *Life!* program incorporates the Health Action Process Approach (HAPA) model, where participants are encouraged to set their own goals relevant to achieving program goals (5).

While the *Life!* program may be beneficial in reducing the prevalence of T2DM in the general population, this report is concerned with what needs to be done to support the DHS policy for meeting the specific needs of culturally and linguistically diverse (CALD) populations.

In this document, CALD populations are defined as:
- people born overseas in countries where English is not the main language spoken; or
- people born in Australia whose main or preferred language spoken is not English.

This definition may not always identify the complexities involved in identifying specific CALD communities. Data on country of birth and/or language spoken may not take into account the importance of **cultural identity**. In addition, census data only provide information on languages other than English spoken at home, but does not specify whether these languages are the main or preferred languages.

Victoria comprises a wide range of cultures, with 25% of the population being born overseas, originating from 233 countries, speaking over 180 languages and following 116 religious faiths (10). The health status of CALD populations varies according to factors such as age, birthplace, proficiency in English, socio-economic status and satisfaction with employment and life. Subsequently, different CALD populations can have different patterns of illness from the general population, enjoying advantages for many conditions and disadvantages for others (11).

Certain CALD populations are particularly predisposed to developing impaired glucose tolerance (IGT) (12) and T2DM (13-16). Additionally, the risk of T2DM increases in populations which have migrated to Western countries, when compared with those who remain in their country of birth (13). One of the reasons for this is that there is increased exposure to different lifestyle factors associated with developing T2DM (17-19). Recent statistics indicate that 28% of the Australian population is born overseas, and 35% of people with diabetes are born overseas (20).

The relationship between migration and risk of diabetes can be assumed to be bidirectional, where people arrive in a new country with a genetic predisposition, they may be exposed to stronger or weaker environmental and lifestyle risk factors compared with their country of origin. Given this possible link between migration and the increased risk of T2DM (13), there is a call for diabetes prevention strategies that meet the needs of groups which are culturally and linguistically diverse from the general population.

While this evidence suggests there is a strong necessity for diabetes prevention programs in Australia specifically targeted for CALD populations, there is little published information about such programs. Yet it is recognised that CALD specific T2DM prevention and management programs are delivered routinely in many health services in Australia, in both the public and private sectors. Some of these programs have been reported and are available in the grey literature (21, 22). In general these programs remain vastly unreported; they are programs with little if any theoretical underpinning and rarely contain outcome evaluation at the same level as the published research studies. Nonetheless, it is noted that these existing programs have resources that would be valuable in the development of specific CALD *Life!* programs (CALD *Life!*).

3. What do we know?

An evidence based approach to undertaking the development of CALD *Life!* programs is warranted, as little published information exists about prevention programs for T2DM and their effectiveness. The following questions were posed to expose the available evidence and where the evidence gaps exist:

- What does the evidence suggest regarding the applicability of the HAPA model in CALD groups?
- What is the prevalence of T2DM in other countries and for CALD groups in Australia and Victoria?
- What is the evidence from studies on diabetes prevention or lifestyle modification programs internationally and in Australia?

3.1 Theoretical Models

3.1.1. Health Action Process Approach (HAPA)

In the *Life!* program a combination of different behavioural models are used to deliver health education and counselling to the participants. The HAPA model and self regulation theory are used in the *Life!* program to set individual goals and to motivate individuals to progress from intention to actual behaviour change (23-25). The HAPA model is comprises two distinct phases; '**motivation formation**' and '**action**'.

The Health Action Process Approach
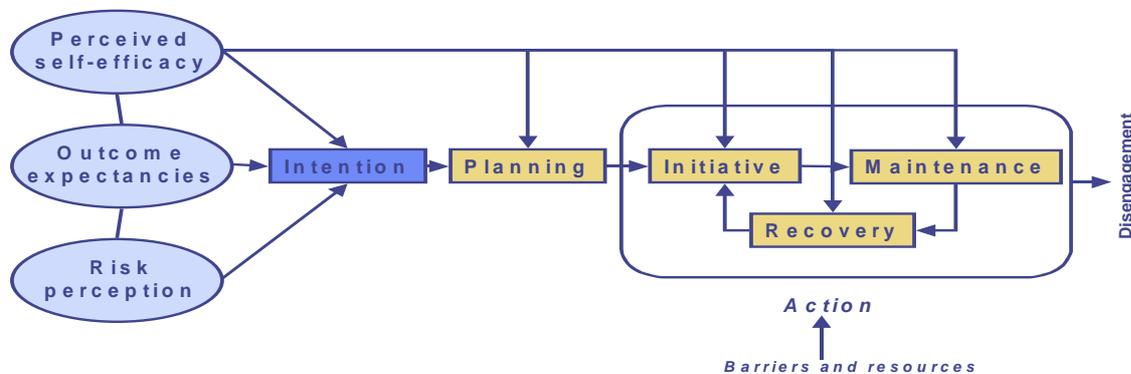
Figure 2. Health Action Process Approach or HAPA model

Motivation Formation

In the motivation formation stage, participants must reach a point where they are considering the possibility of change. Here elements of social cognitive theory such as, risk perception, motives, self-efficacy in decision making and outcome expectancies (or motivation) contribute to the development of goal intentions (25).

Action

During the second stage or action phase, implementation intentions assist the individual to realise their goals and start working towards them. The crucial aspects to this phase include perceived self-efficacy, skills for overcoming barriers and making use of resources (25). When the HAPA model is utilised within the *Life!* program, participants should be able to appropriate self-regulatory strategies in order to:

- Acknowledge that they are at risk for type 2 diabetes;

- Learn that the disease can be prevented by lifestyle changes;

- Gain confidence in their ability to change;

- Decide to change;

- Plan where, when and how to make changes (or action planning);

- Learn how to avoid barriers and use resources (or coping planning), and

- Learn how to recover from relapses.

Internationally recognised measures of risk perception, efficacy expectations, intention, goal planning and social support will be used to develop CALD *Life!* programs that are culturally appropriate in design, implementation and evaluation (24, 26-28). As previously mentioned, some elements of the HAPA remain uncertain in regard to the diversity of culture that will be faced in CALD *Life!* programs. Specific factors such as self efficacy, risk perception and outcome expectancies remain to be investigated when considered in this context and will need to be measured using a Structural Equation Model (SEM).

The use of a SEM would provide a way to analyse how the different determinants of lifestyle change can be used to predict the actual changes in behaviour, physiology and biological outcome measures. Such a SEM is presently under investigation at the GGT UDRH. The main determinants addressed in this investigation are self-efficacy, risk perception, outcome expectations, action planning and coping planning. This approach is likely to better reflect the intervention effect itself and also the predictive value of individuals' characteristics for lifestyle change. The results from the SEM highlight the importance of planning strategies. Currently there are promising results indicating that the HAPA model remains valid for various health behaviours. These offer some support for the hypothesis that the HAPA model can be used for different populations and cultural settings.

3.1.2. Social Determinants

A literature search on behaviour change models, chronic disease prevention, the social determinants of health and multiculturalism suggests that the processes which influence health behaviour can be understood within the broad social, physical, political, economic, structural and cultural environments (29-37).

Biopsychosocial model

Engel has proposed a biopsychosocial model of health, whereby societal factors are viewed as fundamental contributors that affect behaviour through social, psychological and ultimately biological pathways (30, 38-40).

Ecological model

Bronfenbrenner has also developed an ecological view of health, whereby multiple environments (ecologies) directly affect health through **multilevel** (e.g., regions, cities, and neighbourhoods), **multi-structural** (e.g., physical environment, socioeconomic status, and social capital), **multi-**

factorial (e.g., diet, physical activity, smoking, and stress), and **multi-institutional** (e.g., local government, family, and local agency) contexts, which are interdependent of each other and **multi-causal** in nature(29, 41).

Both the Engel and Bronfenbrenner models of health refer to the social determinants, and multiple and interacting pathways that influence health behaviour. This view of health behaviour is particularly relevant to CALD populations, as the process of **acculturation** and **migration** and their effects on health lie within the social, physical, economic, political and cultural environment, and not necessarily with the individual, as many of the health behaviour change models propose (31, 36).

Psychological and psychosocial models of behaviour change may not adequately account for cultural differences in practices and beliefs about health and wellbeing, and illness management and prevention (29). These fundamental differences between and across cultural groups imply that a behaviour change model may not be applicable to CALD populations for prevention of diabetes.

Synergy in developing a CALD *Life!* program may be achieved by taking the most promising concepts from each of the models discussed (HAPA & Social Determinants) and integrating them for use with CALD populations.

3.1.3. Cultural models of health and illness

Hofstede's work has demonstrated that there are national and regional cultural groupings that affect the behavior of societies and organisations. He has developed a model that identifies five primary dimensions to assist in differentiating cultures (42):

- Power Distance,
- Individualism,
- Masculinity,
- Uncertainty Avoidance, and
- Long-Term Orientation.

Hofstede's analysis for the Australian context resulted in a high score of individualism. The Individualism (IDV) index for Australia is 90, the second highest score of any country in Hofstede's surveys from around the world. This has implications for the high level of cultural diversity that exists within Australia, as many CALD communities originate from countries with low individualism

scores, such as China. The low Individualism ranking represents a close and committed member 'group', be that a family, extended family, or extended relationships (42). Therefore, the differences within and between cultures need to be considered when developing lifestyle modification programs to improve health for CALD communities, as some programs may not be successful for the CALD communities unless the program addresses specific cultural beliefs, practices and behaviours.

3.2.   Hierarchy of Evidence

The hierarchy of evidence (below) demonstrates the structural approach used to undertake an efficient study of T2DM in CALD populations. Although there is no single, universally-accepted hierarchy of evidence, there is broad agreement on the relative strength of the principal types of research. Randomised controlled trials (RCTs) rank above observational studies, while expert opinion and anecdotal experience are ranked at the bottom. Evidence hierarchies are integral to evidence-based medicine. The following hierarchy of evidence (43) has been used in this report:

Level of Evidence	Type of Study
1	Evidence from systematic reviews of multiple, well designed, randomised controlled trials.
2	Evidence from at least one properly designed, randomised controlled trial of appropriate size.
3	Evidence from well designed, non-randomised trails, non-controlled intervention studies, cohort studies, time-series or case control studies.
4	Evidence from well designed, non-experimental studies from more than one centre or research group.
5	Opinions of respected authorities based on clinical experience, descriptive studies and reports of expert committees.

3.3.   Type 2 Diabetes Mellitus prevalence internationally

Data from the International Diabetes Federation (IDF) indicates that approximately 194 million people worldwide (5.1%) in the age group 20-79 were estimated to have diabetes in 2003. This estimate of prevalence is expected to increase to 333 million (6.3%) of the adult population by 2025 (44). The regions with the highest number of people with diabetes are the European region and the Western Pacific region with 48 million and 43 million cases respectively. However, the Western Pacific region prevalence rate of 3.1% is significantly lower than the North American region prevalence rate of 7.9% and the European region prevalence rate of 7.8% (44).

3.4 Australian data relating to Type 2 Diabetes Mellitus in CALD populations

Most studies use country of birth to define CALD group membership. One source of data that indicates country of birth and prevalence of diabetes is the 2004-2005 National Health Survey (NHS). Here the prevalence of diabetes for people born in Australia is 3%, other Oceania 4.6%, United Kingdom 5.5%, other North-West Europe 4.6%, Southern and Eastern Europe 10.1%, North Africa and the Middle East 6.4% and South East Asia 4.3% (45).

The same demographic studies have not been undertaken for Victorian CALD populations. Also the data from these studies is not as readily available as the NHS data. A possible source of available demographic data for CALD populations and prevalence of T2DM in Victoria can be obtained from the National Diabetes Register (Diabetes Australia Victoria), but this data has several validity and reliability limitations. As the main gate keeper of Australian immigration, the Department of Immigration and Citizenship would be a possible source for the data required.

A recent study by Sicree *et al.* (46) has estimated the prevalence of diabetes for the Western Metropolitan Region in Melbourne. This region has the greatest ethnic diversity in Victoria. This study used Australian Bureau of Statistics (ABS) Census data, AusDiab study data and IDF data to estimate prevalence of diabetes for the region's CALD communities. Appendix 3 includes a table from this report which estimates the prevalence rates and actual numbers of adults with diabetes in the Western Region according to age and country of birth.

Recent census data indicates that the top 14 languages other than English spoken at home in Victoria are: Italian, German, Greek, Croatian, Chinese, Dutch, Arabic, Turkish, Macedonian, Polish, Serbian, Spanish, Maltese and Vietnamese (47).

DA Vic provides multilingual resources through their Multilingual Infoline Service and has chosen to provide these resources in Arabic, Chinese, Greek, Italian, Vietnamese and Turkish. According to the recent census data (Table 1) these languages correspond to the top 14 languages spoken at home. It could therefore be reasonable to assume that CALD *Life!* programs could be targeted to these same six languages.

Table 1: Language spoken at home by proficiency in spoken English in 2006 (48)

	Speaks English only	Very well or well	Not well or not at all	Total	Not stated(b)	Total
Italian	..	11,064	1,917	**12,981**	232	13,213
Chinese languages:						
Cantonese	..	1,006	281	**1,287**	17	1,304
Mandarin	..	1,402	381	**1,783**	39	1,822
Other(c)	..	234	91	**325**	7	332
Total	..	*2,642*	*753*	***3,395***	*63*	*3,458*
Croatian	..	2,798	641	**3,439**	56	3,495
Greek	..	2,992	554	**3,546**	61	3,607
Turkish	..	1,306	528	**1,834**	34	1,868
Arabic	..	1,436	522	**1,958**	32	1,990
Vietnamese	..	588	338	**926**	30	956
Macedonian	..	1,347	314	**1,661**	35	1,696
Serbian	..	1,083	272	**1,355**	34	1,389
Polish	..	1,250	205	**1,455**	33	1,488
Spanish	..	934	157	**1,091**	19	1,110
Hungarian	..	746	121	**867**	7	874
German	..	3,899	118	**4,017**	40	4,057

The information below (Tables 2 & 3) provides an indication of which CALD populations the CALD *Life!* programs could be targeted towards.

Table 2: Country of Birth (region) of Person by age in 2006 (49)

	Age					
	45-54 years	*55-64 years*	*65-74 years*	*75-84 years*	*85 +*	*Total*
	PERSONS					
Australia	157,600	122,012	79,520	55,827	19,034	1,124,362
Country of birth not stated	11,816	10,468	8,643	7,803	2,891	76,001
United Kingdom(d)	9,412	12,085	8,822	5,427	2,005	48,026
New Zealand	2,368	1,511	661	283	109	11,363
Italy	1,239	2,421	2,592	1,870	327	9,008
Born elsewhere(e)	1,399	1,269	1,044	763	186	8,905
Netherlands	1,313	2,903	1,856	1,187	323	8,229
Germany	892	2,532	1,437	1,081	191	6,896
Croatia	452	686	815	280	40	2,809
Philippines	680	331	79	29	7	2,761
United States of America	433	451	95	69	25	2,134
India	251	237	167	114	22	2,054
Greece	313	607	557	258	30	2,009
South Africa	344	245	138	59	26	1,998
Ireland	349	402	345	260	63	1,954
Malta	440	771	386	135	26	1,888
China (excl. SARs and Taiwan Province)(b)	208	159	106	46	13	1,752
South Eastern Europe, nfd(c)	324	406	425	188	40	1,693

Table 3: Proficiency in spoken English/language by year of arrival in Australia (50)

	PERSONS										
	Before 1991	*1991 - 1995*	*1996 - 2000*	*2001*	*2002*	*2003*	*2004*	*2005*	*2006(b)*	*Year of arrival not stated*	*Total*
Speaks English only	72,376	2,885	4,465	1,044	964	1,214	1,164	1,328	902	4,261	90,603
Speaks other language and speaks English:											
Very well or well	21,568	1,774	2,814	778	797	939	1,152	1,326	950	1,404	33,502
Not well or not at all	4,362	352	518	138	137	164	205	434	359	609	7,278
Proficiency in English not stated	251	32	24	5	5	9	9	24	13	138	510
Total	*26,181*	*2,158*	*3,356*	*921*	*939*	*1,112*	*1,366*	*1,784*	*1,322*	*2,151*	*41,290*
Language and proficiency in English not stated	364	15	14	3	0	7	6	14	6	755	1,184
Total	**98,921**	**5,058**	**7,835**	**1,968**	**1,903**	**2,333**	**2,536**	**3,126**	**2,230**	**7,167**	**133,077**

However, the above information alone is not sufficient to guide which CALD populations have the highest T2DM prevalence or which are at increased risk for T2DM.

Also of great significance is that the ABS Census data, AusDiab data, IDF data, NHS data & VPHS data all rely on *self reported* incidence of diabetes. This self report data can not be considered to be an accurate or reliable source of information.

3.5. Literature Review

From a review of the international literature related to diabetes prevention and management programs, it was found that some programs targeted both the general population and CALD populations, and some programs targeted only the general population. Programs which targeted CALD populations offered culturally specific and unique program elements. These program characteristics accounted for CALD population characteristics that differed from the general population.

Tables 4 & 5 outline results from the literature review and indicate key program characteristics relating to CALD populations as well as the main program outcomes. While the current focus is on diabetes prevention, diabetes management programs also offer potentially useful information about specific CALD population needs.

Table 4. Type 2 Diabetes Mellitus Prevention Programs

Country	CALD population(s)	Intervention(s)	Outcomes
China (51)	None	Diet change and/or increased physical activity (over 6 year period)	▪ Lifestyle intervention reduced the incidence of diabetes mellitus
Finland (7)	None	Intensive diet and exercise program, involving 7 sessions with a nutritionist and then follow up visits. Individually tailored exercise advice.	▪ Those in the intervention group lost significantly more weight than those in the control group, as well as significantly lower plasma glucose concentrations. Positive changes in blood pressure, serum lipids and anthropometric indices
India (52)	None	Four groups; control, lifestyle modification advice, metformin treatment given, both lifestyle and metformin interventions.	▪ there was no added benefit from combining both lifestyle and metformin.
US (53)	African Americans, Hispanic American/ Latino, Asian American or Pacific Islander and American Indians with IGT	Four treatment groups: Lifestyle intervention, metformin treatment, placebo pill treatment, troglitazone treatment	▪ Those in the lifestyle intervention group reduced their risk of developing T2DM by 58%. ▪ Metformin – 31% reduction
New Zealand (54)	Western Samoan New Zealanders at high risk of T2DM	Community development model (on Samoan church population) to deliver the intervention, involving one Samoan worker trained in diabetes fieldwork techniques and community diabetes education. Another Samoan worker was trained as an aerobics instructor. Leaflets, videos, flip charts, posters in Samoan were used.	▪ Significant reduction in waist circumference, as well as significant increases in diabetes knowledge and proportion of participants exercising regularly. ▪ Consumption of fatty foods was reduced, weight remained stable.

The GGT UDRH team has been in contact with some members of the research teams cited in the studies in Table 4, with the intention to learn more about their interventions. However, resources from these programs are not publicly available and the research teams were not forthcoming about the details. All that can be concluded from the studies listed in Table 4 is that lifestyle interventions have worked in these populations, but details about the adaptation of these programs for Chinese and Indian CALD groups are not available.

The program from Finland did not include a CALD component. The US DPP program did have a CALD component which included Chinese and South Asians. However the resources deployed in the US program were extremely intensive which therefore completely limits the transferability of this program.

Table 5. Type 2 Diabetes Mellitus Management Programs

Country	CALD population(s)	Intervention(s)	Outcomes
UK	Pakistani British Women with T2DM (55)	Health Education Program involving pictorial flashcards and one-to-one interviews	• Improvement in health knowledge • Improved glycaemic control
	South Asians in Glasgow with T2DM (Scotland) (56)	Educational program involving group sessions. Booklets about diabetes, diet and foot care were translated into relevant language. Informational videos were also recorded in the relevant language.	• Significant improvements in diabetes knowledge, attitudes and practice.
US	Chinese Americans with T2DM (57)	10 session program integrating Chinese cultural values into an existing Western diabetes management program	• Almost half had lost approximately 2.2 kilograms • Most had reduced blood pressure • Mean glycosylated haemoglobin (HbA1c) levels were lower. • Significant improvements on the Diabetes Quality of Life survey
	Mexican Americans with T2D (58)	Eight weekly 2 hour group sessions, Characteristics of the program included encouragement of family involvement, as well as modelling through cultural figures and cooking demonstrations.	• Increase in diabetes knowledge • Significant decrease in weight and BMI • Improvements in self-efficacy scores, blood glucose and HbA1c • Improved self-management activities
	Hispanic Americans with T2DM (59)	6 weekly, 3 hour, cognitive behavioural education sessions conducted in Spanish. Use of written materials was minimised, with a focus instead on demonstration and return demonstration.	• Significant reduction in HbA1c in the first 6 months • Average total cholesterol improved, although not significantly. • 69% of participants showed an increase in diabetes health knowledge.
	Urban, low-income, diverse CALD populations (Spanish speakers) with T2DM (60)	Version of the National Diabetes Prevention Program tailored for CALD population. Focus on diet, weight-loss, exercise and lifestyle changes, with specific strategies for shopping and eating out and relapse prevention.	• Increase in physical exercise, significant reduction in weight (although still below the goal amount), questionnaire responses indicating an increase in healthy eating habits. • No statistically significant decrease in HbA1c
	Latin Americans with T2DM (61)	The program involved interactive group sessions. Focus on dietary advice, foot care, regular physical activity and screening through various teaching methods.	• Significant improvement in fasting blood glucose, HbA1c, body weight, systolic blood pressure, total cholesterol and triglycerides.

Whilst the management programs in Table 5 are all inclusive of CALD populations, the countries they have originated from contain only a few CALD populations in comparison with Australia. In Australia much greater consideration to multicultural population factors is required in the development of diabetes prevention programs, to potentially meet the different health needs, expectations, beliefs and practices of over 200 different CALD populations.

Based on the literature review the successful approaches to preventing T2DM in CALD communities could consist of:

1. Integration of specific cultural values, practices and beliefs into program material, such as maintenance of healthy aspects of traditional diet;

2. Focus group, interactive group sessions and story telling to convey program information;

3. Encouraged family support and involvement in the program;

4. Use of a bilingual health worker/facilitator, a bilingual diabetes educator or cultural peer to deliver program;

5. Use of life coach for individualised assistance with program goals;

6. Use of pictorial/flashcards and video formats to convey program information;

7. Use of easy to understand written program material and translated program material.

3.5.1. Cochrane Review: *Culturally appropriate health education for type 2 diabetes mellitus in ethnic minority groups*

A recent Cochrane review 'Culturally appropriate health education for type 2 diabetes mellitus in ethnic minority groups' (62), has revealed that culturally appropriate diabetes health education appears to have short term effects on glycaemic control and on participant knowledge related to diabetes and healthy lifestyles. **However, the reviewed studies tended to be of short duration, and longer term outcomes were unknown.** The studies in the review were essentially lifestyle modification programs for those people with diabetes, and there was a focus on management and/or education. They were also heterogeneous in numerous aspects, which made it difficult to make accurate comparisons.

Using specific selection criteria, the Cochrane review identified eleven randomised controlled trials, from a total of 6423 studies of culturally tailored diabetes health education programs. The trials had participants from defined ethnic minority groups, living in middle or high income countries, over 16

years of age, diagnosed with T2DM, and receiving a culturally tailored health education intervention.

The eleven trials that met the selection criteria involved 1603 people, with ten trials providing suitable data for meta-analysis. The three main primary outcomes measured in the review were glycosylated haemoglobin (HbA1c), blood pressure and a culturally validated quality of life questionnaire. The secondary outcomes measured in the review included body mass index (BMI), lipid levels, long term complications of diabetes (retinopathy, neuropathy, and cardiovascular disease), total and specific mortality rates from causes attributable to diabetes, acute hospital admissions, and hypoglycaemic and hyperglycaemic episodes.

The results of the meta-analysis from the eleven trials found that glycaemic control (HbA1c) showed an improvement following culturally appropriate health education at three months (weight mean difference (WMD) -0.3%, 95% CI -0.6 to -0.01), and at six months (WMD -0.6%, 95% CI -0.9 to -0.4), compared with control groups who received 'usual care'. However, this effect was not significant at 12 months post intervention (WMD -0.1%, 95% CI -0.4 to 0.2). Knowledge scores about diabetes and healthy lifestyles also improved in the intervention groups at three months (standardised mean difference (SMD) 0.6, 95% CI 0.4 to 0.7), six months (SMD 0.5, 95% CI 0.3 to 0.7) and twelve months (SMD 0.4, 95% CI 0.1 to 0.6) post intervention. Secondary outcome measures both clinical (lipid levels and blood pressure) and patient centred (quality of life, attitude scores, patient empowerment and self-efficacy) showed no significant improvement compared with control groups (62).

The authors acknowledge the **paucity of data** retrieved from a rigorous search of the literature. **Therefore the current lack of information on this topic emphasises the need for the development of culturally appropriate diabetes programs. Also it is worth noting that none of these programs achieved the outcomes of the Greater Green Triangle Diabetes Prevention Program.**

3.5.2.   Preventing Type 2 Diabetes in Culturally and Linguistically Diverse Communities in NSW

In 2007, the NSW Department of Health commissioned a report 'Preventing Type 2 Diabetes in Culturally and Linguistically Diverse Communities in NSW' (63). The purpose of the report is to inform the development of policies and programs that address diabetes prevalence and risk in

CALD populations in NSW. In gathering information, the project sought details in the following areas:

- Demographic data on CALD populations in NSW;

- Epidemiological data on diabetes risk and rate of progression to diabetes;

- Qualitative evidence about attitudes to diabetes and diabetes risks for different CALD populations;

- CALD specific risk reduction interventions for diabetes and other chronic disease risks and their key characteristics;

- Purpose designed methodologies for the evaluation of relevant CALD specific programs.

A review was conducted of national and international peer reviewed press, governmental and non-governmental organisation reports and websites to obtain data and information regarding the points above and other specific research questions. In this report, six broad CALD populations were identified based on the size of the group, their high prevalence of diabetes, diabetes risk factors and high migration rates.

Findings

This report identified that there are tools designed specifically for use with individuals with T2DM from CALD populations. However, resources designed for use in preventing diabetes with CALD populations were not located. The NSW report also determined a deficiency in systematic evaluation techniques used by local diabetes prevention programs. Measures such as long term follow up, assessment of progression towards diabetes, and physical or biochemical risk factors were lacking. These evaluation gaps were highlighted as contributing significantly to the overall ineffective approach taken to preventing T2DM in CALD populations.

One of the most important findings of the study was that there have been no adequately evaluated programs for CALD communities in Australia.

Recommendations

From the report the following recommendations are central to the development of successful CALD diabetes prevention programs:

- Obtaining relevant data about the populations at risk;

- Awareness of existing programs and resources which address the risk and prevalence of T2DM in CALD populations;

- Identify risk factors specific to each CALD populations;

- Investigate CALD specific group attitudes to health behaviour;

- Develop CALD programs which are:

  - **Consultative** (i.e. involving the target community),

  - **Collaborative**,

  - **Practical** (i.e. recognising cultural barriers and social structures),

  - **Culturally appropriate**;

- Utilise culturally appropriate program evaluations and employ long term follow up which is culturally specific.

These recommendations could be incorporated into the development of CALD *Life!* programs as a method to increase the effectiveness of this program for the target communities.

3.5.3. Diabetes: Australian Facts 2008

This report contains the most recent national data on prevalence, incidence, risk factors, and complications of diabetes (4). The key findings are:

- Diabetes is one of the leading chronic diseases in Australia;
- The prevalence of diabetes is continuing to increase over time;
- Diabetes is a disease which reduces quality of life and has serious health complications and substantial health system costs;
- Diabetes can be controlled and prevented via modified risk factors, and
- Some population groups are at much higher risk than others. This includes those people from CALD backgrounds.

'Diabetes: Australian facts 2008' also includes specific information for CALD populations. It raises the issues that CALD communities face regarding T2DM, which include:
- Increased prevalence of diabetes,
- Increased prevalence of risk factors for diabetes,
- Increased prevalence of complications and hospitalisations due to non-treated diabetes, and
- Increased death rates due to diabetes.

3.5.4. HAPA model and its applicability for CALD

The theoretical basis of behaviour change behind the current *Life!* program is the Health Action Process Approach (HAPA) (see p.10 for more details). There is much literature surrounding the HAPA model and its effectiveness in behaviour change. Some literature has also been published regarding the HAPA model's applicability as a universal construct, and subsequent use in diverse ethnic populations (27, 64-69). The GGT UDRH has contacted Professor Schwartzer who designed the HAPA model. He believes that it is universally applicable even though it was only been tested in the Korean population (70). Conversely, Dr Pilvikki Absetz, who designed the Finnish diabetes prevention implementation trial has doubts about its universal applicability (71). The literature indicates that perceived self-efficacy and an optimistic sense of personal competence is a pervasive phenomenon accounting for motivation and accomplishments in human beings. One study reported the applicability of general perceived self-efficacy in over 25 countries, which lends further confidence to the universal applicability of this construct (68). However, that study also concluded that further investigation is needed to account for cross-cultural differences and gender differences when using the various components of the HAPA model in CALD populations (68). None of the other theories underlying the *Life!* program such as risk perception, internal locus of control, planning and feedback have been tested for use in specific CALD communities in diabetes prevention programs.

There is little evidence for or against the use of the HAPA model for diabetes prevention in different cultures. Substantial modification will be required with effectiveness demonstrated through a randomised controlled trial.

4. OVERVIEW: CALD *Life!* Taking Action on Diabetes

4.1. Aim

The key aim is to adapt the *Life!* diabetes prevention program for CALD populations in Australia. The overall *Life!* program aim is to prevent the onset of T2DM. The recruitment process for the *Life!* program also has the potential to identify those who have T2DM but are unaware.

4.2. Proposed Strategy / Methodology

The level of evidence described above is clearly insufficient for making sound policy decisions on the full development of a *Life!* program for CALD communities.

Research suggests that the process of recruitment for CALD communities into prevention programs can be difficult as these communities experience a variety of barriers, which include barriers in language, filling in forms, lack of available time for classes, barriers to having tests when one does not feel sick and different illness beliefs (72). Recruitment methods for participants in the CALD *Life!* programs are dependent on specific social marketing campaigns that target the communities in culturally appropriate ways. In this process, factors such as risk perceptions and outcome expectation will need to be researched for the CALD communities being targeted (73). Hence education for GPs on issues such as risk perception, outcome expectations and cultural models of health and illness are essential for successful recruitment of participants into the CALD *Life!* program.

Ideally the recruitment process for CALD *Life!* programs will occur in the same manner as the current *Life!* program. General Practitioners (GPs) will remain the main source for enrolling participants into the program, as this has been shown to be a successful method of recruitment in other local diabetes prevention programs for CALD communities (72). Alternative strategies for recruitment can be explored in focus groups with current *Life!* participants and facilitators from CALD backgrounds.

These alternative strategies to enrol participants into a CALD *Life!* program could include recruitment via,
- CALD general practitioners ;
- Community health centres;
- Local churches or places of worship; or
- Local CALD clubs / centres.

This discussion document proposes a two track approach to the development of programs for CALD populations. However, the acquisition of sufficient data is required first to determine which CALD groups to target. The two tracks are pragmatic and experimental. Already the *Life!* program recruits CALD participants who select themselves for the program and the evaluation data collected will be sufficient to compare the performance of CALD participants with others. This approach likely leaves those most at need without access to the *Life!* program. Therefore, a randomised controlled trial would be an essential step to develop a program for these CALD communities. Figure 3 outlines the possible strategy for the hypothetical development and recruitment of participants into a CALD *Life!* program.

Participant approached
+
Life! program explained

AusDRisk ≥ 15

Self-selection
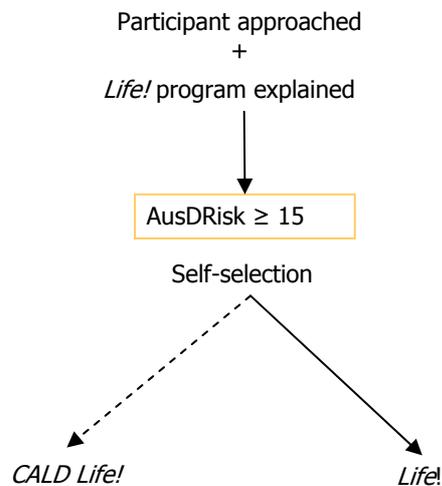
CALD Life!   *Life*!

Figure 3: Strategy for development of CALD *Life!* and the process of recruitment of participants into CALD *Life!*

4.2.1. Project Areas and Settings

The CALD *Life!* programs could initially take place in various primary health care settings in North & West metropolitan Melbourne, using a similar approach to the current *Life!* program. There is the capacity to implement the CALD *Life!* programs in many types of primary health care settings or other local community facilities as nominated by CALD communities.

Other metropolitan areas throughout Melbourne and wider Victoria will also be considered for the implementation of CALD *Life!* programs. However, identifying CALD populations and locations is dependent on accessing demographic information that includes average age, place of residence and T2DM risk for each CALD community.

4.2.2. Facilitators

CALD populations experience many difficulties when receiving health information due to:

- A low level of literacy;
- A low or non-existent English proficiency (74); and
- Culturally specific dimensions of health and health beliefs.

To increase the health literacy, uptake and effectiveness of the CALD *Life!* programs, bilingual facilitators or bilingual health workers would be essential to implement these programs. In addition, they would have the adequate cultural understanding of the CALD population they are working

with. A specific bilingual facilitator would be essential for each different CALD population participating in the program. Use of bilingual health worker or co-facilitator would be dependent on the specific CALD population's cultural preferences.

Engaging a cultural peer from the CALD community as a co-facilitator to a CALD *Life!* program would also have benefits, such as enhancing health literacy (21). The co-facilitator should have a high standing in the CALD community and therefore assist in increasing community awareness about risk of T2DM and the importance associated with prevention of this chronic disease (54)

Professors James Dunbar and Prasuna Reddy will be meeting with other researchers in the field of diabetes education and management in CALD communities to gain greater insight into how to best approach this task. They will be meeting with Professor Trisha Greenhalgh in London and Professor Melanie Davies in Leicester in September 2008 to observe their CALD programs. They will also be visiting a number of relevant centres in the US which have CALD diabetes prevention programs in October 2008.

4.2.3. Further research required

As stated earlier, the level of evidence available on the prevention of diabetes in CALD communities is inadequate.

Ideally a series of randomised controlled trials conducted in different countries is required. An Australian Randomised Control Trial is required, and the capacity exists within Victoria to undertake this work within the *Life!* Program.

4.2.4. Outcome Measures

It is possible that the CALD *Life!* Programs' participants could be assessed using the same outcome measures as in the original *Life!* program. This includes the measurement of Body Mass Index (BMI), waist circumference, physical activity, dietary changes, glucose, lipid profile and blood pressure. In particular, it has been identified that optimal BMI can differ depending on ethnicity (75-78).

4.3   Intervention Goals

The *Life!* Taking action on Diabetes program intervention goals are based on the original GGT DPP study goals. The following intervention goals used in the *Life!* program would remain the same for the CALD *Life!* programs.

The intervention goals are as follows:

1. No more than 30% energy from fat
2. No more than 10% energy from saturated fat
3. At least 15g/1000 kcal fibre
4. 30 min/day moderate intensity physical activity
5. 5% reduction in body weight

These goals are the Program Goals. In the behavioural change model underpinning the *Life!* program each participant follows a process to set their own individual and individually relevant goals for themselves.

4.4.   Key Informant Interviews

Conducting interviews or focus groups with experts in this field would provide further understanding about T2DM and CALD populations in Australia. The possible interviewees would have knowledge regarding health issues in CALD communities, local T2DM prevention programs in CALD populations, the effectiveness of these programs and resources or techniques used to employ these programs. In addition to the researchers already contacted, a list of other possible key informants to invite to the interviews and focus group sessions are listed in Appendix 1.

4.5.   Tools

T2DM risk test tools are listed below. The US risk tool is validated for CALD specific risk factors, but the others have not been validated for CALD risk factors. However, it is known that the AusDiab study (AUSDRisk) does not contain adequate CALD specific data to enable this. Anthropometric measures for CALD populations such as waist circumference can differ between populations. Samples of these risk tools are available in Appendix 2.

Validated	Not Validated
FINDRisk	NSW Health Risk Tool
AUSDRisk	Whitehorse Community Health Centre Risk Tool
US Risk tool	

4.6. Summary

The issues facing the development of CALD *Life!* are complex and comprehensive. There are a range of logistical and practical concerns including that:

- The level of evidence available about prevention of diabetes in CALD communities is low and no relevant evaluated work has been undertaken in Australia.

- GGT UDRH has some understanding of successful approaches used in CALD specific programs from other countries (US, and New Zealand); which, along with our previous research would allow us to seek competitive research funding for a randomised controlled trial. It would be the first of its kind in the world.

- GGT UDRH needs to continue gathering data and resources used with CALD populations in the Australian health system; and the DHS could consider how to improve the data related to diabetes in CALD populations.

- At present the data are insufficient to identify target CALD populations.

- GGT UDRH research team is making contact with key informants who have experience, knowledge and skills in health service provision to CALD populations.

- Translation of appropriate materials into each CALD language will be required once the target group is known.

- Adapting the programs for 'non-language' related cultural factors is required. For example, factors related to culture and food; culture and physical activity or culture and education is crucial.

- Accounting for low literacy levels (pictorial resources etc.) when developing resources has proved important.

- Identifying and engaging CALD health workers; bilingual health workers; or translators contributes to successful outcomes.

5. EVALUATION

CALD *Life!* programs require comprehensive evaluation on the following aspects:

- Training of facilitators;
- Recruitment processes;
- Facilitators' performance;
- Participant outcome measures.

The evaluation should comprise best practice evaluation techniques, which include process, impact and outcome evaluation (79). To our knowledge, these rigorous evaluation procedures are not presently incorporated into any other CALD diabetes prevention programs in Australia.

6. NEXT STEPS

1. The current *Life!* program can be specifically evaluated for CALD participant outcomes.

2. The CALD Strategy and action plan to be completed by the end of September.

3. Evaluation data are being gathered about improved lifestyle outcomes in CALD participants in the *Life!* Program which will be incorporated into the training update for facilitators in February.

4. Consideration needs to be given to improve the health data in CALD communities. The evaluation outcomes will increase the evidence in this area.

5. An opportunity exists to collaborate with Professor Stephen Colagiuri. NSW Health has funded his team $300,000 to develop and implement a diabetes prevention project focusing on Chinese (Mandarin) and Arabic speaking groups.

7. CONCLUSION

T2DM is one of the leading chronic diseases affecting the Australian population, with prevalence rates expected to increase dramatically over the next decade (4). Studies related to T2DM have mainly focused on the general population. In contrast the level of evidence from both national and international studies related to CALD communities is poor, specifically in relation to demographic data, data on prevalence of diabetes, affectivity of diabetes prevention programs and applicability of theoretical models.

According to the Hierarchy of Evidence (p. 14), this report has outlined many sources of information that can assist with the development of a world leading diabetes prevention program for CALD communities.

International evidence from the US DPP included CALD populations, but used extensive resources to outlay their program. Additionally the diversity in CALD populations in this program was mainly limited to Hispanic, African and Chinese Americans. The latest evidence from the Cochrane Collaboration has summarised eleven randomised controlled trials focusing on health education programs for T2DM in ethnic minority groups. This review has emphasised the importance of lifestyle changes (diet and physical activity) in diabetes management, but no long term effects of these programs can be sustained. Ultimately this publication has identified the lack of published information regarding diabetes prevention programs for CALD populations. However, these studies provide a valuable source of information, and can be applied to a future CALD diabetes prevention program in Victoria.

In the Australian context there has been little evidence surrounding T2DM in CALD populations. Previous reports have highlighted the existing gaps in the data available. In particular, 'Diabetes in Culturally and linguistically diverse Australians – Identification of communities at high risk' (80) identified and outlined the following gaps:

- Lack of prevalence data,
- Lack of data on complications from diabetes,
- Lack of data on physiological markers which define and measure the diabetic status, and
- Lack of information to clearly specify particular CALD communities.

There exists also a deficiency in evaluated diabetes prevention programs for CALD communities in Australia. Additionally, there is no evidence for these communities' risks, risk perception, outcome expectancies and group interventions. Therefore it is impossible to accurately identify and target CALD communities in need for CALD *Life!* programs.

On the basis of the above information the GGT UDRH has the capacity to undertake research in diabetes prevention in CALD communities, through CALD participants in the current *Life!* program and through development of a CALD *Life!* program. GGT UDRH also has the capability to commence original research into how to reach those who would not otherwise select themselves for *Life!,* and in particular how the psychosocial theories of behavior change apply to these communities. With the assistance of DHS, target CALD communities for a CALD *Life!* program can

be selected. Finally, an action plan for development of CALD *Life!* programs can be prepared by the end of September.

In conclusion, all parties involved in this project should take both a pragmatic and an experimental approach. Pragmatically we can allow participants from CALD communities to select themselves for *Life!* and the results will be evident in the standard evaluation measures. Experimentally we need to develop a CALD *Life!* program specifically designed for CALD communities' needs.

8. REFERENCES

1. Von Hofe B, Thomas M, Colagiuri R. A Systematic Review of Issues Impacting on Health Care for Culturally Diverse Groups Using Diabetes as a Model. Sydney: Australian Centre for Diabetes Strategies & Multicultural Health Unit; 2002.

2. Martin MB, Larsen BA, Shea L, Hutchins D, Alfaro-Correa A. State diabetes prevention and control program participation in the Health Disparities Collaborative: evaluating the first 5 years. Prev Chronic Dis. 2007 Jan;4(1):A13.

3. Hussain A, Claussen B, Ramachandran A, Williams R. Prevention of type 2 diabetes: a review. Diabetes Res Clin Pract. 2007 Jun;76(3):317-26.

4. AIHW. Diabetes: Australian facts 2008. Diabetes series no 8 Canberra: AIHW; 2008. p. 1-119.

5. Diabetes Australia Victoria. What is *Life!* Taking Action on Diabetes program. *Life!* Taking Action on Diabetes 2008 [cited 10th July 2008]; Available from: http://www.diabeteslife.org.au/HealthProfessionals/WhatisLife/tabid/83/Default.aspx

6. Laatikainen T, Dunbar JA, Chapman A, Kilkkinen A, Vartiainen E, Heistaro S, et al. Prevention of type 2 diabetes by lifestyle intervention in an Australian primary health care setting: Greater green triangle (GGT) diabetes prevention project. BMC Public Health. 2007 19 September 2007;7(249):1-7.

7. Eriksson J, Lindstrom J, Valle T, Aunola S, Hamalainen H, Ilanne-Parikka P, et al. Prevention of Type II diabetes in subjects with impaired glucose tolerance: the Diabetes Prevention Study (DPS) in Finland. Study design and 1-year interim report on the feasibility of the lifestyle intervention programme. Diabetologia. 1999 Jul;42(7):793-801.

8. Absetz P, Valve R, Oldenberg B, Heinonen H, Nissinen A, Fogelholm M, et al. Type 2 Diabetes Prevention in the "Real World" - One-year results of the GOAL Implementation Trial. Diabetes Care. 2007 October 2007;30(10):2465-70.

9. Lindström J, Ilanne-Parikka P, Peltonen M, Aunola S, Eriksson JG, Hemiö K, et al. Sustained reduction in the incidence of type 2 diabetes by lifestyle intervention: follow-up of the Finnish Diabetes Prevention Study. The Lancet.368(9548):1673-9.

10. Karantzas-Savva E, Kirwan A. Ethnic community stakeholders as partners in primary and secondary diabetes prevention. Australian Journal of Primary Health. 2004;1-(3):21.

11. Singh M, de Looper M. Australian Health Inequalities: 1 birthplace. Canberra: AIHW; 2002. p. 1-12.

12. Ratner RE. An update on the Diabetes Prevention Program. Endocr Pract. 2006 Jan-Feb;12 Suppl 1:20-4.

13. Misra A, Ganda OP. Migration and its impact on adiposity and type 2 diabetes. Nutrition. 2007 Sep;23(9):696-708.

14. Lindeman RD, Romero LJ, Hundley R, Allen AS, Liang HC, Baumgartner RN, et al. Prevalences of type 2 diabetes, the insulin resistance syndrome, and coronary heart disease in an elderly, biethnic population. Diabetes Care. 1998 Jun;21(6):959-66.

15. Vozarova de Courten B, de Courten M, Hanson RL, Zahorakova A, Egyenes HP, Tataranni PA, et al. Higher prevalence of type 2 diabetes, metabolic syndrome and cardiovascular diseases in gypsies than in non-gypsies in Slovakia. Diabetes Res Clin Pract. 2003 Nov;62(2):95-103.

16. Yu CH, Zinman B. Type 2 diabetes and impaired glucose tolerance in aboriginal populations: a global perspective. Diabetes Res Clin Pract. 2007 Nov;78(2):159-70.

17. Schulze MB, Hu FB. Primary prevention of diabetes: what can be done and how much can be prevented? Annu Rev Public Health. 2005;26:445-67.

18. Birkeland KI, Berg JP. Type 2 diabetes--preventable, but how? Eur J Endocrinol. 2001 Nov;145(5):573-5.

19. Simmons D, Schaumkel J, Cecil A, Scott DJ, Kenealy T. High impact of nephropathy on five-year mortality rates among patients with Type 2 diabetes mellitus from a multi-ethnic population in New Zealand. Diabet Med. 1999 Nov;16(11):926-31.

20. ABS. Census of population and housing: selected social and housing characteristics, Australia.: Cat. No. 2015.0. Canberra: ABS.; 2002.

21. Australian Centre for Diabetes Strategies. A national profile of diabetes projects for culturally and linguistically diverse community groups. Sydney: Prince of Wales Hospital - University of New South Wales; 2005. p. 1 - 67.

22. Karantzas E. Culturally and Linguistically Diverse Local Diabetes Resource and Service Project. Melbourne: Migrant Resource Centre North West Region Inc; 2003. p. 1-123.

23. Schwarzer R. Self-regulatory Processes in the Adoption and Maintenance of Health Behaviors: The Role of Optimism, Goals, and Threats. J Health Psychol. 1999 April 1, 1999;4(2):115-27.

24. Oettingen G, Hönig G, Gollwitzer PM. Effective self-regulation of goal attainment. International Journal of Educational Research. 2000;33(7-8):705-32.

25. Schwarzer R, Fuchs R. Changing risk behaviours and adopting health behaviours: The role of self-efficacy beliefs. In: Bandura A, editor. Self Efficacy in changing societies. New York: Cambridge University Press; 1995. p. 259-88.

26. Oettingen G, Pak H, Schnetter K. Self-regualtion of goal-setting: Turning free fantasies about the future into binding goals. Journal of Personality and Social Psychology. 2001;80(5):736-53.

27. Schwarzer R, Renner B. Social-Cognitive Predictors of Health Behavior: Action Self-Efficacy and Coping Self-Efficacy. Health Psychology. 2000;19(5):487-95.

28. Sallis J, Grossman R, Pinski R, Patterson T, Nader P. The development of scales to measure social support for diet and exercise behaviors. Preventive Medicine. 1987;16(6):825-36.

29. Baranowski T, Cullen KW, Nicklas T, Thompson D, Baranowski J. Are Current Health Behavioral Change Models Helpful in Guiding Prevention of Weight Gain Efforts? Obesity Research. 2003;11:23-43.

30. Chin NP, Monroe A, Fiscella K. Social Determinants of (Un)Healthy Behaviors. Education for Health: Change in Learning & Practice. 2000;13(3):317-28.

31. Emmons KM, Barbeau EM, Gutheil C, Stryker JE, Stoddard AM. Social Influences, Social Context, and Health Behaviors Among Working-Class, Multi-Ethnic Adults. Health Education & Behavior. 2007;34(2):315-34.

32. Fisher EB. The importance of context in understanding behavior and promoting health. Annals Of Behavioral Medicine: A Publication Of The Society Of Behavioral Medicine. 2008;35(1):3-18.

33. Fisher EB, Brownson CA, O'Toole ML, Shetty G, Anwuri VV, Fazzone P, et al. The Robert Wood Johnson Foundation Diabetes Initiative: demonstration projects emphasizing self-management. The Diabetes Educator. 2007;33(1):83.

34. Fisher EB, Walker EA, Bostrom A, Fischhoff B, Haire-Joshu D, Johnson SB. Behavioral Science Research in the Prevention of Diabetes : Status and opportunities. Diabetes Care. 2002 March 1, 2002;25(3):599-606.

35. Liburd LC, Jack JL, Williams S, Tucker P. Intervening on the Social Determinants of Cardiovascular Disease and Diabetes. American Journal of Preventive Medicine. 2005;29(5, Supplement 1):18-24.

36. Schulz AJ, Zenk S, Odoms-Young A, Hollis-Neely T, Nwankwo R, Lockett M, et al. Healthy eating and exercising to reduce diabetes: exploring the potential of social determinants of health frameworks within the context of community-based participatory diabetes prevention. American Journal of Public Health. 2005;95(4):645.

37. Health Nexus, Ontario Chronic Disease Prevention Alliance. Primer to Action: Social Determinants of Health. Toronto: Ontario Chronic Disease Prevention Alliance; 2008. p. 1-49.

38. Engel GL. The need for a new medical model: a challenge for biomedicine. Science. 1977 April 8, 1977;196(4286):129-36.

39. Engel GL. The clinical application of the biopsychosocial model. Am J Psychiatry. 1980 May 1, 1980;137(5):535-44.

40. Fava GA, Sonino N. The biopsychosocial model 30 years later. Psychother Psychosom. 2008;77:1-2.

41. Dacey JS, Travers JF. Human development across the lifespan. 6th ed. New York, NY: McGraw Hill; 2006.

42. Hofstede G. Geert Hofstede Cultural Dimensions. 2003 [cited 29/07/2008]; Available from: http://www.geert-hofstede.com/

43. van Zwanenberg T, Harrison J. Clinical Governance in Primary Care. 2000 ed. Oxon: Radcliff Medical Press Ltd.; 2000.

44. International Diabetes Federation. Diabetes Atlas. 2nd ed: IDF; 2003.

45. Australian Bureau of Statistics. National Health Survey: Summary of Results. Commonwealth Government of Australia; 2004-5. p. 1-92.

46. Sicree RA, Shaw JE, Zimmet PZ. Estimates of diabetes: Prevalence and numbers Western Metropolitan Region, Victoria. Caufiled: International Diabetes Institute; 2008. p. 1-32.

47. Australian Bureau of Statistics. Basic Community Profile: Language spoken at home (Based on ususal place of residence). Australian Bureau of Statistics; 2008.

48. Australian Bureau of Statistics. Expanded Community Profile: Language spoken at home by proficiency in spoken english   ABS; 2008.

49. Australian Bureau of Statistics. Expanded Community Profile: Country of Birth by Age and Sex. Australian Bureau of Statistics,; 2008.

50. Australian Bureau of Statistics. Basic Community Profile: Proficiency in spoken English/language by year of arrival in Australia by sex. Australian Bureau of Statistics; 2008.

51. Li G, Hu Y, Yang W, Jiang Y, Wang J, Xiao J, et al. Effects of insulin resistance and insulin secretion on the efficacy of interventions to retard development of type 2 diabetes mellitus: the DA Qing IGT and Diabetes Study. Diabetes Res Clin Pract. 2002 Dec;58(3):193-200.

52. Ramachandran A, Snehalatha C, Mary S, Mukesh B, Bhaskar AD, Vijay V. The Indian Diabetes Prevention Programme shows that lifestyle modification and metformin prevent type 2 diabetes in Asian Indian subjects with impaired glucose tolerance (IDPP-1). Diabetologia. 2006 Feb;49(2):289-97.

53. US Department of Health and Human Services. Diabetes Prevention Program. 2006.

54. Simmons D, Fleming C, Voyle J, Fou F, Feo S, Gatland B. A pilot urban church-based programme to reduce risk factors for diabetes among Western Samoans in New Zealand. Diabet Med. 1998 Feb;15(2):136-42.

55. Hawthorne K. Effect of culturally appropriate health education on glycaemic control and knowledge of diabetes in British Pakistani women with type 2 diabetes mellitus. Health Educ Res. 2001 Jun;16(3):373-81.

56. Baradaran HR, Knill-Jones RP, Wallia S, Rodgers A. A controlled trial of the effectiveness of a diabetes education programme in a multi-ethnic community in Glasgow [ISRCTN28317455]. BMC Public Health. 2006;6:134.

57. Wang CY, Chan SM. Culturally tailored diabetes education program for Chinese Americans: a pilot study. Nurs Res. 2005 Sep-Oct;54(5):347-53.

58. Vincent D, Pasvogel A, Barrera L. A feasibility study of a culturally tailored diabetes intervention for Mexican Americans. Biol Res Nurs. 2007 Oct;9(2):130-41.

59. Mauldon M, Melkus GD, Cagganello M. Tomando Control: a culturally appropriate diabetes education program for Spanish-speaking individuals with type 2 diabetes mellitus--evaluation of a pilot project. Diabetes Educ. 2006 Sep-Oct;32(5):751-60.

60. Cramer JS, Sibley RF, Bartlett DP, Kahn LS, Loffredo L. An adaptation of the diabetes prevention program for use with high-risk, minority patients with type 2 diabetes. Diabetes Educ. 2007 May-Jun;33(3):503-8.

61. Gagliardino JJ, Etchegoyen G. A model educational program for people with type 2 diabetes: a cooperative Latin American implementation study (PEDNID-LA). Diabetes Care. 2001 Jun;24(6):1001-7.

62. Hawthorne K, Robles Y, Cannings-John R, Edwards A. Culturally appropriate health education for type 2 diabetes mellitus in ethnic minority groups. Cochrane Database of Systematic Reviews. 2008(3).

63. Colagiuri R, Thomas M, Buckley A. Preventing type 2 diabetes in culturally and linguistically diverse communities in NSW. Sydney: NSW Department of Health; 2007.

64. Luszczynska A, Gutie´rrez-Don˜a B, Schwarzer R. General self-efficacy in various domains of human functioning: Evidence from five countries. International Journal of Psychology. 2005;40(2):80-9.

65. Luszczynska A, Scholz U, Schwarzer R. The General Self-Efficacy Scale: Multicultural Validation Studies. The Journal of Psychology. 2005 September 2005;139(5):439-57.

66. Renner B, Kwon S, Yang B-H, Paik K-C, Kim SH, Roh S, et al. Social-Cognitive Predictors of Dietary Behaviors in South Korean Men and Women. International Journal of Behavioral Medicine. 2008;15(1):1-10.

67. Renner B, Schwarzer R. Risk and Health Behaviors: Documentation of the Scales of the Research Project "Risk Appraisal Consequences in Korea" (RACK). 2nd edn ed: International University Bremen & Freie Universität Berlin; 2005. p. 1-55.

68. Scholz U, Gutiérrez Doña B, Sud S, Schwarzer R. Is General Self-Efficacy a Universal Construct? Psychometric Findings from 25 Countries. European Journal of Psychological Assessment. 2002;18(3):242–51.

69. Schwarzer R, Renner B. Health-Specific Self-Efficacy Scales. p. 1-21.

70. Schwarzer R. HAPA model applicability for CALD populations. 2008. p. Personal correspondence.

71. Absetz P. HAPA model applicability for CALD populations. 2008. p. Personal correspondence.

72. Swinburn Evaluation Team. Swinburne Evaluation Team Progress Report to DHS: Diabetes Prevention - go for your Life Program. Swinburn University of Technology; 2007. p. 1-19.

73. Gill M. Sri Lankan Focus Group Findings: Diabetes Prevention - Go for you Life Study. South East Primary Care Partnership; 2006. p. 1-7.

74. Diabetes Centre & Diversity Health. Culturally appropriate diabetes project. Prince of Wales Hospital SESAHS,. p. 1 - 58.

75. Ramachandran A, Snehalatha C, Satyavani K, Sivasankari S, Vijay V. Metabolic syndrome in urban Asian Indian adults--a population study using modified ATP III criteria. Diabetes Res Clin Pract. 2003 Jun;60(3):199-204.

76. Hong CY, Chia KS, Hughes K, Ling SL. Ethnic differences among Chinese, Malay and Indian patients with type 2 diabetes mellitus in Singapore. Singapore Med J. 2004 Apr;45(4):154-60.

77. Nakagami T, Qiao Q, Carstensen B, Nhr-Hansen C, Hu G, Tuomilehto J, et al. Age, body mass index and Type 2 diabetes-associations modified by ethnicity. Diabetologia. 2003 Aug;46(8):1063-70.

78. Razak F, Anand SS, Shannon H, Vuksan V, Davis B, Jacobs R, et al. Defining obesity cut points in a multiethnic population. Circulation. 2007 Apr 24;115(16):2111-8.

79. Hawe P. Evaluating Health Promotion: A health workers guide. Sydney: MacLennan and Petty; 1990.

80. Thow AM, Waters A-M. Diabetes in culturally and linguistically diverse Australians - Identification of communities at high risk. AIHW cat. no. CVD 30 ed. Canberra: Australian Institute of Health and Welfare; 2005. p. 1 - 60.

Appendix 1 – People to invite for interviews

Name	Position	Workplace	Relevant work / Area of expertise
Bibiana Chan	Research Fellow	Centre For Primary Health Care And Equity, School of Public Health and Community Medicine, University of NSW,	- Health and equity in CALD populations. - Depression management in CALD – Chinese community Sydney
Ruth Colagiuri	Director, Diabetes Unit	Australian Health Policy Institute	Over the past 10 years Ruth has initiated and/or been involved in health policy and development initiatives across four continents and has a strong track record of capacity building for health in Pacific Island countries. She is a co-author of the (Australian) National Diabetes Strategy and Implementation Plan (1998), and authored the Plan of Action for the Western Pacific Diabetes Declaration (2000), and the Diabetes Strategy for (sub-Saharan) Africa (2006), She has also has published in the area of patient education, clinical diabetes care, and professional competencies, co-authored six NHMRC endorsed evidence based guidelines and authored a number of health policy reports and publications.
Cate Burns	Senior Lecturer	Faculty of Health Medicine, Nursing and Behavioural Sciences, School of Exercise and Nutrition Sciences, Deakin University, Burwood, Victoria, Australia	- Research is primarily concerned with understanding the link between social exclusion and poor diet. The three main areas include: - Understanding community food insecurity - Explaining differences in food habits between individuals with different socioeconomic advantages - Understanding dietary change and migration - This research has led to the development of tools for describing individual and community food security, the use of anthropological research methods to determine differences in food skills and values between social strata and peoples of different ethnicity and stage of migration settlement.
Andre Renzaho	Senior Research Fellow	Faculty of Health Medicine, Nursing and Behavioural Sciences, School of Exercise and Nutrition Sciences, Deakin University, Burwood, Victoria, Australia	Research Interests: acculturation as a determinant of obesity among migrants, obesity prevention, cultural competence, Nutritional Anthropology with focus on cultural influences on food and dietary acculturation, international health including Complex Humanitarian Emergencies, refugee public health nutrition including food security, Human Rights-based approaches to health and nutrition planning and Nutrition in Developing Countries, and health program evaluation
Jill Kelly	Primary Health Integration Manager	Whitehorse Division of General Practice	- Research Interests: General Practice, Primary Health Integration, Primary Health Care Population Health data - Current work in recruiting *Life!* facilitators, working with GPs about *Life!* program, and knowledge of the *Life!* program running for Chinese community in Whitehorse.

Appendix 2 - Risk Tools
FINDRisk Tool

Type 2 diabetes risk assessment form

Test designed by Professor Jaakko Tuomilehto, Department of Public Health, University of Helsinki, and Jaana Lindström, MFS, National Public Health Institute, Finland. Test published by the Finnish Diabetes Association in 2001.

Choose the right alternative and click the Calculate button at the end of the form.

1. Age
○ Under 45 years (0 p.)
○ 45–54 years (2 p.)
○ 55–64 years (3 p.)
○ Over 64 years (4 p.)

2. Body-mass index
(Calculate your own body-mass index)
○ Lower than 25 kg/m^2 (0 p.)
○ 25–30 kg/m^2 (1 p.)
○ Higher than 30 kg/m^2 (3 p.)

3. Waist circumference measured below the ribs (usually at the level of the navel)

	MEN	WOMEN	
○	Less than 94 cm	Less than 80 cm	(0 p.)
○	94–102 cm	80–88 cm	(3 p.)
○	More than 102 cm	More than 88 cm	(4 p.)

4. Do you usually have daily at least 30 minutes of physical activity at work and/or during leisure time (including normal daily activity)?

○ Yes (0 p.)
○ No (2 p.)

5. How often do you eat vegetables, fruit or berries?

○ Every day (0 p.)
○ Not every day (1 p.)

6. Have you ever taken antihypertensive medication regularly?

○ No (0 p.)
○ Yes (2 p.)

7. Have you ever been found to have high blood glucose (eg in a health examination, during an illness, during pregnancy)?

○ No (0 p.)
○ Yes (5 p.)

8. Have any of the members of your immediate family or other relatives

been diagnosed with diabetes (type 1 or type 2)?

○ No (0 p.)
○ Yes: grandparent, aunt, uncle or first cousin (but no own parent, brother, sister or child) (3 p.)
○ Yes: parent, brother, sister or own child (5 p.)

[Calculate] [Empty]

Total Risk Score

[   ]

The risk of developing type 2 diabetes within 10 years is

	Lower than 7	**Low:** estimated 1 in 100 will develop disease
□	**7–11**	**Slightly elevated:** estimated 1 in 25 will develop disease
□	**12–14**	**Moderate:** estimated 1 in 6 will develop disease
□	**15–20**	**High:** estimated 1 in 3 will develop disease
□	**Higher than 20**	**Very high:** estimated 1 in 2 will develop disease

AUSDRISK tool

The Australian Type 2 Diabetes Risk Assessment Tool (AUSDRISK)

1. Your age group?

Under 35 years	0 points
35-44 years	2 points
45-54 years	4 points
55-64 years	6 points
65 years or over	8 points

2. Your gender?

Female	0 points
Male	3 points

3. Your Ethnicity/Country of birth:

3a. Are you of Aboriginal, Torres Strait Islander, Pacific Islander or Maori descent?

No	0 points
Yes	2 points

3b. Where were you born?

Asia (including the Indian sub-continent), Middle East, North Africa, Southern Europe	2 points
Other	0 points

4. Have either of your parents, or any of your brothers or sisters been diagnosed with diabetes (type 1 or type 2)?

No	0 points
Yes	3 points

5. Have you ever been found to have high blood glucose (sugar) (for example, in a health examination, during an illness, during pregnancy)?

No	0 points
Yes	6 points

6. Are you currently taking medication for high blood pressure?

No	0 points
Yes	2 points

7. Do you currently smoke cigarettes or any other tobacco products on a daily basis?

No	0 points
Yes	2 points

8. How often do you eat vegetables or fruit?

Everyday	0 points
Not everyday	1 point

9. On average, would you say you do at least 2.5 hours of physical activity per week (for example, 30 minutes a day on 5 or more days a week)?

Yes	0 points
No	2 points

10. Your waist measurement taken below the ribs (usually at the level of the navel)?

For those of Asian or Aboriginal or Torres Strait Islander descent:

Men	Women	
Less than 90 cm	Less than 80 cm	0 points
90 - 100 cm	80 – 90 cm	4 points
More than 100 cm	More than 90 cm	7 points

For all others:

Men	Women	
Less than 102 cm	Less than 88 cm	0 points
102 - 110 cm	88 – 100 cm	4 points
More than 110 cm	More than 100 cm	7 points

Add up your score [ ]

Your risk of developing type 2 diabetes within 5 years*:

Less than 5: Low risk
Approximately one person in every 100 will develop diabetes.

6-14: Intermediate risk
For scores of 6-8, approximately one person in every 50 will develop diabetes.

For scores of 9-14, approximately one person in every 20 will develop diabetes.

15 or more: High risk
For scores of 15-19, approximately one person in every seven will develop diabetes.

For scores of 20 and above, approximately one person in every three will develop diabetes.

If you scored 15 or more points, it is important that you discuss your score with your doctor.

*The overall score may overestimate the risk of diabetes in those aged less than 25 years and underestimate the risk of diabetes in people of Aboriginal and Torres Strait Islander descent.

The Australian Type 2 Diabetes Risk Assessment Tool was originally developed by the International Diabetes Institute on behalf of the Australian, State and Territory Governments as part of the COAG *reducing the risk of type 2 diabetes* initiative

US Risk Tool

Are you at risk for type 2 diabetes?

To find out about your risk for diabetes, check each item that applies to you.

☐ I am 45 years of age or older.

☐ My weight puts me at risk for diabetes.

☐ I have a parent, brother, or sister with diabetes.

☐ I am Asian American or Pacific Islander.

☐ I am fairly inactive. I am physically active less than three times a week.

☐ I have been told that I have polycystic ovary syndrome (PCOS).

☐ I have had diabetes while I was pregnant (this is called gestational diabetes) or I gave birth to a baby weighing 9 pounds or more.

☐ I have been told that my glucose levels are higher than normal.

☐ My blood pressure is 140/90 or higher, or I have been told that I have high blood pressure.

☐ My cholesterol (lipid) levels are not normal. My HDL cholesterol ("good" cholesterol) is less than 35 or my triglyceride level is higher than 250.

☐ Patches of skin around my neck and armpits appear dark, thick, and velvety. This is called acanthosis nigricans (A-can-THO-sis NI-gri-cans).

☐ I have been told I have blood vessel problems affecting my heart, brain, or legs.

Keep in mind: As people get older, their risk for type 2 diabetes increases.

Call 1-800-438-5383 or visit www.ndep.nih.gov to learn more.

AT-RISK WEIGHT CHARTS

Find your height in the correct chart. If your weight is equal to or greater than the weight listed, you are at increased risk for type 2 diabetes.

IF YOU ARE ASIAN AMERICAN — AT RISK BMI ≥ 23		IF YOU ARE PACIFIC ISLANDER — AT RISK BMI ≥ 26		IF YOU ARE NOT ASIAN AMERICAN OR PACIFIC ISLANDER — AT RISK BMI ≥ 25	
HEIGHT	WEIGHT	HEIGHT	WEIGHT	HEIGHT	WEIGHT
4'10"	110	4'10"	124	4'10"	119
4'11"	114	4'11"	128	4'11"	124
5'0"	118	5'0"	133	5'0"	128
5'1"	122	5'1"	137	5'1"	132
5'2"	126	5'2"	142	5'2"	136
5'3"	130	5'3"	146	5'3"	141
5'4"	134	5'4"	151	5'4"	145
5'5"	138	5'5"	156	5'5"	150
5'6"	142	5'6"	161	5'6"	155
5'7"	146	5'7"	166	5'7"	159
5'8"	151	5'8"	171	5'8"	164
5'9"	155	5'9"	176	5'9"	169
5'10"	160	5'10"	181	5'10"	174
5'11"	165	5'11"	186	5'11"	179
6'0"	169	6'0"	191	6'0"	184
6'1"	174	6'1"	197	6'1"	189
6'2"	179	6'2"	202	6'2"	194
6'3"	184	6'3"	208	6'3"	200
6'4"	189	6'4"	213	6'4"	205

Source: Adapted from *Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults: The Evidence Report*

DEPARTMENT OF HEALTH & HUMAN SERVICES · USA

NDEP
National Diabetes Education Program

small steps
big rewards
Prevent type 2 Diabetes

www.ndep.nih.gov

A message from the National Diabetes Education Program, sponsored by the National Institutes of Health and the Centers for Disease Control and Prevention.

Wilfred Y. Fujimoto, M.D., Professor Emeritus of Medicine, Division of Metabolism, Endocrinology and Nutrition at the University of Washington School of Medicine, Seattle, WA, reviewed this material for accuracy.

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NSW Risk Tool

Are you at risk from the world's fastest growing disease?

Risk Factors

I am over 40 years old

I have (or have had) a blood relative with diabetes

I have had a baby weighing more than 4kgs, or have had diabetes during pregnancy

I don't exercise regularly (ie exercise less than half an hour per day, three days per week).

My waist measurement is more than 100cms (for a man) or more than 95cms (for a woman)

My blood pressure is higher than 140/90 or I take blood pressure medication

I was born in Southern Europe, the Middle East, South East Asia; am Polynesian, or Asian Indian.

I have two or more of the following symptoms:

- I urinate excessively
- Am always thirsty
- I have just lost weight for no reason
- I sometimes have numbness or tingling in my feet or legs
- I have blurred vision
- I 'm always tired
- I have itching skin or I often have skin infections

If you said yes to *two or more* questions on the above list, you're at high risk for developing diabetes - or you may have it already. You should see your doctor for a check up - as many as 400,000 people in Australia have this disease without knowing it.

One reason why so many people around the world, including Australia, are dying prematurely of diabetes is because of ignorance about its dangers. When diabetes is undiagnosed or uncontrolled, there's a high risk of complications like heart dis-

Diabetes Prevention for Culturally and Linguistically Diverse (CALD) Populations in Australia

Whitehorse Community Health Centre Risk Tool

ARE YOU AT RISK?

Type 2 diabetes is a serious illness that should not be ignored. For every person who has a known diagnosis of diabetes there is another person who has it and doesn't know, and many more who have pre-diabetes.

To find out if you are at risk check the list below.

Risk Factors for Diabetes

☐ I am over 55 years of age

☐ I am over 45 years of age and overweight

☐ I am over 45 years of age and an immediate family member has diabetes

☐ I am over 45 years of age and have high blood pressure

☐ I am over 35 years of age and from an Aboriginal, Torres Strait Islander, Pacific Islander, Indian sub-continent or Chinese background

☐ I have heart disease or have had a heart attack

☐ I had diabetes when I was pregnant (gestational diabetes)

☐ I have had a blood test that indicates impaired fasting glucose (IFG) or impaired glucose tolerance (IGT)

☐ I am a female who has polycystic ovarian syndrome and I am overweight

☐ I am over 45 years of age and get little or no exercise during a usual day

If you ticked <u>one</u> or more boxes, we recommend you contact your doctor or turn over for further details.

WHITEHORSE COMMUNITY HEALTH SERVICE

go for your life Victoria

Appendix 3 – The estimated prevalence and numbers of adults with diabetes in the Western Region, according to age and country of birth .

Appendix 5 *The estimated prevalence and numbers of adults with diabetes in the Western Region, according to age and country of birth. Estimates based on country of birth diabetes prevalence from overseas data*

Birth Region and Country	Prevalence[a]	Numbers of adults with diabetes (n) Age group (years)					
		25-44	45-54	55-64	65-74	≥ 75	≥ 25
Australia/ New Zealand							
Australia	7.4%	1,346	2,478	3,006	2,343	3,178	12,351
New Zealand	8.5%	129	130	102	39	22	422
UK/ Ireland							
Ireland	7.0%	16	14	25	26	38	120
United Kingdom	3.2%	35	121	263	215	178	813
South Europe							
Bosnia and Herzegovina	9.6%	15	32	42	51	24	164
Croatia	9.6%	18	72	181	316	175	762
Cyprus	15.0%	42	116	174	77	44	453
FYR of Macedonia	9.6%	30	107	213	159	115	624
Greece	9.6%	14	76	254	519	407	1,270
Italy	8.2%	14	188	611	991	828	2,632
Malta	9.4%	4	180	775	697	279	1,935
Portugal	8.3%	2	13	24	19	5	63
Spain	8.3%	1	7	20	25	17	70
Yugoslavia	9.6%	12	43	77	111	128	371
Other Europe							
Austria	6.5%	1	5	20	21	26	73
France	8.6%	1	7	9	11	9	37
Germany	6.5%	7	19	139	83	134	382
Hungary	10.5%	3	9	17	35	34	98
Netherlands	8.1%	1	14	59	48	59	181
Poland	10.5%	25	70	88	92	272	547
Romania	10.5%	10	18	13	14	18	73
Russian Federation	10.5%	4	4	5	8	29	50
Ukraine	10.5%	3	3	5	18	129	158
Asia							
Cambodia	10.7%	14	19	12	6	3	54
China	6.1%	63	82	54	55	36	290
Egypt	19.9%	54	108	142	103	88	495
Fiji	13.0%	28	61	41	11	2	143
Hong Kong	11.7%	24	35	20	13	8	100
India	16.3%	385	238	194	112	51	980
Indonesia	4.0%	8	7	8	4	3	30
Iran	12.1%	6	9	9	9	4	37
Iraq	13.4%	9	14	9	4	2	38
Japan	6.4%	9	6	5	2	2	24
Korea, Republic of (South)	8.4%	19	5	7	3	1	35
Lebanon	7.3%	15	40	47	32	11	145

Malaysia	12.5%	51	98	76	27	6	258
Mauritius	19.2%	28	38	34	16	13	129
Philippines	9.7%	146	264	186	51	31	678
Singapore	14.5%	20	22	20	8	7	77
Sri Lanka	17.1%	169	104	63	25	20	381
Taiwan	7.5%	7	4	4	1	1	17
Thailand	11.0%	31	14	5	1	3	54
Turkey	12.9%	73	52	54	16	2	197
Viet Nam	5.1%	210	270	173	130	96	879
Other countries							
Canada	10.3%	11	10	10	5	4	40
Chile	6.0%	19	35	55	15	4	128
Papua New Guinea	9.4%	6	3	1	1	0	11
Samoa	12.3%	6	26	18	4	0	54
South Africa	1.9%	4	3	4	3	2	16
United States of America	10.7%	27	21	25	7	12	92
Western Region (specified countries) [b]		3,176	5,314	7,398	6,582	6,561	29,031

[a]   Age standardised to the 2006 census estimate of the Australian born population of Victoria.

[b]   No estimates are provided for those from "other" or unknown birth country – which are likely from AusDiab based estimates (Appendix 4) to total about 4500 persons.