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

Diabetes Prevention Research Report Series

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Diabetes Prevention Research Report Series

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

Produced by Ruth Colagiuri, Melanie Thomas, and Alexandra Buckley for the NSW Department of Health.

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List of Acronyms

ABS	Australian Bureau of Statistics
AIHW	Australian Institute of Health and Welfare
AusDiab	Australian Diabetes, Obesity and Lifestyle (Study)
BMI	Body mass index
BP	Blood pressure
CALD	Culturally and linguistically diverse
CVD	Cardiovascular disease
DA	Diabetes Australia
GDM	Gestational diabetes mellitus
GP	General Practitioner (also General Practice)
IFG	Impaired fasting glucose
IGT	Impaired glucose tolerance
NDSS	National Diabetes Services Scheme
NIDDM	Non-insulin dependent diabetes mellitus
NHMRC	National Health and Medical Research Council
QOL	Quality of life
RCT	Randomised controlled trial
TBF	Total body fat
WHR	Waist-hip ratio

Executive Summary

Background

Australia is one of the most culturally and linguistically diverse (CALD) nations in the world and NSW is one of the most multicultural states in Australia with one in three residents having been born overseas and approximately one in five speaking a language other than English at home. While this diversity brings many benefits and a welcome depth and richness to our society, it also brings inherent difficulties and barriers to the delivery of health services and information. This is exemplified in the case of diabetes where the long term nature of the disease and the complexity of its management impose ongoing lifestyle modification and self care requirements on the individual and assiduous attention to clinical monitoring and management on the part health care providers.

Immigration is associated with an increased risk of diabetes and it is known that approximately 35% of people residing in Australia who reported having diabetes in 2001 were born overseas although only 28% of the Australian population in 2001 was born overseas. In addition, many CALD groups residing in Australia have an increased prevalence of diabetes in their home country.

Project overview

This project was commissioned by NSW Department of Health to inform the development of policies and programs aimed at reducing risk factors for, and subsequent progression to diabetes in CALD groups. The project brief was to collate and present the available evidence in relation to preventing type 2 diabetes in CALD communities in NSW by synthesizing:

- demographic data on CALD groups in NSW
- epidemiological data on diabetes risks and rate of progression to diabetes
- qualitative evidence about CALD groups' attitudes to diabetes and diabetes risks
- CALD specific risk reduction interventions for diabetes and other chronic diseases risks and their key characteristics
- purpose designed mechanisms for the evaluation of relevant CALD specific programs.

A pragmatic, structured, multifaceted review of the relevant national and international peer reviewed press, and government and non-government organisation reports and websites was conducted to address the five research questions set out in the project brief. This involved synthesising the available evidence about CALD groups with regard to demographics; the epidemiology of risks and progression to diabetes; cultural variables that influence access to and the uptake of health/prevention services and messages; the status and characteristics of i) successful interventions and ii) mechanisms for evaluating them.

The project was conducted between September and November, 2006.

Key findings

Based on the size of the group (number of people residing in NSW), their high prevalence of diabetes, and/or their high recent migration rates to Australia the following six broad priority CALD groups were identified for the purpose of this project:

- European – including people from Germany, Greece, Italy and Malta
- African – including people from Kenya, Zimbabwe, Somalia, Ethiopia and Sudan
- Chinese – including people from China, Hong Kong, Singapore, Vietnam and Philippines
- Middle Eastern – including people from Lebanon, Iraq and Afghanistan
- Pacific Islands – including people from Tonga, Samoa, Fiji, Nauru and Maoris
- Asian – people from the India subcontinent including Bangladesh, India, Pakistan, Nepal and Sri Lanka

These CALD groups were also found to have an increased prevalence of risks for type 2 diabetes including:

- obesity
- physical inactivity
- impaired glucose tolerance and fasting glucose
- cardiovascular disease
- high blood pressure
- gestational diabetes
- ageing

There are many factors that contribute to the higher level of risk experienced by some CALD groups including:

- genetic factors
- immigration factors
- socio-economic factors
- socio-cultural factors

While some factors were common to all cultural groups, such as a language barrier, literacy rates and lack of access to culturally appropriate care, there were some factors which were specific to each of the identified CALD groups.

Intervention programs which aim to reduce risk factors for type 2 diabetes and other chronic diseases in CALD groups have predominantly focused on increasing physical activity and changing dietary patterns. The apparent key features making these interventions successful are programs which are consultative, collaborative, practical, and culturally appropriate.

Although there are some tools designed specifically for people from CALD groups who are already diagnosed with diabetes, the literature search revealed no tools designed to assess preventative interventions specifically for CALD groups. Evaluations of intervention programs aiming to prevent type 2 diabetes across the board, as well as in CALD groups, rarely include long term follow up and rarely include assessment of progression to diabetes or physical or biochemical measurement of risk factors. In many cases program evaluations focus almost solely on participant acceptance and enjoyment of the program. While this is an important factor, such evaluations do not contribute to the pool of knowledge about effective models and methods for preventing type 2 diabetes in CALD groups.

SECTION 1

Background and Introduction

Background

The magnitude of the diabetes epidemic

Globally diabetes has reached epidemic proportions – by 2025 there will be 330 million people with diabetes out of a total world population of 8 billion and the predicted increase in the Asia-Pacific Region is 72% (2003).

In Australia the prevalence of diabetes has doubled over the last 20 years but, due to the increased population, the actual number of people with diabetes has trebled. The initial Australian Diabetes, Obesity and Lifestyle (AusDiab) study of risk factors and diabetes indicated that 7.4% of Australians 25 years and over have diabetes but, alarmingly, another 16.3% have either impaired glucose tolerance or impaired fasting glucose thus making them at high risk of developing type 2 diabetes in the future (Dunstan et al, 2001). Further, the AusDiab study found that 60% of its 10,000 plus national sample were either overweight or obese and 30% had hypertension – both independent risk factors for type 2 diabetes.

What is diabetes?

There are three main types of diabetes:

- Type 1 diabetes – formerly known as insulin dependent diabetes
  This type of diabetes always requires insulin treatment. It is most commonly diagnosed in childhood or young adulthood but can also occur in later life.

- Type 2 diabetes – formerly known as non-insulin dependent diabetes (NIDDM)
  This form of diabetes was historically diagnosed in middle age to later years but is increasingly occurring in young adults and even children. People with type 2 diabetes are not dependent on insulin for survival but may require insulin treatment to achieve adequate glycaemic control.

- Gestational diabetes
  Gestational diabetes is carbohydrate intolerance of variable severity which is first diagnosed during pregnancy. It is frequently cited as the commonest complication of pregnancy. Untreated or poorly controlled gestational diabetes can result in increased perinatal mortality and maternal complications at birth. While the diabetes in the mother usually "goes away" after the birth, gestational diabetes is an independent risk factor for type 2 diabetes in later life. Infants of a gestational diabetes pregnancy carry a higher risk of obesity and diabetes in adult life. Consequently, targeting women with gestational diabetes could be an important focus of preventative activities.

Why is it a problem?

To all intents and purposes people with diabetes can lead a normal life. However, the repercussions of poorly controlled and/or under-treated diabetes imposes a huge economic cost to the community and a devastating personal burden to individuals in terms of complications and early mortality. The list of complications associated with diabetes is long and includes:

- visual impairment up to and including blindness
- kidney disease up to and including end stage renal failure
- heart disease
- stroke
- lower limb amputation
- erectile dysfunction

Diabetes is a major cause of non-traumatic amputation in Australia and recently became the leading cause of commencement on renal dialysis (ANZDATA, 2004). It is a major contributor to cardiovascular disease and carries a two to four-fold risk of heart disease compared to the non-diabetic population.

The national DiabCo$t Australia study cites the cost of type 2 diabetes per person per year at around $5,000 rising to over $9,000 if both microvascular and macrovascular complications are present (Colagiuri et al, 2003). Type 2 diabetes is increasingly affecting people in the productive years of life (King et al, 1998) and has serious implications for loss of productivity and international competitiveness for countries at any stage of economic development.

DiabCo$t also identified poor self-reported quality of life particularly in the presence of complications. This is borne out by the Australian results of the DAWN study which showed that a high proportion of people with diabetes rate their well-being as poor (Rutherford et al, 2004). There are now a number of international studies demonstrating that people with diabetes experience increased depression and anxiety in comparison to their non-diabetic counterparts (Anderson et al, 2001).

Why this project?

Type 2 diabetes can be prevented or delayed

It is currently not possible to cure or prevent type 1 diabetes. Unlike type 2 diabetes there are no readily identifiable, modifiable risk factors that can be easily assessed. However, there is irrefutable evidence from several international trials about effective and cost effective strategies for preventing or significantly delaying type 2 diabetes in high risk groups (Pan et al, 1997; Tuomilehto et al, 2001; Knowler et al, 2002; Ramachandran et al, 2006).

All the prevention studies were randomised controlled trials (RCTs) and all were in people with impaired glucose tolerance (IGT). The first, known as the Da Qing study, was conducted by Pan and colleagues in China to compare three arms of intervention i) physical activity only, ii) diet only, and iii) physical activity and diet combined. Over six years the Da Qing study resulted in a significant reduction in progression to type 2 diabetes of 31% for the diet only group, 46% for the exercise only group and 42% for the diet plus exercise group.

The Finnish Diabetes Prevention Study was designed to assess the impact of lifestyle modification on the incidence of diabetes. Over an average of a little over three years it achieved a 58% reduction in the cumulative incidence of type 2 diabetes in the intervention group compared with controls. The intervention was based on counselling and encouragement for participants to reduce weight by at least 5%, have no more than 30% of their calories from fat, increase their dietary fibre intake, and exercise for 30 minutes or more per day.

The US Diabetes Prevention Program randomised participants to one of three interventions i) standard lifestyle modifications plus placebo, ii) standard lifestyle modifications plus metformin or iii) an intensive lifestyle modification program. Over a period of just under three years, the intensive lifestyle arm of the study, which aimed for a weight reduction of 7%, resulted in a 58% reduction in progression to diabetes while the metformin arm showed a reduction of 31% compared with treatment with a placebo.

Subsequent RCTs of the effect of lifestyle modification and anti-hyperglycaemic or weight loss medications showed reductions of from 25-60% in the incidence of type 2 diabetes (Buchanan et al, 2002; Chiasson et al, 2002; Torgerson et al, 2004; Gerstein et al, 2006; Ramachandran et al, 2006).

The 'climate' is right

The evidence for preventing type 2 diabetes is irrefutable and there is a global recognition that the crippling burden of chronic diseases such as diabetes and heart disease must be addressed and reduced (WHO, 2005).

Many countries now have national diabetes strategies and plans and the growing impact of diabetes has been well recognised by Australian governments in the form of various policies and strategies eg:

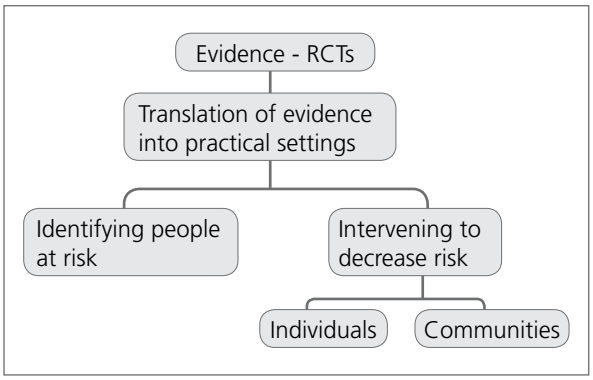
- The National Diabetes Strategy and Implementation Plan (Colagiuri et al, 1998)
- The National Chronic Disease Strategy (NHPAC, 2006a)
- The Diabetes Services Improvement Framework (NSIF) (NHPAC, 2006b)
- The NSW Health Chronic Disease Strategy (NSW Dept Health, 2003)

The Council of Australian Governments has recently reaffirmed its commitment to addressing the burden of chronic diseases in Australia and has singled out diabetes for specific programs – including prevention of type 2 diabetes, which are currently under development.

What needs to be done?

In 2004, NSW Health commissioned a scoping paper to explore and make recommendations about how best to translate the clinical trials evidence about the effectiveness of type 2 diabetes prevention into community settings in NSW (Colagiuri et al, 2004). Figure 1 conceptualises the report's overview of what is required to translate the research evidence about type 2 diabetes into everyday settings. This is particularly valid for CALD communities who are known to be at high risk of type 2 diabetes.

Figure 1: What needs to be done?



Source: Preventing Type 2 Diabetes in NSW: A Scoping Paper. NSW Health 2004

Culturally and linguistically diverse groups are susceptible to diabetes

With one in four residents born overseas (Strong et al, 1998; Thow & Waters, 2005) and over 190 languages spoken, Australia is arguably one of the most culturally and linguistically diverse nations on earth (Von Hofe et al, 2002). While this diversity brings cultural depth and richness to our society, it also poses significant barriers to the delivery of effective and equitable health services (Von Hofe et al, 2002). Further, certain cultural groups are known to be at higher risk of diabetes (Colagiuri et al, 2002a) and the stress and lifestyle changes associated with migration itself may be an additional risk for the development of chronic conditions such as diabetes. Type 2 diabetes is a serious, complex, costly and incurable disease which is not only increasing in prevalence (Barr et al, 2006) but is increasingly affecting people in the productive years of their lives (King et al, 1998) and thus changing traditional patterns of dependency.

NSW Health is seeking to develop effective policies and programs to reduce risks and prevent progression to diabetes in CALD groups known to be at high risk. This work needs to be informed by systematically derived information about which groups are at the highest risk; and which preventative interventions are likely to work best in those groups. Consequently, NSW Health commissioned a structured review of the peer reviewed literature and government and non-government reports to identify and synthesise demographic data on CALD groups in NSW; epidemiological data on diabetes risks and rate of progression to diabetes; qualitative evidence about CALD groups' attitudes to diabetes and diabetes risks; CALD specific risk reduction interventions for diabetes and other chronic diseases - and their key characteristics; purpose designed mechanisms for the evaluation of relevant CALD specific programs; and to generate recommendations that propose the intervention most likely to succeed in reducing diabetes risks in CALD groups that are at the greatest risk.

Project aim

The project aim was to collate and present the available evidence in relation to preventing type 2 diabetes in CALD communities in NSW by synthesizing:

- demographic data on CALD groups in NSW
- epidemiological data on diabetes risks and rate of progression to diabetes
- qualitative evidence about CALD groups' attitudes to diabetes and diabetes risks
- CALD specific risk reduction interventions for diabetes and other chronic diseases risks and their key characteristics
- purpose designed mechanisms for the evaluation of relevant CALD specific programs.

SECTION 2

Methodology

Overview

The project brief was to collate and present the available evidence in relation to preventing type 2 diabetes in CALD communities in NSW.

A structured, multifaceted, pragmatic review of the relevant national and international peer reviewed press, government and non-government organisation reports and websites was conducted to address the five research questions set out in the project brief (see below). The methodology for this review also drew on work led by the principal applicant to scope the potential capacity of the NSW health system to prevent type 2 diabetes in NSW (Colagiuri et al, 2004) by applying this framework as a backdrop for the prevention of type 2 diabetes in CALD groups.

Steps undertaken

Co-ordinating the review required synthesising the available evidence about CALD groups with regard to demographics; the epidemiology of risks and progression to diabetes; the status and characteristics of i) successful interventions and ii) mechanisms for evaluating them and involved the following steps:

1. Developing **a framework and database** of organisations and key contacts for identifying, sourcing and searching the relevant literature
2. Conducting and tabulating the results of a multifaceted search (peer reviewed literature and hand searching, non-peer reports, websites, expert identified unpublished literature) to **identify the risk status** of various CALD groups
3. Conducting and synthesising the results of a multifaceted search (peer reviewed literature and hand searching, non-peer reports, websites, expert identified unpublished literature) to **identify the attitudes of CALD groups** to risk factors and diabetes
4. Conducting and synthesising the results of a multifaceted search (peer reviewed literature and hand searching, non-peer reports, websites, expert identified unpublished literature) to identify **successful risk reduction interventions** for diabetes and other chronic diseases in CALD groups
5. Conducting and synthesising the results of a multifaceted search (peer reviewed literature and hand searching, non-peer reports, websites, expert identified unpublished literature) to identify effective and robust **mechanisms for evaluating interventions** in CALD groups

Methodological framework

Research questions

The methodological framework was built around the five research questions identified to guide the literature review ie:

1. Are there specific CALD groups in NSW with high prevalence of risk factors for developing type 2 diabetes, or with higher incidence of the disease?
2. What are the factors which may contribute to higher levels of risk in specific CALD groups?
3. What evidence exists, and what are its key features, for interventions which are likely to be effective in reducing risk factors for type 2 diabetes in specific CALD groups?
4. What evidence exists, and what are its key features, for interventions which have been trialled in CALD groups, for reducing other risk factors for chronic disease, which may be applicable to reducing risk factors for developing type 2 diabetes?
5. What evaluation methods would be applicable for evaluating the processes, impacts and outcomes of interventions for reducing risk factors for type 2 diabetes targeted to CALD communities?

Finding the relevant literature

In addition to standard literature and web searches, personal approaches by means of a standard letter were made to Multicultural Units (MCUs) and Public Health Units (PHUs) and telephone communication with peers and colleagues was undertaken to source relevant information. Hand searching of the references of reviewed documents was also undertaken where indicated.

Sources of non-peer reviewed literature

- A number of government, non-government, and health institutes, centres and services reports and websites were used to find relevant information to address the research questions. For example:
- Australian Institute of Health and Welfare (AIHW)
- Australian Bureau of Statistics (ABS)
- Diabetes Australia (DA) (national and state bodies and Multicultural Website)
- Centre for Culture Ethnicity and Health
- Commonwealth and State Health Department publications and surveys
- NSW Area Health Services Multicultural Unit and Public Health Units
- NSW Centre for Multicultural Communication

Sources of peer reviewed literature

Sources of peer reviewed information on epidemiology, interventions, and evaluations of initiatives for reducing the incidence of type 2 diabetes in CALD groups and addressing other research questions included:

- **MAIS - Multicultural Australia and Immigration Studies**
  Multicultural and immigration issues in Australia. A bibliographic database that indexes and abstracts a wide range of media from published and unpublished material on all aspects of Australian immigration and multicultural issues.

- **CINAHL via Ovid**
  Contains bibliographic references and abstracts of journal articles, book chapters, pamphlets, audiovisual materials, software, dissertations, critical paths, and research instruments on topics including nursing and allied health, biomedicine, consumer health, health sciences librarianship, behavioural sciences, management, and education.

- **PsycINFO**
  Bibliographic references and abstracts to journal articles, book chapters, dissertations and technical reports. Source material comes from a wide range of languages. Contains links to selected full text on psychology; social, clinical, cognitive and neuropsychology; psychiatry, sociology, anthropology and education.

- **Sociofile/Sociological Abstracts via CSA**
  Bibliographic references and abstracts to literature of sociology and the related social sciences including the topics aging, HIV/AIDS, alcohol abuse, anthropology, cities, communications, counselling, crime, culture, death, demography, drugs, and education. Source material from over 30 languages.

Inclusion criteria

Journal articles and reports were included in the review if they met the following criteria:

- addressed one or more of the research questions
- included, or had relevance to CALD communities living in NSW
- had direct relevance to Australia
- were published during or since 1990.

Searching and sorting the literature

The searches were jointly conducted by two members of the project team who also jointly sorted and/or culled the literature against the research questions and the inclusion criteria.

Reviewing and synthesising the relevant literature

Four members of the Research Team (equivalent to two full time project officers) reviewed and summarised the included papers and reports according to a standardised review guide (Appendix 1) adapted from Von Hofe et al (2002). These summaries were collated by the authors to form a coherent response to the research questions.

SECTION 3

Incidence and Prevalence of Risk Factors in CALD Communities

Are there specific CALD groups in NSW with high prevalence of risk factors for developing type 2 diabetes, or with higher incidence of the disease?

What are the factors which may contribute to higher levels of risk in specific CALD groups?

Question 1

Are there specific CALD groups in NSW with high prevalence of risk factors for developing type 2 diabetes, or with higher incidence of the disease?

It is known that approximately 35% of people residing in Australia who reported having diabetes in 2001 were born overseas although only 28% of the Australian population in 2001 was born overseas. The regions of birth with the highest diabetes prevalence, incidence of insulin treated diabetes and diabetes related hospitalisations and/or mortality rates were the South Pacific Islands, Southern Europe, Eastern Europe and Central Asia, the Middle East, North Africa and Southern Asia (Thow & Waters, 2005). We also know that NSW is one of the most multicultural states in Australia with one in three NSW residents having been born overseas and approximately one in five speaking languages other than English at home (ABS, 2001; NSW Dept Health, 2006a). There are significant deficiencies in the data on risk factor prevalence and incidence for type 2 diabetes in NSW and in Australia generally. For example, the prospective AusDiab study (Barr et al, 2006) cites the overall incidence of diabetes in Australia at 8 per 1,000 per year but has insufficient numbers to report on the incidence or the prevalence of risk factors by ethnicity.

It should be noted that most of the data sources cited do not distinguish between type 1 and type 2 diabetes. However, given that type 2 diabetes accounts for approximately 90% of all diabetes globally, and 85-90% of all diabetes in Australia, this has little or no practical implications for policies and programs aimed at diabetes prevention in CALD groups in NSW.

In order to propose CALD groups within which diabetes prevention activities might bring the greatest health gain we identified priority groups on the basis of:

- Which CALD groups reside in NSW in the largest numbers
- Which CALD groups have the highest prevalence of diabetes and diabetes risks
- Which CALD groups are the most recent immigrants to Australia and therefore may be the least able to access the services and opportunities they need to reduce the risk of diabetes.

We firstly identified the largest immigrant populations that are now residing in NSW (Table 1).

Table 1: Largest immigrant populations residing in NSW.

Top 10 Immigrant Populations in NSW as at 30 June 2001	
1. United Kingdom	303,408
2. New Zealand	119,118
3. China	94,593
4. Vietnam	69,535
5. Italy	67,079
6. Lebanon	59,892
7. Philippines	56,775
8. Greece	43,237
9. Hong Kong	42,605
10. India	41,505

Source: Report by ABS 'Migration Australia 2004-5' available from www.abs.gov.au

Based on our review of the literature and published reports we subsequently identified six broad priority CALD groups due to the high prevalence of diabetes in these groups and/or their high recent migration rates to Australia. Although it is recognised that there is wide cultural diversity within these groups there are also distinct similarities which led to the six broad priority CALD groups being identified in the following way:

- European – including people from Germany, Greece, Italy and Malta
- African – including people from Kenya, Zimbabwe, Somalia, Ethiopia and Sudan
- Chinese – including people from China, Hong Kong, Singapore, Vietnam and Philippines
- Middle Eastern – including people from Lebanon, Iraq and Afghanistan
- Pacific Islands – including people from Tonga, Samoa, Fiji, Nauru and Maoris
- Asian – people from the India subcontinent including Bangladesh, India, Pakistan, Nepal and Sri Lanka

The demographic data and the diabetes prevalence data for these six broad priority CALD groups are reported below. Table 2 summarises the number of residents and migration rates for each country within the identified CALD groups and Table 3 summarises the incidence and prevalence of diabetes in specific CALD groups in Australia and in their home countries.

Demographics and diabetes prevalence data of high risk CALD groups in Australia

1. European – including people from Germany, Greece, Italy, Malta

This group of countries represents people who have been migrating to Australia for a number of years and in comparison to more recent arrivals may be considered older migrants.

As at 30 June 2005 people born in Germany (115,215) represented the ninth largest group of overseas born Australian residents (ABS, 2006). According to the ABS (2001), the largest group of overseas born residents over 55 years of age in the former Hunter Area Health Service in NSW are those born in Germany, accounting for 54%. Anecdotal evidence from the South Eastern Sydney and Illawarra Area Health Service indicates that people from Germany represent 2.2% of the total overseas born population for the area. It is estimated that 6% of older people in Sydney are reported to speak German at home in 1996 (AIHW: Rowland & Karmel, 2004).

The 2002-2005 NSW Population Health Survey showed that the prevalence of diabetes or high blood glucose in German born males and females aged 16 years or over (11.4% and 10.5% respectively) were higher than the NSW averages for males (7.4%) and females (5.8%) (NSW Dept Health, 2006b).

As at 30 June 2005, the third and eighth largest number of residents in Australia who were born overseas were from Italy (224,300) and Greece (127,226) respectively (ABS, 2006). This corresponds to NSW data as at 30 June 2001 which shows people born in Italy (67,079) and Greece (43,237) as the fifth and eighth largest number respectively of residents born overseas (ABS, 2006). It is indicated in anecdotal evidence from the South Eastern Sydney and Illawarra Area Health Service that people from Greece and Italy represent 4.3% and 3.9% respectively of the total overseas born population for the area.

The 1997 and 1998 NSW Health Surveys indicated that the reported prevalence rates of doctor-diagnosed diabetes among Italian born males (12.5%) and females (9.3%) aged 16yrs and over were significantly higher than the state averages of 3.9% for males and 3.2% for females (NSW Dept Health, 2002). According to the 2002-2005 NSW Population Health Survey, the prevalence of diabetes or high blood glucose in Italian born males aged 16 years and over has decreased slightly to 11.0% whilst the prevalence in Italian born females aged 16 years or over has increased to 10.8%, these prevalence rates are still higher than the NSW averages for males (7.4%) and females (5.8%) (NSW Dept Health, 2006b).

Greek born NSW residents aged 16 years or over were found to have a significantly higher prevalence of diabetes or high blood glucose (18.0%) when compared to the 2002-2005 NSW state average (6.6%) (NSW Dept Health, 2006b). Similarly, data from the South Australian SERCIS Migrant Health Survey 1997 found that people born in Greece had a significantly higher prevalence of diagnosed diabetes (5.3%) compared to people born in non-English speaking countries as a whole (4.1%) (Taylor et al, 1997). Although people born in Malta did not make the top 10, as at 30 June 2001 there were 20,441 Maltese born residents in NSW, accounting for 40% of the Australian Maltese born population (ABS, 2006). In 2003-04 people born in Southern Europe had significantly higher diabetes separations (1.3 times) than those born in Australia (AIHW: O'Brien K, 2006).

Italian-speaking people living in Australia, who were either born in Australia or overseas, are most likely to live in the mainland states (Victoria, New South Wales, South Australia, Western Australia and Queensland). Within NSW, they tend to live in Sydney, mainly in parts of western Sydney; outside Sydney, the main areas are Wollongong and the Lower Murrumbidgee (Thow & Waters, 2005).

Greek-speaking people live mainly in Victoria (mainly in parts of Melbourne), New South Wales (parts of Sydney, and in Wollongong and Newcastle) and South Australia (parts of Adelaide) (Thow & Waters, 2005).

2. African – including people from Kenya, Zimbabwe, Somalia, Ethiopia, Sudan

This group of countries represents more recent arrivals to Australia – some of whom may have experienced undue stress and upheaval due to the political situation in their home country.

Although no country individually in this group accounts for the top 10 largest number of residents in Australia at 30 June 2005 or NSW at 30 June 2001, all countries have had substantial increases in their average annual migration rates over recent years. Between 1996 and 2005 people born in Sudan had the highest rate of increase into Australia with an average annual growth rate of 28%. Next highest increases were from Ethiopia (11.2%), Somalia (10%) and Zimbabwe (7.8%). In the year 2004-5 countries that saw an increase in migration to Australia above their average annual increase were Sudan (43.1%), and Kenya (10%) (ABS, 2006). Further, in 2002-3 19.6% of refugees settling in NSW were from Sudan (NSW Dept Health, 2004).

Similarly anecdotal evidence from Sydney West Area Health Service estimates that between 2001-2006 there has been an increase in settlement of people from Sudan who comprise 6.9% of the population who have settled in the area. Anecdotal reports from the former Hunter Area Health Service in NSW suggest that people from Sudan are the most recent arrivals with a number of women already being diagnosed with diabetes. Anecdotal evidence from the former Central Sydney Area Health Service indicates that people from African countries are an emerging population in the area.

The prevalence of diabetes in sub-Saharan Africa is thought to be approximately 2.5% but is increasing rapidly (Thow & Waters, 2005).

3. Chinese – including people from China, Hong Kong, Singapore, Vietnam, Philippines

This group consists of people who are both 'old' arrivals eg Chinese born residents and 'new' arrivals such as Vietnamese born residents.

As at 30 June 2005, people born in China (excluding Hong Kong and Taiwan province) (191,200) were the fourth largest group of overseas born Australian residents. People born in Vietnam (177,728) accounted for the fifth largest group and people born in the Philippines (129,401) were the seventh largest group. This corresponds to NSW data as at 30 June 2001 in which people born in China (94,593) were the third largest group of overseas born NSW residents, accounting for 60% of the Chinese born Australian population. Similarly, Vietnam was fourth (69,535), accounting for 41%, the Philippines (56,775) were seventh, accounting for 51% and Hong Kong (42,605) was ninth, accounting for 57% (ABS, 2006).

In the year 2004-5 countries that saw an increase in migration to Australia above their average annual rates were Singapore (8.3%), China (5.7%) and the Philippines (3.8%) (ABS, 2006). Similarly anecdotal evidence from Sydney West Area Health Service indicates that between 2001-2006 there has been an increase in settlement of people from China and the Philippines who comprise 11.9% and 7.1% respectively of the population who have settled in the area. Anecdotal evidence from the South Eastern Sydney and Illawarra Area Health Service suggests that people from China, Hong Kong and the Philippines represent 6.8%, 3.2% and 2.1% respectively of the total overseas born population for the area.

The prevalence of type 2 diabetes among Asian Australians has been reported to be increasing at a disproportionately high rate compared to non-Asian Australians (Wahlqvist, 2002). In 2003-04 people born in Southern and Central Asia had significantly higher diabetes separations (1.3 times) than those born in Australia (AIHW: O'Brien K, 2006). More specifically, the 2002-2005 NSW Population Health Survey reported the prevalence of diabetes or high blood glucose in NSW residents born in China, Hong Kong, Philippines and Vietnam to be 2.6%, 2.8%, 7.4% and 4.3% respectively (NSW Dept Health, 2006b).

Studies on Chinese populations living outside mainland China have shown a high prevalence of type 2 diabetes, although there is some variation in the age cut-off for a 5% undiagnosed prevalence, a combination of the findings suggests 40 years of age (Lu et al, 1998; Tan et al, 1999).

4. Middle Eastern – including people from Lebanon, Iraq, Afghanistan

This group of countries represents more recent arrivals to Australia. Although no country individually accounts for the top 10 largest number of residents in Australia at 30 June 2005 and only Lebanon is in the top 10 for NSW at 30 June 2001, all countries have had great increases in their average annual migration rates over recent years.

As at 30 June 2001, people born in Lebanon (59,892) represented the sixth largest group of overseas born NSW residents and accounted for 75% of the Lebanese born Australian population. Between 1996 and 2005 the average annual rate of increase of people from Afghanistan was 12% and from Iraq 10.3% (ABS, 2006). Further, in 2002-3 29.2% of refugees settling in NSW were from Iraq (NSW Dept Health, 2004). In 2001, men born in the Middle East and North Africa reported a diabetes prevalence 3.6 times higher than age specific rates for Australian born men, however no statistical significance was found for women despite a higher prevalence of 2.4 (compared to 1.0 for Australian born women) (Thow & Waters, 2005).

Anecdotal evidence from Sydney West Area Health Service estimates that between 2001-2006 there has been an increase in settlement of people from Afghanistan, Lebanon and Iraq who comprise 7.8%, 3.6% and 3.3% respectively of the population who have settled in the area. Similarly, anecdotal evidence from the former Central Sydney Area Health Service indicates that people from Iraq are an emerging population in the area. Anecdotal evidence from the South Eastern Sydney and Illawarra Area Health Service suggests that people from Lebanon represent 2.2% of the total overseas born population for the area.

In 1997-98 the prevalence of diabetes or high blood sugar among people born in the Middle East was 8.1% compared with 3.8% for Australian born people (NSW Dept Health, 2002). Further, in 2003-04 people born in the Middle East had significantly higher diabetes separations (1.5 times) than those born in Australia (AIHW: O'Brien K, 2006). The 2002-2005 NSW Population Health Survey found that the prevalence of diabetes or high blood glucose in Lebanese born males and females aged 16 years and over was 16.0% and 14.4% respectively (NSW Dept Health, 2006b).

In Australia, Arabic-speaking people live predominantly in parts of Sydney, with a substantial population also living in Wollongong. They also live in Victoria, primarily in Melbourne (Thow & Waters, 2005).

5. Pacific Islands – including people from Tonga, Samoa, Fiji, Nauru and Maoris

Although none of these countries accounts individually for the top 10 largest number of residents in Australia at 30 June 2005 or the top 10 for NSW at 30 June 2001, together they constitute a substantial group of similar origin. Anecdotal evidence from Sydney West Area Health Service suggests that between 2001-2006 there has been an increase in settlement of people from Fiji who comprise 3.7% of the population who have settled in the area. Similarly, anecdotal evidence from the former Central Sydney Area Health Service indicates that Pacific Islanders are an emerging population in the area.

In their own countries, Pacific Islander people have among the highest rates of type 2 diabetes in the world. In particular prevalence of type 2 diabetes among adults in Nauru has been reported to be as high as 40% (Zimmet et al, 1984), in Samoa at 22% (personal communication, Dr S. Viali, Ministry of Health and Oceania University of Medicine, Samoa (2006)) and in Tonga at 15% (Colagiuri et al, 2002b).

The rate of hospitalisation of people born in the Pacific Islands for diabetes complications in 1995-96 to 1999-00 was five times than people born in Australia (NSW Dept Health, 2002). Similarly, in 2003-04, people born in the South Pacific had more than double the rate of diabetes separations compared with those born in Australia (AIHW: O'Brien K, 2006).

The most common South Pacific language spoken at home in Australia is Samoan. This population group mainly lives in parts of Sydney and Brisbane (Thow & Waters, 2005).

6. Asian – people from the Indian subcontinent including Bangladesh, India, Pakistan, Nepal, Sri Lanka

This group of countries represents more recent arrivals to Australia. Although the only country that individually accounts for the top 10 largest number of residents in Australia at 30 June 2005 and the top 10 for NSW at 30 June 2001 is India, all countries have had great increases in their average annual migration rates over recent years.

As at 30 June 2005, people born in India (138,662) represented the sixth largest group of overseas born Australian residents and as at 30 June 2001, people born in India (41,505) represented the tenth largest number of overseas born NSW residents, accounting for 40% of the Indian born Australian population. Between 1996 and 2005 the average annual increase in immigration of people from Nepal was 10.6%, from Bangladesh 9.5% and from Pakistan 7.8%. Additionally, in 2004-5 the average annual increase of people from Pakistan and India was higher than the average annual rates being 9.8% and 8.5% respectively (ABS, 2006).

Similarly, anecdotal evidence from Sydney West Area Health Service estimates that between 2001-2006 there has been an increase in settlement of people from India and Sri Lanka who comprise 13.1% and 3.8% respectively of the population who have settled in the area. Anecdotal evidence from the South Eastern Sydney and Illawarra Area Health Service suggests that people from India represent 1.5% of the total overseas born population for the area.

In the 2002-2005 NSW Population Health Survey, NSW residents born in India had a reported diabetes or high blood glucose prevalence of 11.3% (NSW Dept Health, 2006b). Similarly, Abate and Chandalia (2003) reported that Asian Indians who migrated to the UK or other westernised countries had a prevalence rate of diabetes four times higher than those living in India. People from the Indian subcontinent reach a 5% prevalence of undiagnosed type 2 diabetes from 30-40 years of age (Dowse et al, 1990; Ramachandran et al, 1992).

People speaking the South Asian languages Hindi, Sinhalese or Tamil at home are predominantly clustered in Sydney and Melbourne. Hindi-speaking people mainly live in parts of Sydney with another substantial population living in parts of Melbourne. The Sinhalese-speaking population lives mainly in parts of Melbourne and the Tamil-speaking population in parts of Sydney. It is important to note that approximately half of the Australians who speak Hindi at home were born in Fiji, and are most likely Indo-Fijians (Thow & Waters, 2005).

In Australia, Tagalog-speaking (Filipino) people live primarily in New South Wales and Victoria. Within New South Wales they are clustered in parts of Sydney. Vietnamese speaking people are also clustered in parts of Melbourne and Sydney (Thow & Waters, 2005).

Projections for distribution of high risk CALD groups in Australia

Sydney and NSW

In addition to heralding the significant increase in older Italians, Greeks, Chinese and other CALD groups residing in Sydney by 2011, the AIHW (AIHW: Rowland & Karmel, 2004) states that, in 1996, English (19%), Italian (16%) and Greek (8%) were the principal languages spoken in the home among culturally and linguistically diverse older peoples in New South Wales. German (6%) and Cantonese (6%) were also common languages. These are projected to remain the most common languages spoken to 2011. However, the proportions are expected to rise for those speaking English and Greek and to fall for those speaking Italian and German. Cantonese is expected to remain a relatively common language spoken (6% in both years), and the use of Arabic is projected to increase (from 4% to 6%).

Incidence of diabetes

Table 3 summarises the information collated to date on the incidence and prevalence of diabetes in specific CALD groups in Australia and in their home countries and demonstrates the particularly high prevalence of diabetes among CALD groups from the Pacific Islands, Singapore, Pakistan, India, Lebanon, the Philippines and Sri Lanka compared to the overall Australian prevalence of 7.4% demonstrated by (Dunstan et al, 2001). As already suggested, in the absence of direct evidence about the progression to diabetes for people from high risk CALD groups, an assumption can be made that the high prevalence of diabetes in these groups is accompanied by a high rate of risk factors and conversion to diabetes.

According to the National Diabetes Services Scheme (NDSS) the largest prevalence of diabetes cases from overseas born residents are England (11.1%), Italy (7.7%), Lebanon (6%) and China excluding Taiwan (4.5%) (Multicultural Health Communication Services & NSW, 2006).

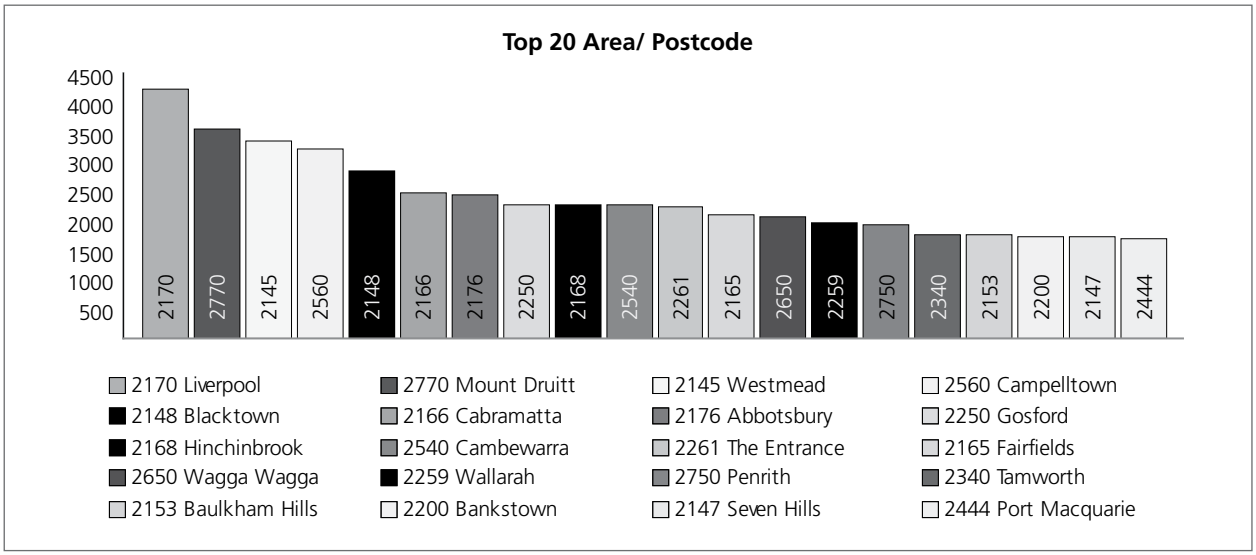
As illustrated in Figure 2 below, the highest numbers of diabetes cases reported by geographical area /postcode are in Liverpool, accounting for more than half of the cases (51.2%). However, it is important to note that these data are indicative only and cannot be substituted for scientifically generated incidence rates. The NDSS data shown in Figure 2 represents the newly registered participants in the scheme. This may include patients who are not newly diagnosed diabetics and therefore cannot be viewed as true estimates of diabetes incidence.

Table 2: Summary of number of residents and migration rates for each country within the groups identified.

Group	Country	Number of residents in Australia 30/6/05	Number of residents in NSW 30/6/01	Average annual migration growth Rate 96-05 (%)	Migration rate 2004-2005 (%)
European	Italy^	224,300	67,079	-1.6	-1.6
	Greece^	127, 226	43,237	-1.2	-1.1
	Malta^	49,555	20,441	-1.3	-1.0
	Germany	115,215	34,766	-0.5	-0.6
African	Kenya	10,574	-	6.6	10
	Zimbabwe	19,655	-	7.8	8.4
	Somalia	5,431	-	10	5.5
	Ethiopia	6,925	-	11.2	11.4
	Sudan	23,787	-	28	43.1
Chinese	China*	191,200	94,593	5.2	5.7
	Hong Kong^	76,218	42,605	-0.1	-
	Singapore^	46,318	9,265	4.4	8.3
	Vietnam	177,728	69,535	0.9	0.9
	Philippines	129,401	56,775	2.6	3.8
Middle Eastern	Lebanon	85,347	59,892	1.1	1.4
	Iraq	37,290	17,081	10.3	5.9
	Afghanistan	17,614	-	12	10.5
Pacific Islands	Tonga^	9,400	-	1.9	1.8
	Samoa^	17,223	6,997	5.2	4.1
	Nauru^	-	-	-	-
	NZ Maoris^	-	-	-	-
	Fijians	59,579	29,989	3.8	3.4
Asian	Bangladesh	12,577	-	9.5	8.2
	India^	138,662	41,505	5.6	8.5
	Pakistan	18,083	-	7.8	9.8
	Nepal	3,950	-	10.5	10.6
	Sri Lanka	67,967	18,782	3.0	3.8

* China excludes Hong Kong and the Province of Taiwan. ^ CALD groups known to have a high prevalence of diabetes in their home country

Figure 2: Top 20 diabetes incidence in NSW classified by postcode.



This figure is similar to findings by Diabetes Australia - NSW (2005) which shows the centre of prevalence of diabetes in Sydney is Fairfield with 6.2% of people having diagnosed diabetes. Fairfield has a high proportion of people from South East Asian, Middle Eastern and Southern European backgrounds and the average income is one third lower than the state average. In contrast, the lowest rates of diabetes, with levels around 2%, are in high income areas such as Sydney's Eastern suburbs and lower North Shore. Further, these areas have low proportions of people from high-risk ethnic backgrounds (Diabetes Australia - NSW, 2005). This is consistent with the majority of refugees settling in greater western Sydney, with the most common areas of settlement being Fairfield (25%), Blacktown (12%), Liverpool (12%) and Auburn (11%) (NSW Dept Health, 2004).

Table 3 highlights the lack of available diabetes incidence and prevalence data on CALD groups in Australia and specifically in NSW. A notable exception to the lack of Australian-CALD diabetes incidence data is a study by Hodge et al (2004) showing the incidence of type 2 diabetes among Greeks was 2.6% and Italians 2.4% compared to 0.7% for Australian-born participants. This study found that the cumulative incidence of diabetes for Greeks and Italians was more than three times that of Australian-born participants.

With regard to gestational diabetes, Henry et al (1993) found that Vietnam-born women had a greater rate of progression to diabetes within 9 years of diagnosis of gestational diabetes (25%) compared to a 9% in Australian-born women. This supports the assertion by Wahlqvist (2002) that the prevalence of diabetes among Asian Australians is increasing at a disproportionately high rate.

According to the AIHW (AIHW: Holdenson, 2003) the only available national incidence data on diabetes are those from the National Diabetes Register (which has collected information since January 1999 on people with insulin-treated diabetes (including type 1, type 2 and gestational diabetes) who have consented to be on the Register. Data from the Register for the period 1999-2001 suggests that the incidence of diabetes for people born in the Middle East and North Africa was 79.8 per 100,000 population for males and 93.3 for females, and 78.4 (males) and 91.9 (females) born in Southern and Central Asia. Incidence rates in both groups were substantially higher than those of Australian-born registrants (46.2 males and 40.5 females) being more than 50% higher for males and more than double for females. This report notes that, as coverage of insulin-treated type 2 diabetes is not complete at the time of publication, these results should be interpreted as indicative only.

Table 3: Incidence and prevalence of diabetes in CALD groups in Australia and their home countries.

Group (group prevalence of diabetes in their home countries)	Country	Prevalence in home country (%)	Prevalence in Australia (%)+	Incidence in home country (%)	Incidence in Australia (%)
European (8.0%) Mediterranean (7.8%)[1]	Italy	6.6[9]	8.1[1] 10.8[10] (NSW)		2.4[3] (Vic)
	Greece	6.1[9]	5.1[1] 18.0[10] (NSW)		2.6[3] (Vic)
	Malta	9.2[9]	10.1[1]	5.1	
	Germany	10.2[9]	5.1[1] 10.9[10] (NSW)		
African (2.5%)[1]	Kenya	2.5[9]			
	Zimbabwe	2.6[9]			
	Somalia	2.3[9]			
	Ethiopia	1.9[9]			
	Sudan	3.4[8]		2.2[8]	
Chinese (6%)[1]	China*	4[2]	4.4[1] 2.6[10] (NSW)		
	Hong Kong	9.8[7]	2.8[10] (NSW)		
	Singapore	20[2]	17.1[1]		
	Vietnam	2[2]	2.5[1] 4.3[10] (NSW)		
	Philippines	10[2]	7.4[10] (NSW)		
Middle Eastern# (6.4%)[1]	Lebanon	6.4[9]	11.5[1] 15.2[10] (NSW)		
	Iraq	7.7[9]			
	Afghanistan	8.2[9]			
Pacific Islands	Tonga	15[6]			
	Samoa	22[5]			
	Nauru	44[2]			
	NZ Maoris	22[4]		10.6[4]	
	Fijians	17[2]			
Asian# (6%)[1]	Bangladesh	7[2]			
	India	14[2]	6.9[1] 11.3[10] (NSW)		
	Pakistan	18[2]			
	Nepal	4.1[9]			
	Sri Lanka	5[2]	9.31		

* China excludes Hong Kong and the Province of Taiwan

The prevalence for these groups as a whole is 8.1% for Arabic in NSW and 11.1% for Asians in Victoria

+ Where not stated prevalence rates are for Australia as a whole

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Findings relating to diabetes risk factor prevalence

Australia specific information about type 2 diabetes risks in CALD groups is scant. However:

It can be assumed that those groups known to have a high prevalence of diabetes in their own country (Table 3) will have a high prevalence of risk factors - in particular a genetic susceptibility to type 2 diabetes.

There is some direct evidence that certain CALD groups have an increased prevalence of risks for type 2 diabetes and cardiovascular disease that are independent from the influence of migration.

These risks include but are not necessarily limited to:

- **Obesity and physical activity**

The AIHW report, A Picture of Overseas born Australians (AIHW: Holdenson, 2003) states that obesity, poor diet and insufficient physical activity are the most significant and modifiable risk factors for developing diabetes with genetics and environmental factors playing a role. When introduced to a western culture and lifestyle prevalence rates of these risk factors vary depending on the cultural and ethnic backgrounds. This report claims that, in 2001, without accounting for age differences amongst these populations, 60.6% of Southern and Eastern European-born people were overweight or obese compared to 46.4% of Australian-born people. Conversely, Australian-born people had the highest prevalence of low or no usual intake of fruit (49.4%) compared to people born in other regions. Although behavioural risk factors are unlikely to completely account for disparities in diabetes prevalence among people from CALD backgrounds, in 2000, people who usually spoke a language other than English at home were more likely to be insufficiently physically active or sedentary (64.2%) compared to people who spoke English at home (53.6%).

Coughlan et al (1997) found that the prevalence of overall obesity (as defined by Body Mass Index (BMI)>30) in the Pacific Islands ranges from a low of 3.3% (men) and 2.2% (women) in rural Papua New Guinea highlands to 77.3% (men) and 77.1% (women) in Nauru. This is greater than the higher obesity prevalence rates reported for Asians of 23.2% (men) and 48.6% (women) in Pakistan. The same authors report that in an urban population of North India, the prevalence of waist-hip ratio (WHR) > 0.85 was found to be 56.2% (men) and 51.3% (women). These rates are higher than overall obesity rates in Asia. Therefore the relationship between central obesity and diabetes may be of greater importance in Asians than overall obesity.

In a study comparing Europeans, Maoris and Pacific Islanders living in New Zealand Simmons et al (2001) found that obesity (BMI>31) was present in 26% of Europeans, 63% of Maoris and 69% of Pacific Islanders. Similarly in a study of 851 Arabic speaking patients in Sydney, 73% of males and 36% of females were considered overweight or obese (BMI>25) (Rissel et al, 1998).

Hodge et al (2004) conducted a four year follow up of 29,000 non-diabetic men and women born in Greece, Italy, Australia and New Zealand who were aged between 40 and 69 years. The authors reported that all measures of obesity - body weight, BMI, WHR, waist circumference, hip circumference, fat mass, and fat mass as a percentage of body mass - were greater in the Greek and Italian migrants. Higher BMI in the migrants was responsible for approximately 50% of the excess relative risk for diabetes incidence. In another Melbourne study, Ball et al (2003) found higher levels of overweight and obesity in adults born in Greece, Italy and Malta compared to study participants of UK or Irish origin.

These findings are also reflected in other Australian studies of younger age CALD groups. For example Booth et al (2001) demonstrated a high prevalence of overweight and obesity in students from Middle Eastern backgrounds and Lynch et al (2000) showed that 5-12-year-old children of Mediterranean backgrounds had higher BMI than white (defined by the authors as white-Asian, white-European and white-Mediterranean) and Asian children. A study of 139 male Year 10 students in Sydney found that WHR was significantly higher in the South Asian study participants. The authors, Mehta et al (2002), suggest that when the percentage of total body fat (TBF) is adjusted for BMI, it appears that South Asian boys carry about 4.5% more body fat for a given BMI than Caucasian boys. Thus the relationship between BMI and %TBF varies with ethnicity and the authors concluded that the South Asian boys in this study appear to have an excess risk with regard to abdominal fat as estimated by WHR, and a higher %TBF for a particular BMI. This supports other evidence that adults of South Asian origin, both in their home country and abroad, suffer an excess disease risk associated with insulin resistance and accumulation of abdominal fat. For example, Ibiebele et al (2000) compared South Asians living in Melbourne to Anglo-Celtic Australians for diabetes prevalence and found that South Asian diabetic men had a significantly higher abdominal-to-hip ratio ($p<0.05$) but significantly lower BMI ($p<0.0001$) than Anglo-Celtic participants.

- **Impaired glucose tolerance (IGT) and impaired fasting glucose (IFG)**

Simmons et al (2001) also reported that, in the age group 40-59yrs, Maori and Pacific Islanders had a higher prevalence of impaired glucose tolerance/impaired fasting glucose of 22.7% and 19.4% respectively, compared with 7.4% for Europeans. The prevalence in the age group 60-79 yrs was similar across ethnic groups.

- **Cardiovascular disease (CVD) risk**

It has generally been thought that Asian immigrants to Australia had a lower prevalence of CVD risks than their Caucasians counterparts. However, in a study of over 500 Melbourne-Chinese adults, Hsu-Hage and Wahlqvist (1993) found the prevalence of hypertension, hyperlipidaemia, and lifestyle habits such as smoking to be similar. The authors suggest that the potential benefits of not being overweight may be overridden by the high hip-to-waist ratio found in Chinese people (0.91 +/- 0.054 for men and 0.88 +/- 0.077 for women) and propose that Asian Australians may not be benefiting from the overall decline in CVD in Australia.

Similarly, the dietary habits and arterial characteristics of 83 migrants from China who had been in Australia for less than 4 years or more than 10 years were compared to assess their arterial stiffness (Dart & Qi, 1995). The preliminary findings suggest that Chinese subjects who have been resident in Australia for more than 10 years have stiffer proximal aortas than those residing in Australia for less than 4 years. The authors suggested that these findings are due to the adoption of a western lifestyle and diet.

A study of 369 participants from rural and urban Samoa who were surveyed in 1978 and 1991 demonstrated an increase in the prevalence of hypercholesterolaemia and hypertriglycerideamia consistent with the increase in prevalence of obesity and type 2 diabetes over the same period (Hodge et al, 1997). Comparison of the age-standardised prevalence rate for hypertriglyceridaemia in Samoans and Australians demonstrated that the prevalence was higher in urban Samoans (24% in men and 11% in women) than in Australians (17% in men and 7% in women) and rural Samoans (7% for men and women) (Hodge et al, 1997).

- **Blood pressure (BP)**

Powles et al (1993) aimed to compare systolic and diastolic blood pressures in 892 individuals who had migrated from rural Greece to Melbourne Australia with their non-migrant relatives. The study found that systolic blood pressures increased more sharply with age in migrants compared with non-migrants in both males (0.89mmHg/yr v 0.41mmHg/yr) and females (1.19mmHg/yr v 0.83 mmHg/yr). Diastolic blood pressure, however, did not exhibit any effect of migrant status irrespective of age. It should be noted that although information on smoking history was collected, no results were reported on the effect of smoking on hypertension in these individuals.

In contrast a study of 1845 people of Anglo-Celtic, Italian, Greek, Arabic, Chinese, Indian and Aboriginal ethnicity found that hypertension defined as systolic BP>140mmHg and/or diastolic BP>90mmHg was higher in Anglo-Celtics compared to all ethnic groups (McGill et al, 1996). Proteinuria, however, defined as UAE>200ug/min was higher in all ethnic groups compared with Anglo-Celtics. However this difference was only significant for Arab and Aboriginal persons after adjusting for age, duration of diabetes and glycaemic control (McGill et al, 1996).

- **Gestational diabetes**

The NHMRC Guidelines for Case Detection and Diagnosis of Type 2 Diabetes cite gestational diabetes (diabetes first diagnosed during pregnancy) as a risk factor for developing type 2 diabetes in later life. This is important to diabetes prevention in CALD groups; firstly because certain groups have been demonstrated to have a higher incidence eg women from African, Mediterranean, Arabian, and Asian countries living in Australia compared to Australian and New Zealand born women (AIHW: Holdenson, 2003), and secondly, because women with gestational diabetes are an easily identifiable group to target for preventative activities.

The prevalence of gestational diabetes among certain CALD groups is known to be high. Henry et al (1993) investigated the incidence of gestational diabetes in Vietnam-born women compared to Australian-born women attending a hospital clinic from 1979 to 1990 and reported an incidence of gestational diabetes of 7.8% in Vietnam-born compared to 4.3% in Australian-born women. These authors also quote a 1986 study by Oates et al which demonstrated the incidence of gestational diabetes among women from India, Italy, Malta, China, Hong Kong and the Philippines to be three times as high as the Australian population (Henry et al, 1993). Similarly, a study comparing Asian and Caucasian women in Melbourne found that the incidence of gestational diabetes was 4.3% in Australian born women compared with 10% in Asian born women (Shelly-Jones et al, 1993).

In a New South Wales study, Asian and Indian women were found to have a significantly higher rate of gestational diabetes than Caucasian women (31.7% and 36.4% respectively compared to 14%). Additionally, 18.8% of women from Arabic backgrounds had a glucose tolerance test diagnostic of gestational diabetes (Gunton et al, 2001). Similarly, a Sydney study found that gestational diabetes is an indicator of type 2 diabetes in the future and that Indian women diagnosed with gestational diabetes are only 13 years from presenting with type 2 diabetes compared with 23 years in Anglo-Celtic women (Yue et al, 1996).

- **Ageing**

Increasing age is also cited in the NHMRC Guidelines for Case Detection and Diagnosis of Type 2 Diabetes as a risk factor for having type 2 diabetes (Colagiuri et al, 2002a). This is of particular relevance to diabetes prevention in NSW as Sydney is currently experiencing an increase in older people from CALD groups of 73%. In actual numbers this represents an increase from 110,000 in 1996 to 190,700 in 2011 by which time older CALD groups are predicted to account for 34% of older people (AIHW: Rowland & Karmel, 2004). This report estimates that by 2011 Italians will account for the largest CALD group over 65 years in Sydney (24,500) with Greeks second (20,400) and then Chinese (14,900). The proportion of older people in two other groups identified as priorities for NSW - Lebanese and Vietnamese - are also expected to increase.

Similarly the Western Australian Hospital Morbidity Database (1995/6) indicates that aged standardised hospital separations due to diabetes in people from CALD communities in those aged 65 years and over compared to the Australian born non-Aboriginal population are:

- 1.3-2.2 times higher in the non-English speaking population
- 1.3-2.6 times higher in the Italian population
- 9 times higher in the 75-79 year age group in the Vietnamese population
  ((Prometheus, 1999) cited in Di Francesco et al, 1999)

Table 4: Are there specific CALD groups in NSW with high prevalence of risk factors for developing type 2 diabetes, or with higher incidence of the disease?

Study	Study Design	Cultural Group	Location of Study	Focus of Study
Abate and Chandalia, 2003	Systematic review	All cultural groups	USA	Impact of ethnicity on type 2 diabetes
ABS, 2001	Cross-sectional	All cultural groups	Australia	Data from the 2001 census
ABS, 2006		Overseas-born Australians	Australia	Data from the Migration Australia Report
AIHW, 2003 Holdenson et al	Review of data sources	Overseas-born Australians	Australia	Risk factors for diabetes and incidence of diabetes.
AIHW, 2004 Rowland and Karmel	Cohort	Overseas-born Australians	Australia	Cultural diversity among older Australians in capital cities
AIHW, 2006 O'Brien et al	Review of data sources	Various	Australia	Diabetes hospitalisations in Australia, 2003-4
Barr et al, 2005	Prospective	Various	Australia	Diabetes, obesity and lifestyle prospective study
Ball et al, 2003	Cohort	Greek, Italian, Maltese	Melbourne	Risk factors: overweight and obesity
Booth et al, 2001	Cross-sectional	European, Middle Eastern, Asian	NSW & VIC	Prevalence and distribution of overweight and obesity in children and adolescents
Colagiuri S et al, 2002a	Systematic review	Various	International	The detection and diagnosis of diabetes
Colagiuri S et al, 2002b	Cross-sectional	Pacific Islanders	Tonga	Prevalence of diabetes and other risk factors in Tonga
Coughlan et al, 1997	Meta-analysis	Pacific Islanders, Papua New Guinea & Asians	Own countries	The prevalence of and risk factors for type 2 diabetes
Dart & Qi, 1995	Cross-sectional	Chinese	Australia	Diet and arterial characteristics in recent and longer-term Chinese migrants
Di Francesco et al, 1999	Needs assessment	Italian and Vietnamese	Perth	Situation and needs assessment for inner city area
Diabetes Australia - NSW, 2005	Observational	Various	Australia	Diabetes in NSW by geographical location
Dowse et al, 1990	Cross-sectional	Indian, Creole & Chinese Mauritians	Mauritius	High prevalence of NIDDM and IGT in Indian, Creole and Chinese Mauritians
Dunstan et al, 2001	Prospective	Various	Australia	AusDiab Report 2001 – Prevalence of diabetes and associated risk factors
Gunton et al, 2001	Cross-sectional	Caucasian, Asian, Indian, Arabic	NSW	Women with abnormal glucose challenge test during pregnancy
Henry et al, 1993	Prospective	Vietnamese	Melbourne	Vietnamese-born and Australian-born mothers with follow up over 12 year period
Hodge et al, 1997	Qualitative & Quantitative	Samoan	Samoa	A study investigating the effects of modernisation on cardiovascular risk factors in Samoans (rural and urban)
Hodge et al, 2004	Prospective	Italians and Greeks	Melbourne	Incidence of type 2 diabetes between Australian-born and Greek and Italian migrants
Hsu-Hage and Wahlqvist, 1993	Cross-sectional	Chinese	Melbourne	Cardiovascular disease risk factors in Chinese Australians

Table 4: Are there specific CALD groups in NSW with high prevalence of risk factors for developing type 2 diabetes, or with higher incidence of the disease? (continued)

Study	Study Design	Cultural Group	Location of Study	Focus of Study
Ibiebele et al, 2000	Cross-sectional	Indian	Melbourne	Prevalence of NIDDM and associated risk factors in migrants of Indian ethnic background residing in Melbourne
Lynch et al, 2000	Cross sectional	Asian, Mediterranean, Mixed ethnicity	Sydney	BMI profile of Australian primary school children in SE Sydney
Lu et al, 1998	Cross-sectional	Asian	Taiwan	Prevalence and associated risk factors of diabetes in Taiwan
McGill et al, 1996	Cross-sectional	Italian, Greek, Arabic, Chinese, Indian, Aboriginal	Australia	Ethnic differences in the prevalence of hypertension and proteinuria in type 2 diabetes
Mehta et al, 2002	Cohort	South Asian, East Asian	Sydney	Risk factors for CVD – high BMI, high WHR, high %TBF, study conducted in a in a cohort of Yr 10 boys in a Sydney High School
(NSW) Multicultural Health Communication Services, 2006	Demographic	Various	Australia	Analysis of NDSS data from CALD communities
NSW Dept Health, 2002	Cross-sectional	Various	NSW	Health of People of NSW, report of the CHO - 2002
NSW Dept Health, 2004	Cross-sectional	Various	NSW	Health of People of NSW, report of the CHO - 2004
NSW Dept Health, 2006a	Cross-sectional	Various	NSW	Health of People of NSW, report of the CHO - 2006
NSW Dept Health, 2006b	Cross-sectional	Various	NSW	NSW Population Health Survey 2002-2005 (HOIST)
Powles et al, 1993	Case controlled	Greek	Australia and Greece	Hypertension - comparing migrants from rural Greece in Melbourne with relatives remaining in Greece
Ramachandran et al, 1992	Cross-sectional	Indian	India	Prevalence of NIDDM and IGT in India
Rissel et al, 1998	Cross-sectional	Arabic	Sydney	Cardiovascular risk factors among Arabic speaking patients in general practice setting in Sydney (inner west)
Shelley-Jones et al, 1993	Randomised controlled trial	Asian	Melbourne	Investigation of factors which may account for higher incidence of gestational diabetes in Asian-born women
Simmons et al, 2001	Cross-sectional	Maori and Pacific Islanders	New Zealand	To compare the extent of hyperinsulinaemia among NZ Europeans and Polynesians (an ethnic group at high risk of type 2 diabetes)
Tan et al, 1999	Cross-sectional	Chinese	Singapore	Prevalence of diabetes in ethnic groups in Singapore
Taylor et al, 1997	Cross-sectional	All cultural groups	Australia	Prevalence of diabetes in overseas-born Australians
Thow and Waters, 2005	Review	Various	Australia	Diabetes prevalence in CALD groups
Wahlqvist et al, 2002	Cross-sectional	Asian	Australia	Prevalence of type 2 diabetes among Asian Australians
Yue et al, 1996	Cross-sectional	Indian	Sydney	Risk factor: prevalence of GDM in ethnic groups
Zimmett et al, 1994	Cross-sectional	Nauru	Nauru	Prevalence of diabetes in Nauru

Question 2

What are the factors which may contribute to higher levels of risk in specific CALD groups?

There are many factors that contribute to the higher level of risk experienced by some CALD groups including both non-modifiable risk factors such as genetics and modifiable risk factors such as migration and associated circumstances. Risk factors in CALD groups may include:

- **Genetic factors**
  - high prevalence of type 2 diabetes and IGT in their home country
- **Immigration factors**
  - pre-immigration health status
  - effects of migration including changes to lifestyle such as diet and exercise and social isolation
  - recency of arrival
  - lack of knowledge of available health care services
- **Socio-economic factors**
  - low socio-economic status in home country
  - low socio-economic status in new country
  - financial burden associated with attending services and complying with recommendations from health professionals
  - low levels of education
  - low levels of literacy
- **Socio-cultural factors**
  - lack of access to culturally appropriate care
  - lack of access to services due to language and literacy barriers
  - non-compliance with health recommendations due to religious/cultural beliefs and attitudes
  - stigmatisation
  - perceptions of body image
  - the role of the family in providing care

Thow and Waters (2005) describe a number of modifiable factors that contribute to diabetes risk and act as a barrier to accessing health care services including language barriers, literacy rates, effects of stigmatisation, lack of access to culturally specific care, religious beliefs and cultural practices. Further factors are described below.

Findings

Lack of culturally specific knowledge by health professionals has been found to affect access to services across all cultures. This effect is due to a lack of awareness of specific religious and cultural factors and can lead to inappropriate dietary, education and treatment advice that is not complied with, resulting in the person being labelled as difficult and the health professional decreasing or withdrawing their assistance. This acts to discourage further access to healthcare services in the future (Hawthorne, 1990; Narayan & Rea, 1997).

A study by the Migrant Information Centre in East Melbourne (MIC, 1999), which assessed the needs of people from 180 cultural groups through focus groups and consultation with providers, found that the major issues identified with respect to health care were knowledge of health services, culturally sensitive health services, preventative health care, access to interpreters and bilingual health professionals and the impact of loneliness on health. Knowledge of health services was thought to be particularly critical to the successful settlement of refugees and it was suggested that health services not readily available overseas, such as podiatry, should be explained within a cultural context. Social isolation was raised as a problem for all generations, particularly, older migrants and women at home caring for young children. Promoting community support networks was seen as an important way of reducing social isolation in migrant communities including aged people, newly emerging and refugee communities.

Language contributes to the higher level of risk in all cultural groups. Language barriers incorporate both verbal and written language as well as illiteracy which is common for some cultural groups even in their native language (Burns et al, 2000). This is consistent with Hawthorne and Tomlinson (1999) who found that of 201 Pakistani Muslims residing in the UK, 27% were illiterate, only 33% were confident in English and that women were less likely to speak English and more likely to be illiterate. Similarly, literacy levels in Ethiopia in 1990 were as low as 60% (Western Region Health Centre, 2001). Further, an Australian study by Di Francesco et al (1999) found that language was identified as a major barrier to accessing services and that this was due to the lack of availability of interpreters which forced people to use friends and/or relatives as interpreters during consultations with health professionals.

A further factor contributing to the level of risk faced by CALD groups is a low rate of referral by general practitioners to allied health professionals and specialists. A study by Di Francesco et al (1999) found that the reasons cited by general practitioners for these low rates of referral are transport problems, language barriers, perceived lack of knowledge of cultural foods among dietitians and the consumers lack of awareness of other services. Similarly, in another Australian study, Wooden et al (1994) cited in Julian (1999) states that immigrants are generally underserviced when compared with the Australian-born population.

A systematic review of issues impacting on health care for culturally diverse groups using diabetes as a model Von Hofe (2002) found a number of factors which affect the quality of care received by people from culturally diverse groups, thereby impacting on their health status and level of risk for diabetes. Some factors were common to all cultural groups, such as language barriers and literacy rates and lack of access to culturally appropriate care. Factors specific to each of the identified CALD groups are reported below.

Barriers by cultural groups

European

In a study by Lewis et al (1997) focus groups were conducted to learn about the attitudes and beliefs about exercise in Italians and Greeks. Despite a similar definition of exercise as being "energetic activity", Italians did not think that walking to the shops was exercise. Barriers to exercise were similar in the two groups and included language, laziness, a fear of injury and/or bad experiences such as falling, lack of importance, change to routine, lack of strength and agility and for outdoor activities, the weather. Italians preferred to exercise in groups compared to Greeks who preferred individual activities. Both groups said they would like to be instructed by someone who speaks their language and are influenced to exercise by recommendations from health professionals, particularly doctors. Similarly, Northern Sydney Health Promotion Unit conducted focus groups with Greek, Italian and Serbian participants: to identify culturally appropriate physical activity options for each group; to support the implementation of these options; and to increase their participation in moderate physical exercise (Northern Sydney Health Promotion, 2002). The following tables summarise the results of the consultation (reproduced from Northern Sydney Health Promotion, 2002).

Table 5: Why physical activity is important.

Italian
• Feel better/alive/cheerful (N = 6) • Prevent stiff muscles (N = 5) • Necessary for the heart, blood circulation, for the whole body, bowel movements, lungs (N = 5) • For the brain (N = 2) • Health reasons • Gives you energy • Cholesterol comes down • Agility

Greek
• Good for the heart (N = 2) • Helps circulation (N = 2) • Helps your mental state (N = 2) • Good for health • Helps lose weight

Table 6: Current exercise/physical activity undertaken and future interests.

Italian

- Walking (N = 32)
- Going out to meet people (N = 29)
- Playing bingo/cards (N =29)
- Looking after grandchildren (N = 7)
- Exercise bike (N = 3)
- Exercise groups/exercise to tape (N = 2)
- Aquarobics, Bike Riding, Dancing, Housework, Treadmill, Up and down stairs, Yoga
- Going out to meet friends, be in good company, play bingo (N = 29)
- Go for day trips in groups (N = 29)
- Teacher to come and explain movements/exercises (N = 23)
- Watch films /listen to music group (N = 5)
- Tai Chi (N = 3)
- Gentle exercises (N = 3)
- Volunteer work (N = 2)
- Knitting in group (N = 2)
- Telling jokes in group (N = 2)
- Hydrotherapy; Swimming

Greek

- Walking (N = 3)
- Gardening (N =2)
- Housework (N = 2)
- Going up and down stairs,
- Jogging, Running, Shopping,
- Swimming
- Teacher to teach some exercises and come on a fortnightly basis (N=10)
- Greek dancing classes

Table 7: How health promotion can help.

Italian

- Increase the pension (N = 29)
- Have someone come and show us how to exercise properly (N = 21)
- Anything you can do that's good for us
- Excursion to get some fresh air
- Develop groups such as these:
  - Have notices sent out/posted up
  - More communication with other Italian groups
  - Other activities (eg films, music, dance, shows)
  - Find out where to go for information
  - Have people come to them to give them information on activities and outings

Greek

- Organise worker to conduct exercise class once a fortnight
- Exercise classes to Greek music
- Dance classes
- Tai Chi class
- Access to a bus to join in with other groups
- Government should build more facilities eg swimming pools
- Provide free transport

Kouris-Blazos et al (1999) compared the dietary habits, health status and lifestyle of Greeks who had migrated to Australia with Greeks living in rural Greece and Anglo-Celtic Australians. It was found that Greek-born Australians had a higher prevalence of diabetes, obesity and hypercholesterolaemia and had a more sedentary lifestyle. The authors suggested that this was due to changes in food and lifestyle habits following migration which include an increased intake of saturated fat, animal meat, sugar; larger portions; changes to cooking techniques and a decrease in physical activity.

A study by Turner and Hilbers (2004) of cultural factors that may impact on the management of diabetes in a Greek community residing in Sydney identified food as the major factor, particularly its importance in community life and the close relation of certain foods to religious events.

African

As the people who make up this cultural group are relatively new migrants to Australia, there is a limited amount of evidence regarding factors that contribute to their higher level of risk of type 2 diabetes. Of particular note for this group is the refugee status of many migrants from African countries which, combined with migrating from a developing to a developed nation, increases the stresses of settlement (Burns et al, 2000). Further, the urbanisation and westernisation in their home countries is resulting in changes to lifestyle (dietary changes resulting in a move away from traditional healthy foods and reduced levels of physical activity) which are being translated into increases in the prevalence of chronic diseases such as diabetes (Ahmed & Ahmed, 2001).

A study of 45 Somali women who had been living in Australia for less than 5 years found that the major changes in dietary patterns following migration were an increased consumption of breakfast cereals and a change in the source of protein from camel (high in unsaturated fat) to lamb (high in saturated fat) (Burns, 2004). Further, weight gain was reported in 38% of the women, however the study cannot conclude that the weight gain is a result of the dietary changes, in fact, the obesity rate seen in this study group was similar to the level of obesity in Australian women of the same age.

In contrast, a study by Burns et al (2000) of Somali refugees entering Victoria under a humanitarian program identified potential problems due to an increase in fat intake, alteration in fatty acid composition of the diet, reduced fibre intake, low levels of physical activity, difficulties in control of body weight and social isolation following migration. Further, the study found that the issues of importance to refugees were food access and security, changes in food supply and patterns of purchase, changes within families in responsibility for food preparation and changes in social networks, impacting on food habits and physical activity levels.

This is consistent with findings by Renzaho and Burns (2006) indicating that sub-Saharan Africans who have migrated to Australia experience dietary changes that are associated with obesity and chronic disease. These changes include increased consumption of takeaway food (at least once per week), substitution of lamb for camel (increase saturated fat intake), replacement of low-energy dense high fibre foods with processed high-energy dense foods. Further, the 139 households that were surveyed indicated that they experienced difficulty locating traditional familiar foods and that when located their tastes were different to the same product in their home country, which led to increased use of butter, salt, sugar and oil to try to replicate the traditional taste.

Chinese

Family support is very important in the Chinese culture as the responsibility for making decisions about health care rests with the family in traditional Chinese families (Rankin et al, 1997). Filial piety is also an important factor, showing respect to the parents and bringing shame to them if they have children who do not act accordingly (Guruge et al, 2001). Children, in particular the eldest son, have a moral responsibility to care for parents in their old age.

Studies of Chinese immigrants in Canada show that cultural factors such as language barriers, effect of family support on patient behaviour and effects of cultural and religious beliefs on diet have led to patients being perceived by Western health professionals as non-compliant, thereby affecting the education and treatment they receive (Anderson et al, 1995; Guruge et al, 2001). Chinese people consider Western medicine to only provide symptom relief and thus act as a "quick fix", unlike their traditional Chinese medicine that gets to the root of the illness and restores Yin-Yang balance (Guruge et al, 2001).

A study by Jayne and Rankin (2001) in 30 Chinese participants residing in the US found that they perceived diabetes as being stigmatising which led them to keep it a secret and avoid social situations in which their diabetes would be found out. This type of behaviour provides an enormous barrier to accessing services, patient compliance and adherence to recommendations.

A literature review by O'Neill et al (2000) of the interplay between ethnicity and chronic illness demonstrated that in Vietnam there is a perception that to be fat is a sign of health and fortune, therefore Vietnamese people may find it difficult to understand that some fatty foods are unhealthy. Further, the authors found that hospitality is a very important part of the Vietnamese culture which may make it difficult to avoid certain foods and that traditional remedies are used for the treatment of diabetes including melon tea, lotus seed tea and aloe vera.

Similarly, an assessment by Di Francesco et al (1999) of the service needs of Vietnamese people with diabetes in Perth demonstrated that a number of health beliefs affect access and treatment in this community. These include preferences for alternative/traditional remedies and distrust of Western medicine. This may be related to the belief that the long-term use of Western medicine results in further medical complications and the belief that the responsibility for health lies with the individual and their family rather than outside professional sources. Further, barriers to accessing services cited by Vietnamese participants of this study were language problems, cost of services and equipment and dependence on family members to access services.

Language and material circumstances have also been identified as barriers to adhering to recommendations in a group of 30 Chinese and Anglo-Canadian women with diabetes residing in Canada, whose health beliefs and perceptions were examined by Anderson et al (1991). The authors found that Chinese women had difficulty understanding education material and recommendations, often because interpreters were unavailable. Due to their recent arrival many of the Chinese women were working class, trying to survive in a new country and therefore not well established financially. This affected their ability to take time off work for medical appointments for fear of job loss. There was also a stigma attached to diabetes that kept some of the Chinese women from telling their employers of their illness.

Middle Eastern

As the people that make up this cultural group are relatively new migrants to Australia, there is a limited amount of evidence regarding factors that contribute to their higher level of risk of type 2 diabetes. In a study of 389 Arabic speaking patients who attended their general practice in Sydney at least once in the past 2 years it was found that over two thirds had never received written information about diabetes nor were they referred to a dietitian or attended a diabetes clinic (Girgis & Ward, 2004).

Similarly, Rissel et al (1998) in a study of 851 Arabic speaking patients attending their general practice in Sydney found that females were significantly less likely to have been tested for diabetes ($p<0.05$) or blood pressure ($p<0.05$) compared with their Australian born counterparts in NSW.

Pacific Islanders

Pacific Islanders generally have larger body sizes than their Western counterparts. This is due, at least in part, to religious and cultural beliefs that place a great importance on food and its connection with social customs and hospitality. There is also a greater acceptance of larger body size in these cultures, which are traditionally associated with high status, power, authority and wealth and is perceived as being beautiful and healthy (Vainikolo et al, 1993; Brewis et al, 1998; Craig et al, 1999).

In a sample of 225 Samoans residing in Samoa and New Zealand, Brewis et al (1998) found that although body ideals were slim, both groups perceived being above normal body weight at larger body sizes compared to Western groups and ranked obese bodies as more attractive. This is consistent with findings by Wang et al (1999) who found that a group of 23 Pacific Islanders and native Hawaiians residing in Hawaii associated higher weight with wealth and happiness. They also found that the barriers to diet and exercise in this group were: the pressure to eat at social or family visits/functions, the lack of resources to buy appropriate food and a general lack of motivation to commence exercise. They suggested that walking groups could help motivate people to lose weight.

A study by Simmons et al (1998) in 1,599 Europeans, Maori and Pacific Islanders residing in New Zealand, generated 30 barriers to care. The most frequently reported barriers to care were the limited range of services, that services were not community based, lack of self motivation, unsatisfactory education, lack of diabetes knowledge and public awareness, personal costs of care, spiritual health beliefs, physical access and language barriers. Inadequate financing has been put forward by Simmons et al, (1996) to explain a significant barrier to compliance with and adherence to recommendations experienced by Pacific Islanders, with over 66% of Maori and Pacific Islander people with diabetes residing in New Zealand being unemployed.

A study by Vainikolo et al (1993) assessing the food consumption patterns and beliefs of Tongans residing in New Zealand found that upon migration there was an increase in the intake of energy, fat, protein, cholesterol and calcium as a result of an increased intake of meat, dairy products, fats and oils. The authors indicate that the results of these dietary changes are increased weight and an increased risk of developing chronic diseases such as diabetes. Similarly, Samoans in Australia indicated that they had problems preparing traditional foods at home because ingredients are hard to access and very expensive.

Asian

Many studies have found that religious attitudes and beliefs act as barriers to positive health care practices and therefore contribute to higher levels of risk in Asian populations (Kelleher & Islam, 1994; Hawthorne & Tomlinson, 1997; Narayan & Rea, 1997). This is often because health practitioners underestimate the impact of these beliefs on everyday life and do not account for them in health recommendations and/or treatment regimes.

Herbal remedies and culturally specific diets such as the Ayurvedic diet system influence patient compliance and adherence to recommendations by providing a more culturally appropriate alternative to Western medicine. The lack of acknowledgement and consideration of these alternatives by health professionals can allow them to become factors that contribute to increased levels of risk (Hawthorne, 1990; Narayan & Rea, 1997).

Kelleher and Islam (1994) conducted interviews with 20 Bangladeshi participants residing in the UK and identified the main barriers to correctly self-managing diabetes were due to religious beliefs and attitudes, especially in relation to food. Major themes identified were that many of the kinds of food subjects were being asked to give up were classified as "soul food" and therefore were seen to satisfy a spiritual need. The importance of food in festivities, religious events and maintaining social relationships acted as a major barrier, as did the necessity to fast for certain religious events.

A study by Hawthorne (1990) which interviewed and compared 71 Asian and British participants residing in the UK, found that significantly fewer Asians received education incorporating their cooking techniques and traditions. They also found that there were a number of clashes between religious beliefs and the education they had received which acted as a barrier to their adherence to recommendations for the correct management of diabetes.

Perception of weight is a major contributing factor in this group as demonstrated by Patel et al (2001) who studied a sample of 737 Asian and European women residing in the UK. There was a greater awareness of obesity among European women, compared with Asian women and a greater number of Asian women who perceived themselves as the right weight, were actually overweight and had abdominal obesity. The authors conclude that appropriate education and awareness of obesity needs to be given to Asian communities. These findings are consistent with a study by Greenhalgh et al (1998) , in which large body size was generally viewed as an indicator of health. In a sample of 40 Bangladeshi men and women residing in the UK most chose photographs of large individuals when asked to pick the healthiest looking person.

A further factor is a lack of knowledge regarding necessity for services and an external locus of control in which many Asian cultural groups believe their actions have little effect and thus will not change their circumstances. This is due to the traditional way of thinking that emphasises faith, ritual, trust and is one in which questions of life and death are answered by consulting the holy texts as opposed to one in which individual choices of lifestyle occur (Kelleher & Islam, 1994).

Multiple cultural groups

A study by Green et al (2003) used family interviews and focus groups to capture views regarding socio-cultural influences on eating and physical activity in Turkish, Greek, Indian and Chinese immigrants in Victoria. All participants reported a wider variation in diet as a result of migration, however dietary acculturation was most evident amongst children. Children often requested that their families prepare Australian meals whilst older generations continued to eat traditional meals. The authors concluded that cultural background is relevant to childhood obesity problems and that when designing interventions, diverse communities need to be consulted and the role of the extended family needs to be considered.

A study by Diabetes Australia (2004/5) (see Appendix 2), which consisted of focus groups with Greek, Arabic and Samoan communities and questionnaires for dietitians, diabetes educators, doctors and community health workers found that most CALD clients relied on their general practitioner for care and that there were a number of factors that affected successful diabetes management. These included age, degree of acculturation, level of community awareness, financial status, level of education, family support in Australia and availability of health professionals from within their community. Further, it was suggested that there is a need for education resources that consider a person's ethnicity, preferred language, culture and individual and family background and experiences.

Table 8: What are the factors which may contribute to higher levels of risk in specific CALD groups?

Study	Study Design	Cultural Group	Location of Study	Focus of Study
Ahmed and Ahmed, 2001	Observational	Sudanese	Sudan	Diabetes in Sudan
Anderson et al, 1991	Cross-sectional	Chinese	Canada	Cultural differences in women's perspectives on illness and their perceptions of health professionals
Anderson et al, 1995	Cross-sectional	Chinese	Canada	Differences in feelings about professional care and cultural and religious beliefs
Brewis et al, 1998	Cross-sectional	Samoans	Samoa and NZ	Attitudes towards obesity in Samoa and New Zealand
Burns, 2004	Cross-sectional	Somali Women	Australia	Comparison of diet in Somalia with diets in Australia & identification of specific issues eg. – language & literacy
Burns et al, 2000	Cross-sectional	Somali refugees	Victoria	Impact of changes to diet & lifestyle and social networks
Craig et al, 1999	Cross-sectional	Tongan	Tonga and Australia	Cultural perceptions of body size
Di Francesco et al, 1999	Needs Assessment	Italian and Vietnamese	Perth	Needs assessment
Diabetes Australia, 2004/5	Needs Assessment	Greek, Arabic, Samoan	Australia	Nutrition needs and a resource directory for CALD groups
Girgis and Ward, 2004	Cross-sectional	Arabic – Lebanon	Australia	Quality of care
Green et al, 2003	Cross-sectional	Turkish, Greek, Indian and Chinese immigrants	Victoria	Social, cultural and environmental influences on child activity and eating in Australian migrant communities.
Greenhalgh et al, 1998	Case control	Bangladeshi	UK	Perceptions of weight and underlying attitudes and beliefs
Guruge et al, 2001	Case report	Chinese	Canada	Cultural barriers and religious beliefs
Hawthorne, 1990	Case control	Asians	UK	Differences between Asians and British participants on diabetes management with education
Hawthorne and Tomlinson, 1997	Randomised controlled trial	Pakistani Muslims	UK	Barriers to positive health care
Hawthorne and Tomlinson, 1999	Cross-sectional	Pakistani	UK	Language and literacy levels contributing factor limiting access to services and information

Table 8: What are the factors which may contribute to higher levels of risk in specific CALD groups? (continued)

Study	Study Design	Cultural Group	Location of Study	Focus of Study
Jayne and Rankin, 2001	Cross-sectional	Chinese	US	Barriers to diabetes self management that are influenced by culture
Kelleher and Islam, 1994	Cross-sectional	Bangladeshi	UK	Barriers to positive health care and self-management of diabetes
Kouris-Blazos et al, 1999	Cross-sectional	Greek	Australia	Food habits, health status and lifestyle of elderly Greek immigrants compared to Greeks living in rural Greece and Anglo-Celtic Australians
Study	Study Design	Cultural Group	Location of Study	Focus of Study
Lewis et al, 1997	Cross-sectional	Italians, Greeks and Indo-Chinese	Australia	Cultural barriers to exercise amongst the ethnic elderly
Migrant Information Centre in East Melbourne, 1999	Needs Assessment	Not stated	Melbourne	Needs of migrant communities in East Melbourne
Narayan and Rea, 1997	Case report	Indian	US	Case study of a Hindi Indian woman's interaction with a home care nurse affecting cultural factors
Northern Sydney Health Promotion, 2002	Needs Assessment	Greek, Italian, Serbian	Australia	Increasing participation in exercise using culturally appropriate physical activity
O'Neill et al, 2000	Literature review	Vietnamese	Vietnam	Traditional cultural practices and chronic illnesses
Patel et al, 2001	Case control	Asian	UK	Perception of weight and actual weight
Rankin et al, 1997	Cross-sectional	Chinese	US	Reported a pilot study that tested factors about compliance with treatment recommendations
Renzaho and Burns, 2006	Cross-sectional	Sub-Saharan Africans	Australia	Post-migration food habits of sub-Saharan African migrants in Victoria: a cross-sectional study
Rissel et al, 1998	Cross-sectional	Arabic	Sydney	Cardiovascular risk factors among Arabic speaking patients in general practice setting (Sydney - inner west)
Simmons et al, 1996	Cross-sectional	Maori, Pacific Islanders	New Zealand	Barriers to care – inadequate financing
Simmons et al, 1998	Cross-sectional	Maori, Pacific Islanders	New Zealand	Barriers to care
Thow and Waters, 2005	Literature and data sources review (ABS, NDR, NMD, NHMD)	All groups that have a high prevalence / risk of diabetes	Australia	Review of data sources covering diabetes and risks in culturally and linguistically diverse Australians
Turner and Hilbers, 2004	Cross-sectional	Russian, Greek, Spanish, Chinese, Tongan, Bangladeshi	Australia	Cultural factors that may impact on the management of diabetes
Vainikolo et al, 1993	Cross-sectional	Tongans	New Zealand	Food consumption patterns and beliefs of Tongans living in Dunedin
Wang et al, 1999	Cross-sectional	Pacific Islanders, Hawaiians	Hawaii	Focus groups to determine cultural barriers to diet and exercise
Western Region Health Centre, 2001	Cross-sectional	Ethiopian	Australia	Focus groups to determine perceptions about diabetes and preferred methods of education
Wooden et al, 1994 (cited in Julian, 1999)	Review	All cultural groups	Australia	The health of Australia's ethnically diverse population
Von Hofe et al, 2002	Systematic review	All cultural groups	Various countries	A systematic review of issues impacting on health care for CALD groups using diabetes as a model

SECTION 4

Interventions in CALD Communities

What evidence exists, and what are its key features, for interventions which are likely to be effective in reducing risk factors for type 2 diabetes in specific CALD groups?

What evidence exists, and what are its key features for interventions which have been trialled in CALD groups, for reducing other risk factors for chronic disease, which may be applicable to reducing risk factors for developing type 2 diabetes?

Question 3

What evidence exists, and what are its key features, for interventions which are likely to be effective in reducing risk factors for type 2 diabetes in specific CALD groups?

There have been no studies conducted in Australia of the rigour or magnitude of the Chinese, Finnish, Swedish, or US diabetes prevention trials in either CALD communities or the broader population with IGT. The majority of reports available for review were evaluations of community or service developments and were not designed to provide research evidence. Few of the reports undertook more than process or process plus impact evaluation. A comprehensive literature review undertaken for NSW Health (Colagiuri et al, 2004) highlighted the lack of NHMRC gradable evidence on what works best in translating the international RCT evidence about prevention into the everyday community setting. Without particular regard to ethnicity this work identified the components of lifestyle interventions that have been shown to be effective in preventing or delaying the onset of diabetes in the clinical trial setting as follows:

- multiple lifestyle changes
- 5-7% weight loss
- low fat, low calorie diet
- increased physical activity
- individualisation of goals and strategies
- frequent contact with participants
- individual lifestyle coaches
- supervised physical activity sessions.

Findings

Diabetes prevention in Indian Asians living in India

The results of the major diabetes prevention RCTs have already been summarised in the introduction to this report (page 9). In addition a recent community-based RCT conducted in 531 native Asian Indians with IGT (mean age 45 years, BMI 25.8kg/m2) was reported by Ramachandran et al (2006). Participants were randomized to four groups - control, lifestyle modification, metformin 250mg twice daily, or lifestyle modification and metformin. After 3-years, risk of progression to diabetes was reduced by 29% with lifestyle modification, 26% by metformin, and 28% by lifestyle modification and metformin compared with the control group. Progression from IGT to diabetes was significantly reduced by lifestyle modification or metformin but no additional benefit was gained by combining them.

Being from the sub-continent of India is among the risk factors for developing type 2 diabetes listed in the NHMRC Guideline for the Case Detection and Diagnosis of Type 2 Diabetes (Colagiuri et al, 2002a). The study population was younger, leaner and more insulin resistant than the participants in the landmark Chinese, Finnish and US diabetes prevention trials (Pan et al, 1997; Tuomilehto et al, 2001; Knowler et al, 2002). Ramachandran and colleagues suggest that screening for glucose intolerance should be undertaken at an earlier age in Asian Indians due to the earlier age at which they develop hyperglycaemia. While the Ramachandran study was conducted in Indian Asians living in their own country its results are likely to be valid for Indian Asians living in Australia.

Ethnic community stakeholders as partners in primary and secondary diabetes prevention

Karantzas-Savva and Kirwan (2004) reported on a project entitled "Listening to Ethnic Communities About Diabetes" which developed, piloted and evaluated culturally appropriate primary and secondary prevention health promotion strategies and resources with **Maltese, Filipino** and **Vietnamese** communities in the municipality of Brimbank, Victoria.

The project aimed to enhance self-management of diabetes among people from CALD communities and to engage the CALD communities in increasing understanding of, and access to, diabetes prevention and management strategies and services in the primary care sector. Its key features were:

- a steering committee which included representation of community ethnic organisations
- an ethno centric needs analysis
- a phased approach based on canvassing needs, developing a response to the identified needs, piloting the response.

Phase 3 of the "Listening to Ethnic Communities About Diabetes" project saw the piloting of at least one intervention for each of the targeted ethnic communities. Pilot projects included: a five-week education program with a focus on exercise and using pedometers for the Maltese community; a dietary resource developed and launched for the Filipino community; and a state-wide Vietnamese radio campaign using a CD produced by the project containing culturally and linguistically appropriate diabetes messages in the form of short narratives/ stories in the Vietnamese language, and supported by the establishment of a Vietnamese phone information line linked to Diabetes Australia-Victoria (DA-VIC).

This case study highlights some methods for achieving effective intersectoral collaboration. The health and ethnic community sectors have traditionally operated in parallel to one another. The project attempted to bridge this gap by working intersectorally and building knowledge and understanding between agencies by working together on common goals and built the capacity of each of the three target CALD communities by involving community members throughout. Local health services providers, DA-VIC and ethnic agencies continued to be involved beyond the life of the project including the direct involvement in establishment of a Maltese Diabetes Support Group, ongoing diabetes awareness campaign via Vietnamese radio, and uptake of seeding grants offered to Filipino associations and groups for promotion of the Filipino dietary resource produced. The authors claim that as a result of this approach, the project has been able to demonstrate improvement in the delivery of diabetes prevention and management initiatives to the three targeted CALD communities.

A national survey of diabetes programs for CALD groups

In 2004, the former Australian Centre for Diabetes Strategies (ACDS) conducted a national survey of CALD diabetes projects (ACDS, 2005) in partnership with the former South Eastern Sydney Area Health Service Multicultural Unit. While the aim of this project was to seek information about programs for people from CALD groups already diagnosed with diabetes which were completed between 2000 and 2003, several respondents reported on programs being conducted for CALD groups that either:

a) focused on diabetes prevention or health promotion or

b) were for people with diabetes and/or their carers but also included a component on prevention.

Although, the survey asked about outcomes and the evaluation of the outcomes of these programs, no evaluations are detailed in the report - presumably because the survey respondents did not provide this information. The programs on which the report provides information that is relevant to preventing type 2 diabetes in CALD groups in NSW are:

- **Australian South Sea Islander Healthy Living Program**

Project Setting: Community Health Centre, Hospital, Community Groups – conducted by the Mackay Health District, Queensland

The project aimed to improve the Australian South Sea Islander awareness of diabetes prevention.

Key features

Collaboration with key stakeholders – partnerships with the targeted community (eg stakeholder membership in the project steering committee) and a local setting, in this case the community health centre, local hospital and community groups.

Outcomes

- An improved knowledge of the connection between nutrition, exercise, health and well-being
- An improved understanding of type 2 diabetes and information on how to bring about positive health and lifestyle changes by using the Healthy Living Program
- Improved referrals of Australian South Sea Islanders to GPs, Specialists and other Allied Health care professionals.

- **Diabetes Reduce Your Risk Bilingual Community Educators Program**

Project Setting: community group – conducted by: Diabetes Australia – NSW

The aim of this project was to develop a diabetes education program to increase diabetes awareness and reduce risk in CALD communities and to train bilingual community educators to conduct the program.

Key features

Strong partnership with the targeted community, a community setting and community empowerment.

Outcomes

The project found the training and employment of a bilingual community educator to be an effective way of increasing awareness of diabetes in CALD communities.

- **Multicultural Women's Group Education Sessions**

Project setting: rural /remote community group, Broken Hill, NSW – conducted by the Regional Diabetes Centre (Broken Hill).

The aim of this project was to provide accessible information to women from CALD groups, in an outback town in NSW, who are either at risk of or have diabetes or are carers of a person with diabetes.

Key features

Working with the targeted community (in a local setting) staff from the Diabetes Centre attended the multicultural women's group as guest speakers – identified issues that were important to them and provided information in a non-threatening, non-clinical environment.

Outcomes

The project resulted in increased complication screening, behaviours such as blood glucose monitoring and accessing podiatry. No information on indicators of primary prevention was provided.

- **The Redcliffe Caboolture Diabetes Action Project**

Project setting: metropolitan community, Brisbane, QLD – conducted by the Redcliffe-Caboolture Health Service District, Queensland Health.

The aim of this project was to increase awareness of diabetes prevention in the **Samoan** community.

Key features

Community involvement – engagement of the Samoan community in the form of champions and church leaders.

Outcomes

- Seven champions from the community were engaged in forming a Steering Committee with the objective of reducing and preventing diabetes by educating the people about its consequences.
- The group has a weekly walking group and five members have undertaken training on the Australian Guide to Healthy Eating and the National Physical Activity Guidelines for Australians.

- **Development of Healthy Eating with Diabetes Resources in Chinese Language**

Project setting: community, Northern Territory – conducted by Diabetes Australia – NT.

The aim of this project was to develop a culturally appropriate nutrition education resource for people of Chinese descent with type 2 or 'pre-diabetes'.

Key features

Community involvement (focus groups with local Chinese community in capital city and outback Australia).

Outcomes

A 12 page booklet "Healthy Eating with Diabetes" in Chinese language – no evaluation reported.

- **Tackling IGT Patients and Practitioners Together**

Project setting: general practice, Western Australia – organised by the Fremantle Regional Division of General Practice.

The aim of this project was to improve the screening of Mediterranean patients for IGT by GPs, and to improve lifestyle self-management in people at risk of diabetes.

Key features

Focus on a two person GP practice with a large Mediterranean population.

Outcomes

- Developed and implemented a clinical audit in relation to screening and record keeping for Mediterranean people who are overweight and over 50 years.

The findings for this question are summarised along with those of Question 4 at the end of this section.

Table 9: What evidence exists, and what are its key features, for interventions which are likely to be effective in reducing risk factors for type 2 diabetes in specific CALD groups?

Study	Study Design	Cultural Group	Location of study	Focus of Study
ACDS, 2005	Survey	South Sea Islander, Samoan, Chinese, Mediterranean	Australia	Mapping of CALD diabetes projects
Colagiuri et al, 2004	Literature review	N/A	Australia	Review of translating international RCT evidence about diabetes prevention into the everyday community setting
Karantzas-Savva and Kirwan, 2004	Intervention	Maltese, Filipino, Vietnamese	Victoria	Report on the development, piloting and evaluation of culturally appropriate primary and secondary prevention health promotion strategies in ethnic communities
Knowler et al, 2002	Intervention	American	America	Diabetes prevention trial
Pan et al, 1997	Intervention	Chinese	China	Diabetes prevention trial
Ramachandran et al, 2006	Intervention	Indian Asians	India	Diabetes prevention trial
Tuomilehto et al, 2001	Intervention	Finnish	Finland	Diabetes prevention trial

Question 4

What evidence exists, and what are its key features for interventions which have been trialled in CALD groups, for reducing other risk factors for chronic disease, which may be applicable to reducing risk factors for developing type 2 diabetes?

A review of published peer-reviewed literature and non-peer-reviewed reports has provided evidence of interventions which have been trialled in CALD groups for the purpose of reducing chronic disease risk factors. These intervention programs have predominantly focused on increasing physical activity and changing the dietary patterns of Australian immigrant communities.

Findings

Physical inactivity contributes to the burden of chronic disease and due to socio-cultural barriers, people from immigrant communities, particularly women, are often less likely to engage in exercise programs. To overcome this, programs such as the Heart Health Programs for Migrant Women (Brown et al, 1996; Brown et al, 1997), the Swimming Program for Afghan Women in Perth (Di Francesco & Hansen, 2002), and the Dance for Fitness project for Arabic speaking women in Eastern Melbourne (Active for Life VicHealth, 2000) have been developed and implemented to promote physical activity opportunities for women of CALD communities. Nutrition programs have also been trialled in CALD groups. The Health Promotion Unit of the Central Sydney Area Health Service (2003) ran a media campaign with the aim of increasing knowledge and awareness of the effects of saturated fat on coronary heart disease. These trialled intervention programs are summarised below.

Heart Health Program for Greek-Australian Women

Brown et al (1996) conducted a 12 week minimal-intervention heart health program on a community sample of Greek-Australian women recruited from a Greek Orthodox Church. This program, run in a bilingual and interactive format, aimed to improve cardiovascular health and decrease obesity by increasing the participant's physical activity and reducing their saturated fat intake. Physiological and self-reported data were collected at pre-test, and after 12 weeks of weekly group meetings and then again after a 12-week home-based self-help program.

This minimal-intervention heart health program had significant effects on body composition and aerobic fitness in the group of Greek-Australian women. A mean weight loss of almost 4 kg over 12 weeks was accompanied by a small decrease in skinfold measurements and by improvements in cardiovascular fitness, as evidenced by a reduction in heart rate response (15 bpm) to the step test, and by a small but statistically significant drop in diastolic blood pressure (4.9 mmHg). Each of these changes was maintained at the end of a further 12-week period during which the women followed the self-help program at home.

Notwithstanding the changes in cardiovascular risk factors, the real success of the program was indicated by the high adherence and low attrition rates and by the sustained increase in physical activity following the end of the formal program. Almost 2 years after completion of the study, this Greek community organises two exercise classes on a weekly basis, with a choice of morning or late afternoon times to accommodate those women who work.

The use of an existing social group and the running of the program in familiar surroundings (the church hall), at a time of day which suited the group are likely to have contributed to the success of the program. Offering the program in a bilingual, interactive format which allowed the group to tailor activities and information to their own interests and allowed maintenance of cultural distinctiveness were also important factors in maintaining adherence. The results of this program suggest that programs designed specifically to target women from CALD groups have a role to play in health promotion in Australia.

Heart Health for Migrant Women: a short intervention with Macedonian Australian Women

Brown et al (1997) reported on a study designed to determine if a 12-week program, which had already shown some success with groups of Polish and Greek-Australian women (Brown et al, 1996), would be effective in improving diet and exercise habits in Macedonian-Australian women, when offered by community educators over a short period of eight weeks.

Women were recruited through articles in a Macedonian newspaper, through ethnic radio, and through word of mouth within the Macedonian community, with the aid of a Macedonian migrant health worker. During the first stage, participants attended a weekly group meeting in a Macedonian church hall, and followed a home-based exercise program. During the second eight weeks, the home-based program continued, but there were no weekly group meetings.

There were significant reductions in body mass index, arm, waist and hip circumferences after the first 8 weeks of the program. After 16 weeks the initial changes in BMI, arm, waist, hip and arm circumferences were well maintained, with average reduction of 1.4kg/m2, 5.9cm, 4.2cm and 2.2cm respectively.

This study confirmed that an exercise and dietary modification program which had previously shown some success with groups of women from Poland and Greece, would be effective if it was shortened and delivered by community educators without extensive research skills.

The results confirm that this type of program is feasible, and that improvements in fitness and body composition can result from a relatively minimal intervention. This shortened program resulted in small but significant and well-maintained mean reductions in BMI and waist circumference, with an average weight loss after 8 weeks of 2.3kg. Decreases in exercising heart rate were also notable in the first 8 weeks, indicating a reasonable adherence to the program, and improvement in fitness. The poor maintenance of cardiovascular improvement at follow-up may indicate the importance of the group in maintaining compliance with the program. The authors suggested the need for more bilingual fitness leaders and health educators if a greater proportion of women, who have limited access to mainstream programs, are to be reached.

Swimming Program for Afghan Women (Pilot Program)

Di Francesco and Hansen (2002) reported on a swimming program for Afghan women run from the Eastern Perth Public and Community Health Unit which ran over three terms between May and November 2000. There were three objectives for the pilot:

1. To promote participation in physical activity.
2. To improve knowledge relating to physical activity.
3. To improve knowledge of and use of the public transport system.

Twenty-four swimming lessons were delivered in total and the evaluation was based on quantitative data on participant demographics and level of participation (surveys), qualitative data from program participants (group discussion) and qualitative data from program enablers (semi-structured interviews). The main feature of this program was that it addressed the modesty requirements of the Afghan women by securing protected time (to the exclusion of others) where the women could swim.

The participating Afghan women considered that the program was culturally appropriate, offered the privacy and support necessary for their participation and that they intended to continue being physically active. Participants developed water skills and feelings of self-efficacy about those skills. During the group discussion a number of women expressed pleasure and pride in having learned how to swim.

Women's only swimming project – Maribyrnong Health Promotion Project

The 'Women's only swimming project' was conducted by the WestBay Alliance Health Group in the local government area of Maribyrnong, Melbourne (West Bay Alliance, 2002). The project targeted Muslim women and aimed to promote physical activity in this group so as to reduce the likelihood of developing risk factors for heart disease and diabetes. One of the main elements of the project was to increase the capacity of the target group through skills, empowerment and confidence development with the aim of supporting sustainability of the program. The project involved consultation with the target group, community agencies and private organisations. The report concluded that the consultative and collaborative processes used in the project ensured its success but no objective evaluation appears to have been undertaken.

Dance for Fitness: A health and fitness project for Arabic speaking women in the eastern suburbs of Melbourne

"Dance for Fitness" was a six month project which targeted Muslim and/or Arabic speaking women living in the eastern suburbs of Melbourne (Active for Life VicHealth, 2000). The primary objectives of this project were to enable these women to have access to exercise facilities in a private, safe and affordable environment. Opportunity was also given for the women to be informed of health issues, enabling them to take positive action for their own health. Dance and aerobic activities were developed to meet the needs of this community and were generally well received by the community as a means of increasing physical activity and fitness. Again, no evaluation appears to have been undertaken to ascertain the actual outcomes of the project.

Arabic Nutrition Promotion: healthy Food for a Healthy Family

In 2001, the Health Promotion Unit of the Central Sydney Area Health Service (2003) conducted a six-week media-based (radio, pamphlet and poster) healthy-eating nutrition campaign targeting Arabic speaking people. The focus of this campaign was to increase knowledge and awareness of the effects of saturated fat on coronary heart disease. Focus groups were conducted following the media campaign to evaluate its success. Unfortunately only a small number of focus group participants had heard the radio messages or had read the campaign posters and pamphlets. It is clear that a 6 week campaign is not sufficient to achieve an appropriate level of message penetration in this CALD community which would enable dietary patterns to be changed.

Table 10: What evidence exists, and what are its key features for interventions which have been trialled in CALD groups, for reducing other risk factors for chronic disease, which may be applicable to reducing risk factors for developing type 2 diabetes?

Study	Study Design	Cultural Group	Location of study	Focus of Study
Active for Life, 2000	Intervention	Muslim &/or Arabic speaking women	Melbourne	Health promotion – physical activity in Muslim women
Brown et al, 1996	Intervention	Greek women	NSW	Reducing cardiovascular and metabolic disorders risk factors in Greek-Australian women
Brown et al, 1997	Intervention	Macedonian woman	Australia	Reducing cardiovascular and metabolic disorders risk factors in Macedonian-Australian women
Di Francesco and Hansen 2002	Intervention	Arabic women (Afghan)	Perth	Health promotion – physical activity in Muslim women
Health Promotion Unit CSAHS, 2003	Intervention	Arabic speaking people	Sydney	6 week media campaign to increase knowledge and awareness of effects of saturated fat on coronary heart disease
West Bay Alliance, 2002	Intervention	Muslim women	Melbourne	Health promotion – physical activity in Muslim women

Summary of findings of Question 3 and 4

Numerous reports of intervention programs are available through websites and other sources. However it should be noted that such reports almost invariably do not include information on outcomes or more than short term follow up of impact. There are also many programs which have not resulted in formal reports or where reports are not readily available.

Characteristics

The reports reviewed in relation to both Questions 3 and 4 focused almost exclusively on lifestyle intervention eg nutrition and physical activity, awareness raising or information provision with the latter often involving the development of a resource. It was rare to find an objective evaluation of these studies and most of the evaluations appear to have concentrated on process issues eg acceptability and feasibility.

The themes that emerged in the majority of the interventions reviewed in relation to Questions 3 and 4 include collaborative efforts (involving the target community) through needs assessment and efforts to meet the identified needs. The main characteristics of seemingly successful programs are:

- **Consultative**
  - involving thorough consultation and assessment of needs from the perspective of the target community.
- **Collaborative**
  - using a strong partnership approach to engage the target community eg involving a range of segments of the community eg multicultural community associations, community leaders, bilingual health professionals (including GPs), interpreters, and bilingual community workers
  - including government eg local council involvement and relevant non-government organisations eg Diabetes Australia.
- **Practical**
  - addressing and removing barriers to practical, linguistic and socio-cultural barriers eg accommodate cultural mores and requirements such as the swimming program for Muslim women cited above
  - utilising existing social structures and linkages to reach the target group and/or address culture specific issues eg churches
  - using bicultural health workers.
- **Culturally appropriate**
  - developing strategies that take account of and accommodate cultural and linguistic characteristics of the groups
  - incorporating evaluation mechanisms which focus on the acceptability of the project.

SECTION 5

Evaluation Methods

What evaluation methods would be applicable for evaluating the processes, impacts and outcomes of interventions for reducing risk factors for type 2 diabetes targeted to CALD communities?

Question 5

What evaluation methods would be applicable for evaluating the processes, impacts and outcomes of interventions for reducing risk factors for type 2 diabetes targeted to CALD communities?

Peer reviewed evidence about the effectiveness (or otherwise) of diabetes or related chronic disease prevention programs is sadly lacking outside of the clinical trial setting (Colagiuri et al, 2004). The general lack of investment in public health research of nations everywhere has been bemoaned by many and was cited by Wanless (2004) as a significant barrier to intervening to reduce the impact of preventable chronic diseases in the UK. Rigorous evaluations of diabetes risk reduction interventions specifically in CALD groups appear to be even more notable by their absence than those that focus on the general population. Regardless of whether the project reports we reviewed were from the peer-reviewed literature or other sources, although the reports claimed the projects to be successful, few were found which provided objective quantitative evidence to support the outcomes specified. Further, the reports reviewed frequently used the term outcomes to describe outputs eg the development of resources such as videos or written educational material but did not report on the effectiveness of the resources in changing behaviour or reducing risks.

Findings

Although there are some tools designed specifically for people from CALD groups who are already diagnosed with diabetes, the literature search revealed no tools designed to assess preventative interventions specifically for CALD groups. Further, program evaluations for the prevention of type 2 diabetes (eg interventions aimed at increasing physical activity or adherence to healthy weight and dietary recommendations) across the board, as well as in CALD groups, rarely include long term follow up and rarely include assessment of progression to diabetes or physical or biochemical measurement of risk factors such as:

- weight and BMI
- blood pressure
- measures of glucose intolerance.

There are, however, some evaluation/research instruments designed specifically for assessing outcomes for people with overt diabetes, eg quality of life (Guo, 2001). There are also some questionnaires designed to test knowledge of diabetes in people who already have diabetes but these are usually developed by individual services to assess particular projects and we found no published examples of validated generalisable instruments for assessing preventative interventions in CALD groups.

In a number of the program reports we reviewed, focus groups and/or discussion groups were conducted soon after the completion of the program, with or without feedback/evaluation sheets translated into the language of the target group.

This appears to be highly acceptable to CALD groups and has the added merit of:

- further engagement of the target group
- providing opportunity to clarify and reinforce participants' understanding of the health messages and recommendations conveyed in the program
- providing opportunity to add new knowledge
- lending itself well to qualitative data collection and impact evaluation
- collecting information for improving the quality of program delivery
- being a relatively efficient and low cost option.

While this method is well suited to collecting qualitative information eg about the acceptability, feasibility, and immediate impact of programs it does little to measure effectiveness in terms of objective assessment of behaviour change that might lead to a reduction in risks. More importantly, it does not take account of quantitative information such as that obtained from physical (weight, BMI, hip-waist ratios, blood pressure) and biochemical assessments (IGT, IFG, lipids). In view of this but, mindful that qualitative evaluations of programs should be retained for the reasons already listed, the following issues are of paramount importance:

1. The ultimate aim of risk reduction interventions is to halt or delay progression to diabetes in people at identifiable risk. Consequently, the gold standard for measuring the effectiveness of such programs is the incidence of diabetes in a given target population. Since we know from the RCT evidence that intensive lifestyle interventions - diet and physical activity - significantly prevent or delay the onset of type 2 diabetes in people with IGT (Tuomilehto et al, 2001; Knowler et al, 2002), surrogate measures, such as reduction in weight or increase in physical activity, are useful measures for evaluating risk reduction programs.*.

2. These measures are objective and transcend culture and do not require CALD specific tools. However, mechanisms and methods for recruiting and retaining people from CALD communities for immediate and longer term follow up do need culture specific strategies, many of which are outlined above. Further, it is important to include CALD specific tools for evaluating the acceptability of such programs and their impact on quality of life.

3. Essentially there are five main areas for evaluating risk reduction interventions for diabetes and related conditions:

    - Incidence of diabetes
    - Presence or absence of risk factors for diabetes (and/or cardiovascular disease)*
    - Reach and penetration to the target group
    - Acceptability to the target group
    - Impact on quality of life

The reports reviewed for this project highlight the emphasis on evaluating chronic disease prevention / health promotion interventions for CALD communities on the basis of processes – often to the neglect of outcomes. In many cases evaluations focus almost solely on participant acceptance and enjoyment of the program. While this is an important factor, such evaluations do not contribute to the pool of knowledge about effective models and methods for preventing type 2 diabetes in CALD groups. Nonetheless it is worth noting that the indirect influence of many programs which cannot be assessed under the above headings, although difficult to measure in the classic tradition of cause and effect, may have considerable intangible impact on developing both individual and community capacity for raising awareness of and reducing risks in CALD groups.

* 1. Risk factor assessment can be used as a surrogate for incidence
2. Physical activity and dietary intake or composition can be used as a surrogate for modifiable risk factors

Table 11: What evaluations methods would be applicable for evaluating the processes, impacts and outcomes of interventions for reducing risk factors for type 2 diabetes targeted to CALD communities?

Study	Study Design	Australian Cultural Group	Location of Study	Focus of Study
Colagiuri et al, 2004	Literature review	N/A	Australia	Review of translating international RCT evidence about diabetes prevention into the everyday community setting
Guo, 2001		Chinese		evaluation/research instruments designed specifically for assessing outcomes for people with overt diabetes, eg quality of life
Knowler et al, 2002	Intervention	American	America	Diabetes prevention trial
Tuomilheto et al, 2001	Intervention	Finnish	Finland	Diabetes prevention trial
Wanless, 2004		N/A	UK	

SECTION 6

Discussion

There is ample evidence that certain CALD groups are more susceptible to type 2 diabetes than their Australian born counterparts but there remain substantial gaps in the pool of knowledge about the precise type 2 diabetes risk status of specific CALD communities. However:

1. It can be assumed that those groups known to have a high prevalence of diabetes in their own country will have a high prevalence of risk factors - in particular a genetic susceptibility to type 2 diabetes.

2. There is some direct evidence that certain CALD groups have an increased prevalence of risks for type 2 diabetes and cardiovascular disease that are independent of the influence of migration.

Many factors contribute to the higher level of risk experienced by CALD groups including both non-modifiable risk factors such as genetics and modifiable risk factors such as migration and associated circumstances. Language and cultural barriers, along with possible low education and literacy level or low socio-economic status either in the home country or following immigration, pose substantial barriers to accessing health information and services. Even when appropriate levels of access are achieved, religious and cultural beliefs – and the lack of understanding of these by health care providers – may hinder patient adherence to recommendations for healthy living, risk reduction, and medical treatments.

CALD communities residing in NSW that have a known elevated risk of diabetes; are residing in NSW in large numbers; are recent immigrants; or who are contributing significantly to the growing proportion of older people in NSW, were identified in broad cultural groups ie European, African, Chinese, Middle Eastern, Pacific Islanders and (Indian) Asians. The magnitude of the diabetes problem, both current and potential, in these communities combined with the magnitude of the personal and societal cost of diabetes is more than sufficient to warrant urgent attention.

Effective interventions for the prevention of type 2 diabetes are available. To date lifestyle interventions involving modest weight loss have been shown to be the most effective, achieving a reduction in diabetes incidence of 58%, and have also been shown to be cost effective. While it may be useful to add metformin to therapies designed to prevent diabetes in certain individuals, individual medical advice should be sought. Data for the use of Acarbose and Rosiglitazone in diabetes prevention have also been published although none of these medications are officially "indicated" for use in diabetes prevention in NSW/ Australia.

There have been no studies conducted in Australia of the rigour or magnitude of the Chinese, Finnish, Swedish, US or Indian prevention trials in either CALD communities or the broader population with IGT. The majority of reports available for review were evaluations of community or service developments and were not designed to provide research evidence. Few of the reports undertook more than process or process plus impact evaluation. A comprehensive literature review undertaken for NSW Health (Colagiuri et al, 2004) highlighted the lack of NHMRC gradable evidence on what works best in translating the international RCT evidence about prevention into the everyday community setting. Without particular regard to ethnicity this work identified the components of lifestyle interventions that have been shown to be effective in preventing or delaying the onset of diabetes in the clinical trial setting as follows:

- multiple lifestyle changes
- 5-7% weight loss
- low fat, low calorie diet
- increased physical activity
- individualisation of goals and strategies
- frequent contact with participants
- individual lifestyle coaches
- supervised physical activity sessions.

As indicated in the NSW Department of Health report, *Preventing Type 2 Diabetes in NSW - A Scoping Paper* (Colagiuri et al, 2004), it is feasible and desirable to identify individuals and communities with an identified and/or identifiable high risk profile for type 2 diabetes and to intervene to reduce risks and prevent progression to diabetes. There is as yet little evidence about what models and methods work best for translating the RCT evidence about diabetes prevention into everyday settings in the general community, let alone in CALD communities.

Identifying and reaching CALD groups most in need and opening avenues whereby they can access the required services appears to be best addressed by the use of bi- or multi-lingual GPs and community health workers and by engaging community leaders and organisations. It has been suggested that a validated acculturation scale should be used to identify those people from CALD communities who are the least acculturated so that they can be targeted for health promotion interventions (Rissel et al, 1998).

As can be seen from the literature cited in this report, health promotion programs for people from CALD communities are predominantly predicated on diet and physical activity. Given the evidence about type 2 diabetes prevention and the other benefits of improving diet and physical activity this is entirely appropriate. However, although there are many of these programs, few appear to have a specific aim of preventing diabetes or related conditions such as hypertension and cardiovascular disease. Further, few programs undertake more than process evaluation and of those that assess changes to weight or and/or physical activity, few involve any form of long term follow up.

Physical inactivity contributes to the burden of chronic disease and due to socio-cultural barriers, people from immigrant communities, particularly women, are often less likely to engage in exercise programs. To overcome this, programs such as the Heart Health Programs for Migrant Women (Brown et al, 1996), the Swimming Program for Afghan Women in Perth (Di Francesco & Hansen, 2002), and the Dance for Fitness project for Arabic speaking women in Eastern Melbourne (Active for Life VicHealth, 2000) have been developed and implemented to promote physical activity opportunities for women of CALD communities. Nutrition programs have also been trialled in CALD groups. For example, the Health Promotion Unit of the Central Sydney Area Health Service (2003) ran a media campaign with the aim of increasing knowledge and awareness of the effects of saturated fat on coronary heart disease.

The themes that emerged in the majority of the interventions reviewed in relation to program effectiveness were based on process, acceptability and feasibility within the target group. Key characteristics of so-called successful programs were those based on collaborative efforts (involving the target community) through needs assessment and efforts to meet the identified needs and those that were practical eg removed barriers, used bilingual health workers and linked organisations and the community.

However, there is little in the way of formal objective evaluation of these programs and virtually no long term evaluation of any kind. No tools or instruments designed specifically for prevention in CALD communities were found in our literature search and there is a need to develop and validate some simple, standardised tools specific to CALD groups that can be used to assess changes to weight, exercise and diet. On this point it should be noted that the only truly objective way to measure the incidence of risk factors and progression to diabetes is by epidemiological surveys based on physical and biochemical parameters. However, once a baseline is established, interim monitoring can be undertaken using surrogate indicators such as BMI, waist circumference, and improvements to diet and exercise.

Currently, evaluations of health promotion programs for CALD communities are based around participation and acceptability. There are also ample reports indicating considerations for cultural appropriateness and engaging CALD communities (Diabetes Australia, 2004/5; Centre for Culture Ethnicity & Health, 2006) and Executive Summaries of these papers are shown in Appendix 2 and 3 respectively. This information is valuable to guide the development and design of programs. What is required in addition to this are longer term and more rigorous evaluations.

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APPENDICES

Appendix 1

REVIEW CRITERIA

Q1: Are there specific CALD groups in NSW with high prevalence of risk factors for developing Type 2 Diabetes, or with higher incidence of the disease?			
Title			
Author		**Source**	
Cultural Group		**Country**	
A. CLASSIFICATION OF STUDY:	Intervention/ Non-Intervention		
B. TYPE OF STUDY:	Meta-analysis/ Systematic Review/ Randomised Control Trial/ Cohort/ Case-control/ Case-series/ Observational/ Cross-sectional		
C. ASSESSMENT:	Qualitative/ Quantitative/ Combined		
D. QUALITY:		**SCORE**	
1. Is there a clear rationale – is the issue/problem to be addressed clearly specified?		Y/N	
2. Is the research question unequivocally stated and appropriate to the specified study issue/problem?		Y/N	
3. Methods:			
i. Does the study clearly describe the design, subjects, tools and data collection? (ie. could someone else repeat it?)		Y/N	
ii. Are the population characteristics and size described (representative)?		Y/N	
iii. Is the intervention clearly specified?		Y/N/NA	
iv. Can the type of data collected answer the research question?		Y/N	
E. RESULTS:			
1. How was the data analysis done?			
2. Would someone else be able to repeat the data analysis?		Y/N/NS	
3. Was the data analysis appropriate to the research question?		Y/N/NS	
4. Was the data correctly interpreted?		Y/N	
5. Does the data support the authors' claims?		Y/N	
6. Describe the study:	Population:	M/F/B A/C	
Size:	Diabetes:	Y/N	
Health Problem:		**Total Score:**	
		Percent:	
F. SUMMARY:			
Describe the intervention and/or data collection methods used (eg. tools)			
Summarise the overall outcomes/findings			

INSTRUCTIONS TO SCORERS

Scoring code: YES = 1, N/A = 1, NO = 0, NS = 0

Abbreviations: N/A = Not applicable

NS = Not stated

M/F/B = Male/Female/Both

A/C = Adult/Child

Health Problem - refers to a health problem other than diabetes (eg obesity)

Apply scores to the sections on Quality, Methods and Results only (ie all the Y/N questions)

QUALITY

1. Is there a clear rationale - is the issue/problem to be addressed clearly specified? Y/N 1 or 0
2. Is the research question unequivocally stated and appropriate to thee specified study issue/ problem? Y/N 1, 1/2 or 0

METHODS

i. Does the study clear describe the design, subjects, tools and data collection? Y/N

ii. (ie. Could someone else repeat it?)

iii. Are the population characteristics and size described (representative)? 1 1/4, 1/2, 3/4 or 0

iv. Is the intervention clearly specified? Y/N?NA 1 or 0

v. Can the type of data collected answer the research question? Y/N 1 or 0

RESULTS

All results questions must be scored as 0 or 1

Ambiguous Questions

Methods

Question iv

Refer to the question or issue raised by the authors in their introduction, if not specifically stated as an aim.

Results

Question 1

All data is analysed in some way, even if interviews are simply sorted into themes

Question 5

refers to whether or not the discussion accurately reflects the results NOT do the results support the original hypothesis.

Appendix 2

Priority Needs for CALD Communities – Diabetes Australia

Executive summary

This report represents findings from the Identification of Priority Needs for Nutrition Information Materials to Cater for Australia's Culturally and Linguistically Diverse (CALD) Communities Project. It is well known that managing a complex chronic disorder such as diabetes is difficult for people when English is their first language and when access to education resources and a health care system that they are 'familiar' with is available. What then must be the issues surrounding diabetes management and care for a person with diabetes from a CALD community?

Within the current Australian health system model, health professionals struggle to meet the health needs of people from CALD backgrounds. Health education approaches used in the past that relied upon a demographically and culturally similar population living within a geographical location do not really reflect the reality of many communities within Australia today. Many urban communities now have many cultural groups residing within them, and as a consequence the makeup and dynamics of Australia's ethnic communities are changing. Public health workers are constantly required to redefine the populations they are working with and adjust programs to the actuality of the community.

This project, funded under the National Diabetes Services Scheme (NDSS) – an initiative of the Australian Government administered by Diabetes Australia Ltd., will assist every organisation interested in improving diabetes services and delivery. The project was originally seen as an opportunity to acknowledge and build upon any existing diabetes best practice models for CALD community clients; however, the reality was that it found health professionals and health workers struggling to meet even the basic nutrition/diabetes education needs of many CALD community clients, and CALD clients unaware of diabetes services available for them. The project, though, has contributed enormously to understanding and acknowledging the issues faced by CALD community members with diabetes by creating an opportunity to hear the 'community's voices'.

This achievement has been possible only as a result of the Australian Diabetes Educators Association (ADEA) and the Dietitians Association of Australia (DAA) working collaboratively towards the common goal 'better diabetes services for all Australians'. The assistance of the project advisory committee has enabled so much to be achieved in a short timeframe.

Source: Diabetes Australia (2004/2005). Identification of Priority Needs for Nutrition Information Materials to Cater for Australia's Culturally and Linguistically Diverse (CALD) Communities. Australian Government - National Diabetes Services Scheme (NDSS), Canberra, Australia. Available online at: http://www.diabetesaustralia.com.au/_lib/doc_pdf/reports/CALD-Nutrition.pdf

Appendix 3

Centre for Culture, Ethnicity and Health, Discussion Paper

Executive summary

This discussion paper has resulted from work with the Moonee Valley Melbourne Primary Care Partnership (MVM PCP) Physical Activity Network (PAN), an alliance of health and government agencies in the local government areas of Moonee Valley and Melbourne who have an interest in physical activity with people from CALD backgrounds. The paper has been written to identify and present key considerations for inclusion in planning, implementing and evaluating physical activity programs with CALD communities.

Given the lack of information that currently exists about physical activity and CALD communities, to inform this paper, CEH has used two different methods to investigate current physical activity initiatives that have successfully engaged people from CALD backgrounds. The first was a literature review, the second were focus groups, interviews, a collection of case studies with local service providers and discussions amongst the PAN members for MVM PCP.

The findings have been collated and are summarised in the paper under the following headings:

- Attitudes to physical activity
- Gender as an important factor
- Engaging communities for the development of physical activity initiatives
- Avoiding the 'one size fits all' approach
- Communicating for success
- Programs and activities that reflect our diverse communities
- Getting the timing and costing right and
- Organisational planning for cultural difference.

This discussion paper also identifies key recommendations to assist the health, community and fitness sectors to achieve successful engagement and participation of CALD communities in physical activity initiatives.

Source: Centre for Culture Ethnicity & Health (2006). Engaging Culturally and Linguistically Diverse Communities in Physical Activity: A Discussion Paper. Centre for Culture, Ethnicity & Health, Melbourne, Victoria. Available online at: http://www.ceh.org.au/resources/resbyceh.html