Diabetes in culturally and linguistically diverse Australians

Identification of communities at high risk

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Abbreviations

ABS	Australian Bureau of Statistics
ACT	Australian Capital Territory
AIHW	Australian Institute of Health and Welfare
ASR	age-standardised rate
AusDiab	Australian Diabetes, Obesity and Lifestyle Study
CALD	culturally and linguistically diverse
CI	confidence interval
FECCA	Federation of Ethnic Communities' Councils of Australia
GDM	gestational diabetes mellitus
ICD–9–CM	International Classification of Diseases, 9th Revision, Clinical Modification
ICD–10–AM	International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Australian Modification
NDSS	National Diabetes Services Scheme
NHS	National Health Survey
NSW	New South Wales
NT	Northern Territory
Qld	Queensland
SA	South Australia
SERCIS	Social Environmental Risk Context Information System
SPR	standardised prevalence ratio
Tas	Tasmania
UK	United Kingdom
Vic	Victoria
WA	Western Australia
WHO	World Health Organization

Summary

The purpose of this report is to identify those groups of people from culturally and linguistically diverse backgrounds that have a high prevalence or risk of diabetes compared with the Australian-born population. The report describes the demographics of these groups in relation to the size of the community, their proficiency in English, and location within Australia. The report also identifies gaps in the available literature and data.

In this summary, we have highlighted the culturally and linguistically diverse groups with the highest rates in regard to each of the measures included in this report—prevalence of diabetes, incidence of insulin-treated diabetes, hospitalisations and mortality. However, the threshold used to decide whether to include a group in this 'highest rate' list is somewhat arbitrary, and has usually been chosen only on the basis of including 4–5 groups for each measure. It is important to refer to the source tables when making a comprehensive assessment.

Level of disease

Prevalence estimates are used where possible to indicate the rate of diabetes. However, comprehensive prevalence information is lacking, so other relevant measures are also included in this report. In particular, incidence measures (that is, new cases) provide useful information, as do other indicators of disease levels such as hospitalisation rates, mortality rates, and rates of complications from diabetes. The prevalence of relevant risk factors is also included in this report.

Due to data limitations, it is difficult to succinctly assess the level of disease in different culturally and linguistically diverse population groups. In particular, data are not always available in standard groups, and are often based only on regional groups rather than more specific country- or language-based groups.

By region of birth

Information is included in this report on diabetes prevalence, incidence, hospitalisations and mortality. Table S1 provides a summary of the groups with the highest rates.

Information is also included in the report on lower limb amputations (Table 6) and certain risk factors (Table 5).

Table S1: Regions of birth with the highest rate ratios for specific measures relevant to diabetes

Prevalence	Incidence of insulin-treated diabetes	Hospitalisations	Mortality
Middle East/North Africa	Middle East/North Africa	South Pacific	South Pacific
Southern Asia/South-East Asia	Southern Asia	Middle East/North Africa	Middle East
	Southern Europe/ Eastern Europe & Central Asia	Southern Europe	North Africa
			Southern Europe

Note: See Table 1 for data.

By country of birth

Prevalence based on country of birth is included, however these data need to be used with caution as the estimates have high relative standard errors associated with them. The non-English-speaking countries with the highest standardised prevalence ratios were Singapore, Egypt, Lebanon, South Africa and Sri Lanka (Table 2).

Table 4 presents the number of people registered with the National Diabetes Services Scheme, by country of birth.

By language spoken at home

The prevalence of diabetes based on the language spoken at home is included, however, these results have high relative standard errors associated with them and so need to be used with caution. The language groups with the highest standardised prevalence ratios were those in the Middle East/North Africa, Southern Asia, other South-West Asia, and East Asia (Table 3).

Demographics

The size of various population groups by country of birth and age structure is presented in Figure 2. The largest overseas-born populations in Australia are people born in the United Kingdom (UK)/Ireland, New Zealand, Italy, Former Yugoslav Republics, Vietnam, China and Greece (Table A6).

Information is also provided on English proficiency based on language spoken at home (Table 7). The groups with the highest proportion reporting that they do not speak English well or at all are: Chinese not included in other groups (this group is very small), Vietnamese, Korean, Khmer, followed by a number of other Chinese languages and Japanese. There are also a number of larger sized groups having more than 15% reporting that they do not speak English well or at all, including those speaking Greek, Arabic and Italian.

Detailed information on where these groups live in Australia is included in Tables 8–12, and in Appendix C (Tables A18–A24).

Gaps in the data

The main data gaps identified in this report fall into four groups. Firstly, there is a dearth of prevalence information for specific groups of people from culturally and linguistically diverse backgrounds. While some information is available for particular regions or countries of birth, or language groups, these do not allow for analysis based on the specific groups of interest. Secondly, there is a lack of relevant information on complications from diabetes for these specific groups. Thirdly, there is little information on prevalence rates based on measured glucose levels for these groups. Finally, detailed information on language skills for the high risk groups is also lacking.

1 Introduction

The purpose of this report is to identify those groups of people from culturally and linguistically diverse backgrounds in Australia that have a high prevalence or risk of diabetes compared with the Australian-born population. The report describes the demographics of these groups, particularly in relation to the size of the community, their proficiency in English, and location within Australia, with the aim of providing information that could be used to identify those most in need of targeted educational materials. The report also identifies gaps in the available literature and data relating to diabetes risk and prevalence in Australians from culturally and linguistically diverse backgrounds.

Australia is a multicultural nation with 28% of its population born overseas (ABS 2002a). Data from the Australian Bureau of Statistics (ABS) 2001 Census of Population and Housing showed that after people born in the United Kingdom (UK) and Ireland (5.8% of the population) and New Zealand (1.9%), the most commonly reported overseas places of birth were Italy (1.2%), Vietnam (0.8%), China (0.8%), Greece (0.6%), Germany (0.6%), the Philippines (0.5%), and India (0.5%). Among the almost 4 million people who spoke a language other than English at home, the most common languages were Italian (353,607 people), Greek (263,718), Cantonese (225,307), Arabic (209,372), Vietnamese (174,239) and Mandarin (139,286) (ABS 2002a).

Since 1976, there has been a marked change in the country of origin of immigrants to Australia. In 1976 the largest group of immigrants were from the UK and Ireland (41.1%), with nearly all the other large groupings from European countries (ABS 1997a). By 2001, while the largest group was still from the UK and Ireland, this had dropped to 26.4% and people born in Vietnam, China, the Philippines and Malaysia were contributing almost 12% of the total immigrant intake.

Project description

This project was undertaken for Diabetes Australia, in four stages:

- Stage 1 involved a review of the literature and available data sources (outlined in Appendix A) for information on prevalence, incidence, risk, trends and attitudes to self-care among Australians from culturally and linguistically diverse backgrounds. Only data sources which had become available since the adoption of the National Diabetes Strategy (Colagiuri et al. 1998), that is, since 1998, were included in this review.
- Stage 2 augmented this information with data from the ABS 2001 Census of Population and Housing to determine the demographics of high risk groups of Australians from culturally and linguistically diverse backgrounds. Data from the National Diabetes Services Scheme (NDSS) were also used to provide information on the distribution of Australians from culturally and linguistically diverse backgrounds registered with the NDSS.
- Stage 3 identified key gaps in available national information and data collections about diabetes among people from culturally and linguistically diverse backgrounds. Recommendations have been proposed for ways in which these national data collections could be improved to better identify at-risk communities.
- Stage 4 was the production of this report summarising the findings and gaps and providing information that could be used to rank the most 'at-risk' culturally and

linguistically diverse communities according to those most in need of targeted educational materials.

Scope

In this report people from culturally and linguistically diverse (CALD) backgrounds are defined as:

- people born overseas in countries where English is not the main language spoken, that is people whose country of birth is not Australia and its external territories, New Zealand, the UK, Ireland, the United States of America, Canada or South Africa. This selection of countries is based on the main countries from which Australia receives overseas settlers who are likely to speak English; or
- people born in Australia whose main or preferred language spoken is not English.

This definition may not always identify the complexities involved in identifying specific CALD communities. Data on country of birth and/or language spoken may not take into account the importance of cultural identity. For example, Assyrian people may define themselves as separate from the Arabic population despite potentially having the same country of birth. In addition, census data only provide information on languages other than English spoken at home, but does not specify whether these languages are the main or preferred languages.

It should be noted that Indigenous Australians are not included in the scope of this report despite the fact that they are a culturally and linguistically diverse group who have a significantly higher prevalence of diabetes than non-Indigenous Australians.

2 Diabetes in culturally and linguistically diverse Australians

Overview

It is well established that certain culturally and linguistically diverse groups in Australia have a high prevalence of diabetes compared with the Australian-born population. It is thought that the differentials in diabetes prevalence and risk by birthplace are due to a combination of genetic, biological, behavioural and environmental risk factors. However, there are limited data available indicating which specific language and cultural groups have the highest rates of diabetes or are most at risk.

Diabetes other than gestational diabetes

In their report *A Picture of Diabetes in Overseas-born Australians*, Holdenson et al. (AIHW 2003a) found that proportionally more overseas-born people than Australian-born report having diabetes. Approximately 35% of people who reported having diabetes in 2001 were born overseas despite the fact that only 28% of the Australian population in 2001 were born overseas. The regions of birth with the highest diabetes prevalence, incidence of insulin-treated diabetes and diabetes-related hospitalisation and/or mortality rates were the South Pacific Islands, Southern Europe, Eastern Europe and Central Asia, the Middle East, North Africa and Southern Asia (Table 1; also see Appendix Tables A1–A5).

It is very difficult to obtain reliable estimates of the prevalence of diabetes for specific countries of birth. The ABS provided standardised prevalence ratios for self-reported diabetes prevalence from the 2001 National Health Survey (NHS) for specific countries of birth (Table 2). However the relative standard errors for these country-specific estimates were very high (i.e. between 25% and 50%), so extreme caution should be taken in interpreting the results. Of the countries included, only people born in Egypt reported significantly more cases of diabetes than expected based on the prevalence for Australian-born people.

Table 1: Diabetes prevalence, incidence, hospitalisation and deaths, age-standardised rate ratios by region of birth, people aged 20 years and over

	Ratios (Australian-born=1.00)							
	Prevalence[a] 2001		Incidence of insulin-treated diabetes 1999–2001[b]		Hospitalisations 1999–00		Mortality 1997–2000	
Region of birth	**Males**	**Females**	**Males**	**Females**	**Males**	**Females**	**Males**	**Females**
Middle East	3.60*	2.43	1.73*	2.30*	2.07*	1.52*	1.96*	2.51*
North Africa							1.68*	2.20*
Southern Asia	1.87*	1.54	1.70[d]*	2.27[d]*	1.26*	1.14*	1.33*	1.48*
South-East Asia			1.17	1.37*	0.69*	1.15*	0.88	1.17
Southern Europe	0.85	1.46*	1.33[c]*	1.33[c]*	1.53*	1.12*	1.42*	1.93*
Eastern Europe & Central Asia					1.09*	0.70*	1.27*	1.35*
Australia	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UK & Ireland	1.17	0.71	0.71*	0.74*	0.79*	0.64*	0.87*	0.87*
Northern & Western Europe	1.26	0.55			0.91*	0.89*	1.07	1.25*
All other countries	1.56	0.57	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
South Pacific	n.a.	n.a.	0.96	1.35*	2.22*	2.62*	2.25*	2.98*
New Zealand	n.a.	n.a.			0.66*	0.50*	n.a.	n.a.
North-East Asia	n.a.	n.a.	0.93	1.32	0.56*	0.67*	0.81*	0.96
Other Africa	n.a.	n.a.	1.15	1.02	1.00	0.77*	1.00	0.87
Americas	n.a.	n.a.	1.01	0.98	1.02	0.77*	0.73*	0.79

* Significantly different from 1.00 (Australian-born) at the 5% level of significance.

n.a. Not available.

(a) From self-reported data. Ratios for prevalence data were calculated using the indirect method of standardisation, rather than the direct method used for incidence, hospitalisations and mortality. Therefore the prevalence ratios are based on the ratio of observed cases to expected cases, whereas the incidence, hospitalisation and mortality ratios are ratios of the age-standardised rates.

(b) People aged 15 years and over.

(c) Does not include Central Asia.

(d) Includes Central Asia.

Note: Shaded areas indicated that regions of birth have been combined for this measure.

Source: AIHW: Holdenson et al. 2003a.

Table 2: Standardised prevalence ratios for self-reported diabetes by country of birth, people aged 20 years and over, 2001

Country of Birth	Standardised prevalence ratio (SPR)[(a)]	95% confidence interval for SPR	Relative standard error of estimate[(b)] %	Crude rate %
Singapore	4.6	0.6–8.5	43.4	17.1
Egypt	3.8*	1.5–6.1	29.8	22.1
Lebanon	3.3	1.0–5.6	35.0	11.5
South Africa	2.3	0.3–4.3	42.7	6.6
Sri Lanka	2.2	0.1–4.2	46.7	9.3
India	2.2	0.6–3.7	35.8	6.9
United States of America	1.9	0.1–3.8	47.9	7.2
Malta	1.8	0.2–3.4	44.3	10.1
Malaysia	1.8	0.3–3.3	42.6	7.0
China	1.5	0.6–2.4	31.4	4.4
Italy	1.1	0.6–1.6	21.8	8.1
Vietnam	1.1	0.0–2.2	48.5	2.5
Netherlands	1.0	0.2–1.9	41.4	6.5
United Kingdom	1.0	0.7–1.2	14.4	4.8
Australia	1.0	0.9–1.1	4.8	3.5
Germany	0.9	0.2–1.5	38.1	4.9
Greece	0.8	0.2–1.4	36.1	5.1

* Significantly different from 1.0 (Australian-born) at the 5% level of significance.

(a) Ratios are based on the indirect standardisation method using the 2001 Australian-born population as the standard.

(b) Relative standard errors are based on the number of people with diabetes for each country of birth.

Note: Ratios compare estimates for people born in each country of birth with those born in Australia. Therefore, if confidence intervals include 1.0, there is no significant difference in the diabetes rate when compared with the rate for those born in Australia. Results should be interpreted with extreme caution as in most cases the relative standard errors are above 25%, which is considered very high.

Source: Provided by the ABS from ABS 2001 National Health Survey.

An analysis of self-reported diabetes prevalence using data from the ABS 2001 NHS indicated that people whose main language spoken at home was a Middle Eastern or North African language reported significantly more cases of diabetes than expected based on age-specific rates for those speaking English only (Table 3). This analysis also showed that of those with diabetes whose main language spoken was Middle Eastern and North African, 97% were born in the Middle East and North Africa, and 81% reported speaking English very well or well while 19% reported not speaking English well.

Data from the 1997 and 1998 New South Wales (NSW) Health Surveys indicated that the reported prevalence of doctor-diagnosed diabetes in females aged 16 years and over who spoke Italian at home (7.9%) was significantly higher than the state average for females (3.2%) (NSW Department of Health 2001). No other statistically significant differences were found for males or females speaking other languages at home.

Table 3: Standardised prevalence ratios for self-reported diabetes by main language spoken at home, people aged 20 years and over, 2001

Main language spoken at home, by language group	Standardised prevalence ratio (SPR)[(a)]	95% confidence interval for SPR	Relative standard error of estimate[(b)] %	Crude rate %
Middle Eastern & North African	3.6*	2.1–5.6	24.8	10.1
Southern Asian	2.5	1.0–4.7	38.4	5.5
Other Southwest Asian	2.2	0.4–5.2	55.9	4.5
Eastern Asian	1.6	0.9–2.5	25.6	4.4
Southeast Asia	1.4	0.6–2.5	33.4	3.4
Eastern European	1.2	0.7–1.8	23.8	5.0
Southern European	1.1	0.8–1.5	16.1	5.3
Northern European	1.0	0.4–1.8	34.5	5.8
English only	1.0	0.9–1.1	4.2	3.7
Other languages	2.2	0.8–4.3	40.5	5.8

* Significantly different from 1.0 (English only) at the 5% level of significance.

(a) Ratios are based on the indirect standardisation method using the 2001 English only speaking males as the standard for males and English only speaking females as the standard for females.

(b) Relative standard errors are based on the number of people with diabetes for each main language spoken.

Note: Ratios compare estimates for people speaking each language with those speaking English only. Therefore, if confidence intervals include 1.0, there is no significant difference in the diabetes rate when compared with the rate for those speaking English only. Results should be interpreted with extreme caution as in most cases the relative standard errors are above 25%, which is considered very high.

Source: AIHW derived from ABS 2001 National Health Survey.

Gestational diabetes

Gestational diabetes mellitus (GDM) is a form of diabetes that may develop during pregnancy (AIHW 2002). It involves glucose intolerance in pregnant women who have not previously been diagnosed with diabetes. Usually glucose metabolism returns to normal after the baby is born. The Australasian Diabetes in Pregnancy Society (2001) estimates the incidence of gestational diabetes to be around 5% and data from the 1999–2000 AusDiab Study revealed that 3.6% of women who had been pregnant reported having been told that they had gestational diabetes (AIHW 2002).

Ethnicity is a risk factor for GDM, with women from India, the Pacific Islands, Asia and the Middle East being at high risk. Beischer et al. (1991) found that the incidence of GDM in women born in Southern Asia, Africa, Vietnam, Mediterranean countries, Arabic countries, China and other Asian countries was significantly higher than that of women born in Australia and New Zealand. More recent Australian data have highlighted the high prevalence of GDM among Asian women, particularly those from Vietnam (10.6%), Sri Lanka (10.5%), China (8.6%) and the Philippines (6.7%) (Cheung et al. 2001). The South Australian Diabetes Clearing House reported a similarly high rate for GDM in Asian-born women in South Australia of 5.3% compared with 2.2% in Australian-born women (Parsons et al. 2000). It has also been found that Asian, European, or Central and South American racial heritage is a predictive risk factor for GDM in Australian women (Davey & Hamblin 2001).

Similarly, the NSW Mothers and Babies publication (Centre for Epidemiology and Research 2002) reported high rates of GDM among mothers born in North-East Asia (11.0%), Southern Asia (10.4%), Melanesia, Micronesia and Polynesia (8.6%), South-East Asia (8.3%), and the

Middle East and North Africa (6.9%), compared with mothers born in English-speaking countries (2.7%).

Evidence from other countries also shows that certain immigrant groups have a higher risk of GDM than the native-born population. Non-Hispanic black mothers who were born outside the United States of America have been seen to have elevated risk for GDM (Kieffer et al. 1999). Weijers et al. (1998) also found that GDM risk was elevated among Turkish and Moroccan women who had migrated to the Netherlands.

Other risk factors for GDM are glycosuria, age over 30 years, obesity, family history of diabetes, past history of GDM or glucose intolerance and previous adverse pregnancy outcome (Davey & Hamblin 2001). As certain cultural groups are at higher risk for factors such as obesity (discussed below), individuals in these groups may be more likely to have more than one risk factor.

The National Diabetes Services Scheme

The National Diabetes Services Scheme provides blood and urine testing strips, syringes and needles for special injection systems at subsidised prices to people with diabetes who have been diagnosed by a medical practitioner or credentialed diabetes educator and are registered with the NDSS. In the 1999–2000 AusDiab Study, 78% of people with known diabetes reported that they were registered with the NDSS.

Table 4: NDSS registrants by country of birth[(a)], Australia and top 20 overseas countries of birth

Country of birth	Number of registrants	Per cent of total
Australia	122,029	55.2
England	19,925	9.0
Italy	10,138	4.6
Greece	4,470	2.0
New Zealand	3,801	1.7
India	3,604	1.6
China (excluding Taiwan Province)	3,489	1.6
Scotland	3,289	1.5
Malaysia	3,274	1.5
Germany	3,049	1.4
Philippines	2,845	1.3
Vietnam	2,761	1.2
Lebanon	2,600	1.2
Holland (Netherlands)	2,247	1.0
Yugoslavia (Former)	1,914	0.9
Sri Lanka	1,895	0.9
Fiji	1,638	0.7
Croatia	1,624	0.7
Egypt	1,576	0.7
Poland	1,511	0.7
Ireland	1,286	0.6

(a) Only includes registrants for whom country of birth was recorded (n=221,049).

Source: Data provided by Diabetes Australia.

Data provided by Diabetes Australia show that of all people registered on the NDSS as at 31 December 2001, country of birth was recorded for 44% of registrants and, of these, 45% were born overseas (Table 4).

Diabetes in specific groups

International diabetes prevalence by region

The International Diabetes Federation (IDF) Diabetes Atlas (IDF 2003) provides estimates of the prevalence of diabetes in countries around the world. These data indicate that diabetes prevalence rates are higher in the Caribbean (10.3%), Eastern Europe (9.3%), Northern America (8.1%), Western Europe (8.0%), Southern and South-Eastern Europe (7.8%), New Zealand (7.6%), Northern Europe (7.0%), and North Africa and the Middle East (6.4%) than in Australia (6.2%) (Figure 1). Asia and the South Pacific had lower prevalence rates than Australia. These international comparisons should be interpreted with caution, as the IDF data were derived from a variety of measured and self-reported data, with preference given to measured data, and varying methodologies and data sources were used to compile and extrapolate the IDF data into regions.

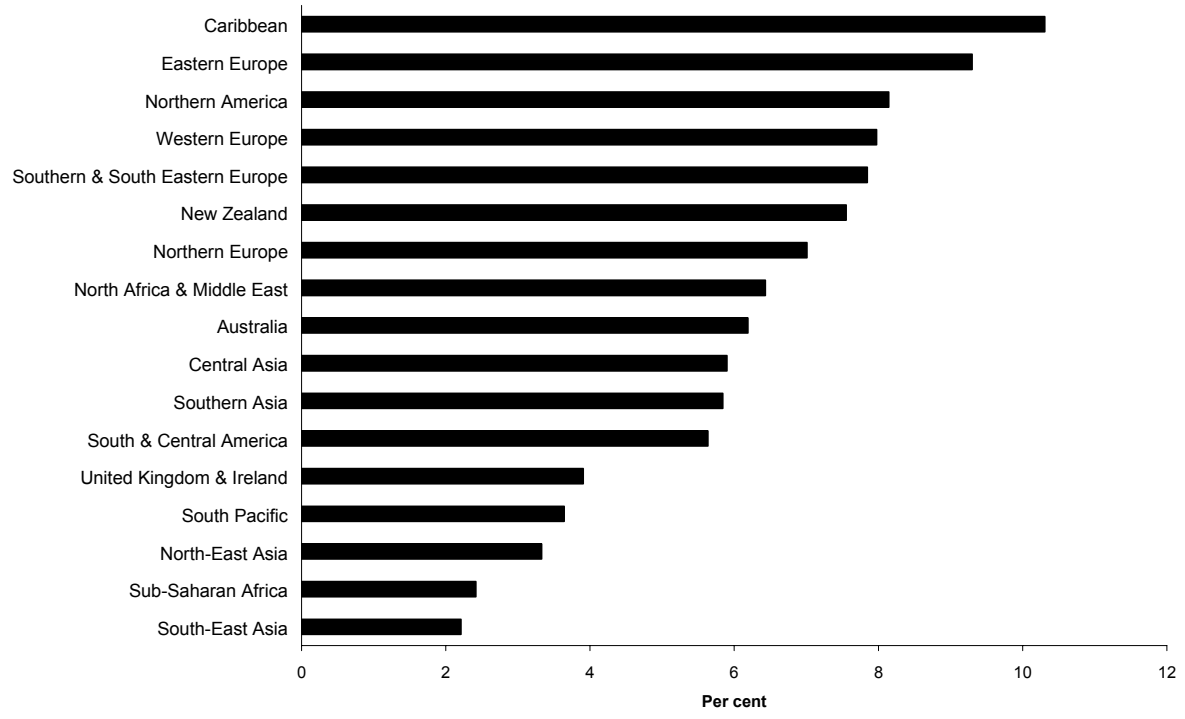

Figure 1: Prevalence of diabetes in people aged 20–79 years by selected region of residence, 2003

Notes

1. Crude rates are presented.

2. South Pacific includes Melanesia, Micronesia & Polynesia (excludes Hawaii).

Source: Derived from IDF 2003.

Northern and Western European

Data from the 2001 NHS indicate that the prevalence rates of diabetes among immigrants from both the UK and Ireland, and other Northern and Western Europe, are not statistically significantly different from that of the Australian-born population (Tables 1 and 2). The NSW Chief Health Officer also found that in 1997 and 1998 the prevalence of current diabetes or high blood sugar among people born in Northern and Western Europe as a whole (4.3%; 95% CI 3.4%–5.2%) was similar to that for the Australian-born population (3.8%; 95% CI 3.5%–4.1%) (NSW Department of Health 2002). In contrast, results from the South Australian Social Environmental Risk Context Information System (SERCIS) Migrant Health Survey conducted in 1997 showed that, after adjusting for age and sex, immigrants from Poland had a statistically significantly higher prevalence of medically confirmed diabetes than Australian-born people (Taylor et al. 1997). Further, this South Australian survey showed that, in comparison to other people from non-English-speaking countries as a whole (4.1%), immigrants from Poland (10.3%) and other Northern and Western Europe (excluding Germany and the Netherlands) (7.5%) had significantly higher medically confirmed diabetes prevalence rates.

The national incidence of insulin-treated diabetes in 1999–2001 and the rate of hospitalisations in 1999–00 (Table 1) were both statistically significantly lower for males and females from Northern and Western Europe compared with the Australian-born population. Similarly, the NSW Chief Health Officer (NSW Department of Health 2002) found that the rate of hospitalisations for diabetes complications was statistically significantly lower in 1995–96 to 1999–00 among people born in Northern and Western Europe (95.7 per 100,000 population; 95% CI 91.6–99.8) compared with that for people born in Australia (158.0 per 100,000 population; 95% CI 156.4–159.6).

Death rates in 1997–2000 for diabetes among immigrants born in the UK and Ireland were also statistically significantly lower than the corresponding Australian-born death rates, but for females born in Northern and Western Europe the diabetes-related death rate was significantly higher than the rate for Australian-born females (Table 1).

Southern European, Eastern European and Central Asian

Results from the 2001 NHS showed that females born in Southern Europe, Eastern Europe and Central Asia reported significantly more cases than expected based on Australian-born female rates (Table 1). However, there was no evidence of a statistically significant difference between the prevalence of self-reported diabetes in males born in these regions compared with their Australian-born counterparts.

The NSW Chief Health Officer (NSW Department of Health 2002) found that, compared with people born in Australia, the prevalence of diabetes or high blood sugar in 1997 and 1998 was statistically significantly higher for people born in Southern Europe (9.9%; 95% CI 7.4%–12.4%) but similar for people born in Eastern Europe (7.9%; 95% CI 3.8%–12.0%). Results for specific countries of birth from 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 16 years and over were statistically significantly higher (based on comparison of 95% confidence intervals) than the state averages (3.9% for males and 3.2% for females) (NSW Department of Health 2001).

Data from the South Australian SERCIS Migrant Health Survey 1997 indicated that, after adjusting for age and sex, people born in Greece or Cyprus had a statistically significantly higher prevalence of medically confirmed diabetes (5.3%) than people born in non-English-speaking countries as a whole (4.1%) (Taylor et al. 1997).

Incidence rates of insulin-treated diabetes in 1999–2001 and diabetes-related death rates in 1997–2000 were statistically significantly higher for both males and females born in Southern Europe, Eastern Europe and Central Asia than for their Australian-born counterparts (Table 1). Further, males born in these regions, as well as females born in Southern Europe alone, had significantly higher hospitalisation rates in 1999–00 than their Australian-born counterparts; while females born in Eastern Europe and Central Asia had a significantly lower hospitalisation rate than Australian-born females. The NSW Chief Health Officer (NSW Department of Health 2002) found that the rates of hospitalisations for diabetes complications in 1995–96 to 1999–00 were statistically significantly higher among people born in Southern Europe (199.1 per 100,000 population; 95% CI 190.7–207.7) and Eastern Europe (191.6 per 100,000 population; 95% CI 180.0–203.6) compared with that for people born in Australia (158.0 per 100,000 population; 95% CI 156.4–159.6). Detailed literature on diabetes prevalence and incidence for specific communities within these immigrant groups were not found.

Results from the Melbourne Collaborative Cohort Study (Hodge et al. 2004; personal communication from Allison Hodge 13 January 2004) showed that at baseline Greek- and Italian-born immigrants aged 40–69 years had higher diabetes prevalence rates (9.7% and 9.4% respectively) than their Australian- or New Zealand-born counterparts (2.9%). Further, at 4-year follow-up, after adjusting for age Greek- and Italian-born immigrants who did not have diabetes at baseline were statistically significantly more likely than people born in Australian or New Zealand to have developed Type 2 diabetes (Greek-born odds ratio 3.8, 95% CI 2.9–5.0; Italian-born odds ratio 3.3, 95% CI 2.6–4.3).

These findings are supported by McKay et al. (2000), who found in their study of the Victorian Visual Impairment Project that Mediterranean ethnicity was positively associated with self-reported diabetes. They reported that, compared with people of UK or Irish heritage, Italian- and Greek-born people had a statistically significantly higher odds ratio for self-reported diabetes (2.1 and 1.8 respectively). Italian-born people in Western Australia have also been reported to have a high prevalence of diabetes (DiFrancesco et al. 1999).

North African and Middle Eastern

In 2001, men born in the Middle East and North Africa reported a prevalence of diabetes 3.6 times higher than expected, based on the age-specific rates for Australian-born men (Table 1). However, there was no evidence from the ABS 2001 NHS that women born in the Middle East and North Africa report more cases than expected. The NSW Chief Health Officer (NSW Department of Health 2002) reported that the prevalence of current diabetes or high blood sugar in 1997 and 1998 was 8.1% for people born in the Middle East; this was statistically significantly higher than the rate of 3.8% for Australian-born people. The high prevalence rates of diabetes among the North African and Middle Eastern communities living in Australia are supported by a study conducted in an Arabic-speaking general practitioner's office in Sydney which found that 13% of Arabic-speaking males and 5% of Arabic-speaking females surveyed had diabetes (Rissel et al. 1998), and by the high reported prevalence of diabetes for Egyptian-born people recorded in the ABS 2001 NHS (Table 2).

Data from the National Diabetes Register show that both male and female immigrants from North Africa and the Middle East had statistically significantly higher incidence rates of insulin-treated diabetes in 1999–2001 compared with the Australian-born population, with rate ratios of 1.73 for males and 2.30 for females (Table 1).

Immigrants from the Middle East and North Africa also had statistically significantly higher rates of diabetes-related hospitalisation and mortality than the Australian-born population, with mortality among Middle Eastern-born people higher than those born in North Africa

(Table 1 and Appendix Table A5). The NSW Chief Health Officer (NSW Department of Health 2002) found that the rate of hospitalisations for diabetes complications in 1995–96 to 1999–00 was statistically significantly higher for people born in the Middle East (664.3 per 100,000 population; 95% CI 637.4–691.9) compared with the rate for people born in Australia (158.0 per 100,000 population; 95% CI 156.4–159.6).

Anecdotal evidence suggests that Arabic-speaking people have a high risk of diabetes after migrating to Australia (Conquest 2002; Yunus 2002). Further, the Ethiopian Community Diabetes Project Report (Rozman 2001) suggested that the prevalence of diabetes among Ethiopian-born Australians is likely to increase due to the age structure of this community.

In addition to these data on North African and Middle Eastern immigrants to Australia, two Dutch studies have found that Middle Eastern- and North African-born (Turkish and Moroccan) populations in the Netherlands had a higher prevalence of diabetes than people of Dutch origin (Weijers et al. 1998; Dijkshoorn et al. 2003). In New Zealand it was found that people of Middle Eastern ethnicity had one of the highest prevalence rates of diabetes (8.2%) of all non-European groups (4.3% overall) compared with a prevalence of 1.9% in European New Zealanders (Simmons et al. 1999).

South-East Asian and Southern Asian

It has been reported that the prevalence of Type 2 diabetes is increasing at a disproportionately high rate among Asian Australians compared with their non-Asian counterparts (Wahlqvist 2002). In 2001, South-East Asian and Southern Asian immigrants to Australia reported more cases of diabetes than expected (significantly more for males) based on age-specific rates for Australian-born (Table 1). A similar result was found in the 1999–2000 AusDiab study. The NSW Chief Health Officer (NSW Department of Health 2002) reported a 3.8% prevalence rate for diabetes or high blood sugar in 1997 and 1998 among people born in South-East Asia and 5.8% for those born in Southern Asia; however neither rate was statistically significantly higher than the rate for people born in Australia (3.8%).

Incidence rates of insulin-treated diabetes in 1999–2001 among male and female immigrants from Southern Asia and Central Asia, and female immigrants from South-East Asia, were statistically significantly higher than the corresponding Australian-born rates (Table 1).

Male and female immigrants from Southern Asia, and female immigrants from South-East Asia, had statistically significantly higher diabetes-related hospitalisation rates in 1999–00 than people born in Australia (Table 1). In contrast, males born in South-East Asia had a statistically significantly lower diabetes-related hospitalisation rate in 1999–00 than Australian-born males. The NSW Chief Health Officer (NSW Department of Health 2002) also found that the rate of hospitalisations for diabetes complications from 1995–96 to 1999–00 was significantly higher among people born in Southern Asia (232.6 per 100,000 population; 95% CI 216.1–250.0) compared with that for people born in Australia (158.0 per 100,000 population; 95% CI 156.4–159.6), while for people born in South-East Asia it was significantly lower (141.5 per 100,000 population; 95% CI 130.6–152.9).

Diabetes-related mortality rates for 1997–2000 for both males and females born in Southern Asia were significantly higher than the rates for Australian-born males and females (Table 1).

In their study of the service needs of people from Italian and Vietnamese communities living in Perth, DiFrancesco et al. (1999) found that while the overall age-standardised diabetes-hospital separation rate for 1995–96 among people born in Vietnam was similar to that for Australian-born people, the rate among Vietnamese people aged 75–79 years was nine times higher than the rate for their Australian-born counterparts. They suggested that this might

mean that the burden of diabetes among the Vietnamese community might increase as it ages.

A high prevalence of diabetes in Asian-born populations is also seen in other countries, particularly among immigrants from Southern Asia (Chowdhury et al. 2003). In their review of ethnicity and diabetes, Abate and Chandalia (2003) reported that although the prevalence of diabetes was 8–10% in the Philippines and 4% in Japan, the prevalence among Filipinos living in Houston, Texas was 16%, while the prevalence among Japanese people living in Seattle was as high as 21%. They also reported that Asian Indians who had migrated to the UK or other westernised countries had a prevalence of diabetes that was about four times higher than that of those living in India. In other studies, British South Asian children were found to have higher average levels of insulin and insulin resistance than white children even after adjusting for height and ponderal index (Whincup et al. 2002), and Feltbower (2002) reported that South Asian children who had migrated to the UK had a higher prevalence of Type 1 diabetes than those living in Asia.

Immigrants from other countries

South Pacific

The NSW Chief Health Officer (NSW Department of Health 2002) reported the prevalence of diabetes or high blood sugar in 1997 and 1998 to be 5.0% for people born in the South Pacific. This was not statistically significantly different from the rate for Australian-born people, as the number of respondents from the South Pacific was small. The NSW Chief Health Officer also found that the rate of hospitalisations for diabetes complications in 1995–96 to 1999–00 among people born in the South Pacific (855.1 per 100,000 population; 95% CI 806.7–905.5) was statistically significantly higher at over five times the rate for Australian-born people (158.0 per 100,000 population; 95% CI 156.4–159.6).

The incidence of insulin-treated diabetes in 1999–2001 was statistically significantly higher for females born in the South Pacific and New Zealand than for the Australian-born females but no difference was observed for males (Table 1). Diabetes-related mortality rates in 1997–2000 and hospitalisation rates in 1999–00 for immigrants from the South Pacific were significantly higher than those for the Australian-born population (Table 1).

Urbanised Pacific Islander people have consistently been reported to have high rates of diabetes (Foliaki & Pearce 2003); in particular, the diabetes prevalence among adults in Nauru has been reported to be as high as 40% (Colagiuri et al. 2002). Simmons et al. (1999 & 2001) reported a much higher age-adjusted prevalence of known diabetes among immigrant Pacific Islander people in New Zealand—4% (for all ages) compared with 2% in European New Zealanders; and 25% for those aged 40–59 years compared with 7% in Europeans.

Americas

The NSW Chief Health Officer (NSW Department of Health 2002) reported that the prevalence of diabetes and high blood sugar in 1997 and 1998 was 4.2% for people born in Latin America and 1.4% for people born in Northern America; however the number of respondents from these regions was small. Anecdotal evidence also suggests that South American-born people are at higher risk of diabetes after migrating to Australia (Cameron 2002).

The incidence of insulin-treated diabetes in 1999–2001 for immigrants from the Americas and the rate of hospitalisations in 1999–00 for males born in the Americas were not significantly different from the rates for Australian-born population (Table 1). However, females born in the Americas had a significantly lower diabetes-related hospitalisation rate than Australian-

born females, and the diabetes-related mortality rate in 1997–2000 was significantly lower among males born in the Americas compared with Australian-born males.

The NSW Chief Health Officer (NSW Department of Health 2002) found that the rates of hospitalisations for diabetes complications in 1995–96 to 1999–00 were significantly lower among people born in Latin America (89.0 per 100,000 population; 95% CI 73.9–106.0) and Northern America (111.8 per 100,000 population; 95% CI 92.0–134.5) than the rate for Australian-born people (158.0 per 100,000 population; 95% CI 156.4–159.6).

Other Africa

The NSW Chief Health Officer reported that the prevalence of diabetes or high blood sugar in 1997 and 1998 among people born in Africa (including North Africa) was 6.2%; however this was not statistically significantly higher than the rate for the Australian-born population (NSW Department of Health 2002). In contrast, the rate of hospitalisations for diabetes-related complications in 1995–96 to 1999–00 was statistically significantly higher (208.3 per 100,000 population; 95% CI 194.0–223.4) than the corresponding rate for the Australian-born population (158.0 per 100,000 population; 95% CI 156.4–159.6).

The available national data provide little evidence of differences in the incidence of insulin-treated diabetes and diabetes-related hospitalisation and mortality rates between immigrants from 'Other' Africa (i.e. regions other than North Africa) and Australian-born males and females (Table 1).

A study conducted in a Ghanaian community in Sydney found that 20% of men and 11% of women from this community had Type 2 diabetes (Saleh et al. 2002). Similarly, Mbanya et al. (1999) found high rates of glucose intolerance among African and Caribbean immigrants to the UK compared with those living in rural and urban Cameroon and Jamaica; and Riste et al. (2001) found a known and newly-detected diabetes prevalence of 18–26% among African-Caribbeans in the UK.

North-East Asia

The NSW Chief Health Officer reported that the prevalence of diabetes or high blood sugar among people born in North-East Asia (this region was called Eastern Asia in the NSW Chief Health officer's report) in 1997 and 1998 was 3.1%, which was just slightly lower than the rate for the Australian-born population (3.8%) but not statistically significantly different (NSW Department of Health 2002).

The available national data indicate no significant difference in the incidence of insulin-treated diabetes in 1999–2001 between immigrants from North-East Asia and the Australian-born population (Table 1). However, the diabetes-related hospitalisation rates in 1999–00 for males and females born in North-East Asia were significantly lower than the rates for their Australian-born counterparts, as was the diabetes-related mortality rate in 1997–2000 for North-East Asian-born males. The NSW Chief Health Officer found that the rate of hospitalisations for diabetes-related complications in 1995–96 to 1999–00 among the North-East Asian-born population was 148.2 per 100,000 population (95% CI 139.2–157.7), which was not significantly different from the rate for the Australian-born population (158.0 per 100,000 population; 95% CI 156.4–159.6).

Risk factors for diabetes

Type 1 diabetes is believed to be caused by exposure to environmental factors, possibly toxins or viruses (AIHW 2002). A genetic component is suspected, although a large proportion of cases occur in people with no family history of the disease (Dorman et al. 1995). Race and ethnicity are also important factors. No modifiable risk factors for Type 1 diabetes have been clearly identified.

Genetic, environmental and behavioural risk factors all contribute to the aetiology of Type 2 diabetes. While the genetic basis for Type 2 diabetes remains unknown, twin and family studies have shown a strong relationship between family history and risk. Race and ethnic background have also been seen to be associated with higher risk. Environmental factors associated with an increased risk of diabetes include urbanisation and increased modernisation. These factors also influence behavioural choices that are linked to increased risk, particularly physical inactivity and poor nutrition and, indirectly, overweight and obesity. Increasing age is also a risk factor for Type 2 diabetes (AIHW 2002).

This section focuses on Type 2 diabetes, primarily because it accounts for 85–90% of diabetes (AIHW 2002), and also because the existence of modifiable risk factors means that it is possible to prevent or delay its onset.

Overweight and physical inactivity

Immigrants from non-Westernised countries may be at particular risk for Type 2 diabetes, due to the dietary and environmental changes associated with migration to developed countries such as Australia—often referred to as 'Westernisation'. The adoption of a more westernised lifestyle for some immigrants means an increased consumption of high-energy foods, which together with a sedentary lifestyle can lead to overweight or obesity (IDI 2000; Renzaho 2004).

In 2001, without accounting for age differences in the populations, the prevalence of overweight was much higher among those born in Southern and Eastern Europe (61%) and North Africa and the Middle East (54%) compared with the Australian-born population (46%) (Table 5). It has been reported that the high prevalence of Type 2 diabetes among people born in the South Pacific could result from their high prevalence of obesity (Simmons et al. 2001).

In contrast, the prevalence of overweight and obesity among immigrants born in South-East Asia (34.5%) was markedly lower than that for the Australian-born population despite the fact that South-East Asian immigrants had the highest rates of sedentariness or physical inactivity (Table 5). However, a World Health Organization expert consultation (WHO 2004) concluded that a substantial proportion of Asian people have a high risk of Type 2 diabetes at a body mass index (BMI) level that is lower than the existing cut-off point for overweight ($\geq 25 kg/m^2$).

Various other Australian studies have identified a high prevalence of obesity among certain culturally and linguistically diverse groups. A high prevalence of overweight and obesity was seen in students from European and Middle Eastern cultural backgrounds (Booth et al. 2001), and 5–12-year-old children of Mediterranean ethnicity were found to have higher BMI than white and Asian children (Lynch et al. 2000). Similarly, the prevalence rates of overweight and obesity were higher for adults born in Greece, Italy and Malta than for those of UK or Irish heritage who participated in the Melbourne Collaborative Cohort Study (Ball et al. 2003).

Table 5: Prevalence of overweight and physical inactivity by region of birth, people aged 18 years and over, 2001

Region of birth	Overweight[a][b]			Sedentary/low physical activity level		
	Males	Females	Persons	Males	Females	Persons
			Per cent			
Southern & Eastern Europe	70.3	51.1	60.6	75.1	79.0	77.1
North Africa & Middle East	65.7	37.1	54.4	65.3	84.8	73.0
UK	56.4	41.6	49.0	61.4	69.2	65.3
Other Oceania	51.9	44.0	47.9	59.0	73.0	66.2
Other Northern & Western Europe	55.8	39.1	47.7	67.6	66.9	67.2
Australia	55.1	38.1	46.4	63.5	73.1	68.5
South-East Asia	32.6	18.4	34.5	79.7	87.1	84.0
All other countries	33.4	29.2	31.3	69.6	74.4	72.0

(a) Overweight indicates a self-reported Body Mass Index of greater than or equal to 25.0 kg/m^2.

(b) These data are not age-standardised and therefore the age distribution of the population should be considered when interpreting these estimates.

Source: ABS 2002b.

A high prevalence of overweight and obesity was also seen in Sydney Arabic-speaking and Ghanaian populations. The prevalence of overweight for the Arabic-speaking population (surveyed at an Arabic-speaking doctors' surgery) was 73% for males and 36% for females (Rissel et al. 1998). Within the surveyed Ghanaian community, 53% of males and 40% of females were overweight (but not obese), and a further 18% of males and 26% of females were obese. Abdominal overweight was present in 53% of males and 74% of females (Saleh et al. 2002).

Results from the ABS 2001 NHS indicate that a large proportion (almost 70%) of Australian-born people are sedentary or undertake a low level of physical activity. Immigrants from the UK, other Northern and Western Europe, the North Africa and the Middle East, and 'other Oceania' reported similar rates of inactivity. However, people born in Southern and Eastern Europe, and South-East Asia reported much higher rates of physical inactivity (around 80%).

In addition, low levels of physical activity were observed in the 'parents' generation, compared with children or grandparents, from Greek, Turkish, Indian and Chinese communities that have migrated to Australia in the last three decades (Green et al. 2003). This suggests that 'middle aged' immigrants might be at higher risk of developing Type 2 diabetes. This is also observed within the Spanish and Hispano-American population (Email communication from Mrs Gladys Hitchen, Steering Committee, 23 June 2004).

Impaired glucose tolerance

There are limited data available to estimate the prevalence of impaired glucose tolerance (IGT) in Australians from CALD backgrounds. However the risk of IGT is likely to be higher in groups that have a greater risk of Type 2 diabetes such as people born in the South Pacific Islands, Southern Asia and South-East Asia (AIHW 2002).

Age

The risk of developing Type 2 diabetes increases significantly with age, and this risk factor is particularly pertinent in identifying Australians from CALD backgrounds at high risk of Type 2 diabetes.

Changes in Australia's immigration policies, particularly since World War II, have meant that immigrants have come to Australia in 'waves' from various regions (ABS 1997a). The proportion of people emigrating from non-English-speaking countries has increased from 54% in 1976 to 61% in 2001. Further, since 1976 there has been a decline in the proportion of the population from European countries and an increase in the Asian-born population. Groups who arrived in earlier immigration waves have higher median ages than more recent arrivals (DIMA 2001): the longer an immigrant group has resided in Australia, the higher its median age in comparison to the rest of the population. See Appendix C, Tables A6 and A7, for more detail.

The changing age profile of particular overseas-born groups affects the size of these groups at older ages, which is particularly relevant for aged care services. In the 1996 census, for people aged 65 years and over, the five largest groups with a language other than English spoken at home were those speaking particular European languages (Italian, Greek, German, 'other European languages', and Polish). However, by 2011 Cantonese is expected to become one of these top five groups (AIHW: Gibson et al. 2001).

Data from the ABS 2001 Census of Population and Housing also indicate that different communities have different age structures. For example, Italian, Greek and Polish communities have a large proportion of older people, whereas Chinese, Indian, Malaysian and Vietnamese communities have a large proportion of young people (Figure 2).

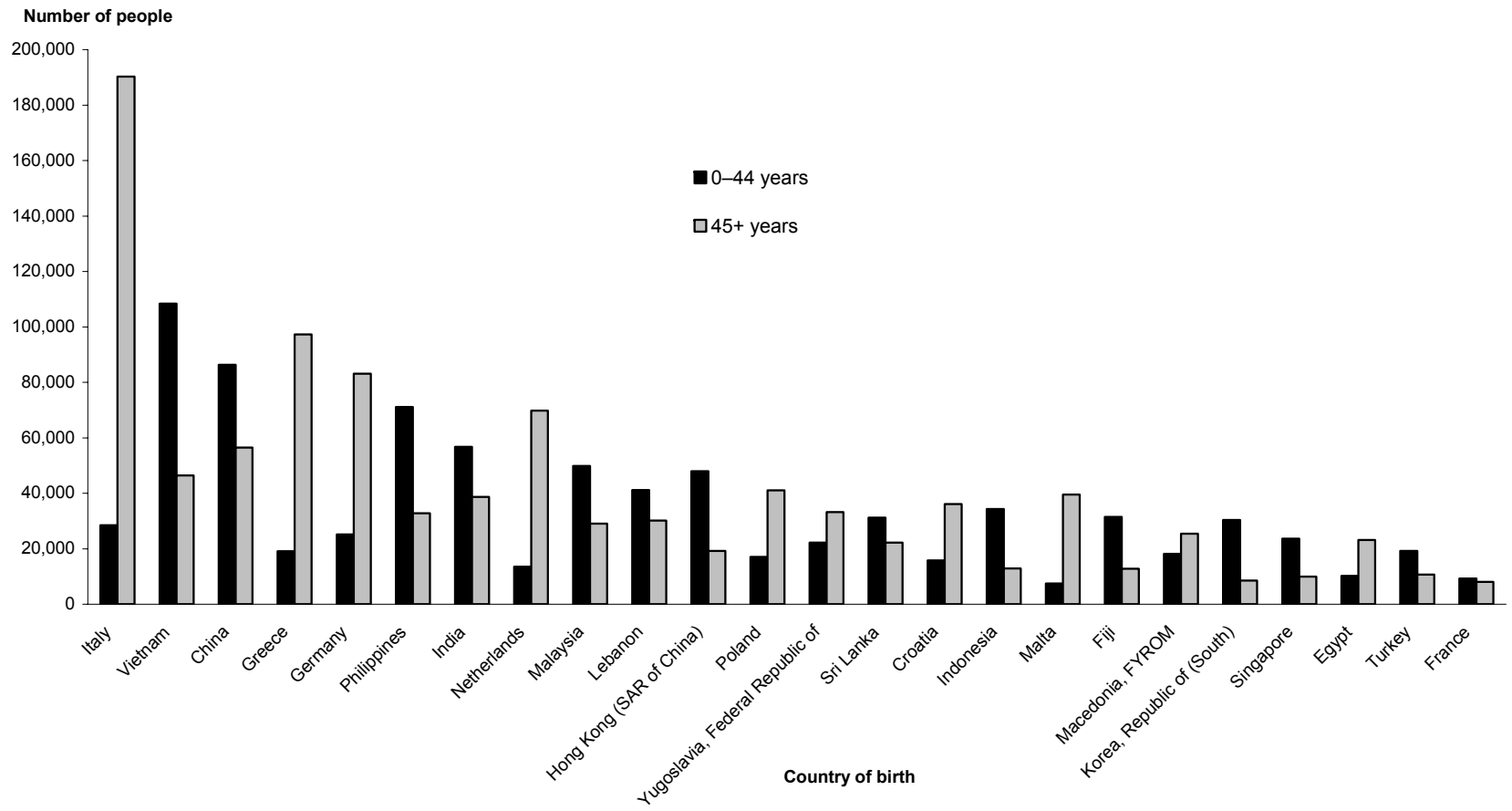

Figure 2: Age distribution of overseas-born Australians from non-English-speaking countries, 2001

Notes

1. China excludes SARs and Taiwan Province.
2. SAR is an abbreviation of 'Special Administrative Region'. SARs comprise Hong Kong (SAR of China) and Macau (SAR of China).
3. FYROM is an abbreviation of 'Former Yugoslav Republic of Macedonia'.

Source: ABS 2001 Census of Population and Housing Expanded Community Profile

Complications of diabetes

Complications of diabetes can be microvascular (diseases of the small blood vessels), macrovascular (diseases of the large blood vessels) or associated with pregnancy. Microvascular complications include retinopathy, kidney diseases and neuropathy. Macrovascular diseases include coronary heart disease, stroke and peripheral vascular disease and are more common with Type 2 diabetes (AIHW 2002). Diabetes during pregnancy increases the risk of complications during pregnancy and childbirth, as well as the risk of pre-term birth. Further, women who have had gestational diabetes are at an increased risk of developing Type 2 diabetes; at least 10% will have diabetes mellitus 5 years after the birth of their child, and 50% will develop diabetes in the 25 years following the birth (Martin 1991; O'Sullivan 1991; Hoffman et al. 1998). Their babies are at increased risk of developing obesity and diabetes later in life.

Data relating to diabetes complications in Australians from culturally and linguistically diverse backgrounds are limited. The reports of the Australian and New Zealand Transplant Register provide data on Australians with primary renal disease by very broad regions of birth. Of those patients with diabetic nephropathy in 2002, 60% were of Caucasian origin, 11% of Asian origin, 6% of Maori, Pacific Islander or Torres Strait Islander origin, and the remainder Indigenous or 'other' (McDonald & Russ 2003).

Karter et al. (2002) investigated ethnic disparities in diabetic complications in an insured population in the United States of America and found that the incidence of end-stage renal disease was elevated among ethnic minorities—African Americans, Asians, and Latinos—but rates of other complications were similar or lower relative to those of Caucasians.

An analysis of diabetes-related lower limb amputations by region of birth was undertaken using the National Hospital Morbidity Database over two periods of time: 1995–96 to 1998–99 and 2000–01 to 2002–03. The time periods were split to account for coding changes introduced in July 1999 and July 2000 that affect hospital separation data for diabetes mellitus (AIHW 2003b). The analysis presented in Table 6 compares hospital separation rates for diabetes-related lower limb amputations among overseas-born Australians and people born in Australia. These results show that men and women aged 25 years and over who were born in the South Pacific had hospitalisation rates that were 2 to 3 times higher than that of the Australian-born population over both periods of time. Rates for people born in Eastern Europe and Central Asia were also significantly higher in the earlier time period but not the later period; and for people born in Southern Europe, and the Middle East and North Africa rates were significantly higher in the second time period. In contrast, people born in the UK and Ireland, New Zealand, South Eastern Europe, North-East Asia and South-East Asia tended to have significantly lower hospitalisation rates in both periods of time. It is particularly interesting that rates were lower than expected for South-East Asian-born males given that the prevalence of diabetes was higher than expected for this population (see Table 1). This is consistent with the finding by Holdenson et al. (AIHW 2003a) that Asian-born Australians have fewer hospitalisations per unit of prevalence, this suggesting that factors other than prevalence could be affecting this population differently from Australian-born people.

Table 6: Standardised separation ratios[(a)] for diabetes-related lower limb amputations by region of birth, people aged 25 years and over, 1995–2004

	1995–96 to 1998–99			2000–01 to 2003–04		
Region of birth	**Males**	**Females**	**Persons**	**Males**	**Females**	**Persons**
South Pacific	2.7*	3.1*	2.9*	2.1*	3.4*	2.5*
Southern Europe	1.1	1.3	1.2	1.1*	1.4*	1.2*
Eastern Europe & Central Asia	1.4*	1.2	1.3*	1.0	1.3*	1.1
Sub-Saharan Africa	0.4	0.6	0.5	1.3	0.9	1.2
Middle East & North Africa	0.9	1.5	1.1	1.0	1.1	1.0
Northern Europe	1.1	0.8	1.0	1.1	1.3	1.1
Australia	1.0	1.0	1.0	1.0	1.0	1.0
Western Europe	0.8	1.0	0.9	0.9*	1.2*	1.0
South Eastern Europe	0.9	1.1	1.0	0.9*	1.1	0.9
UK & Ireland	0.7*	0.6*	0.7*	0.7*	0.7*	0.7*
Southern Asia	0.7	0.7	0.7	0.8*	0.6*	0.7*
South & Central America & Caribbean	0.8	0.3	0.6	0.5*	0.9	0.6*
New Zealand	0.5*	0.6	0.5*	0.8*	0.4*	0.7*
Northern America	0.7	1.0	0.7	0.5*	1.0	0.7*
North-East Asia	0.3*	0.5	0.4*	0.2*	0.3*	0.3*
South-East Asia	0.3*	0.5	0.4*	0.3*	0.4*	0.4*

* Significantly different from 1.0 (Australian-born) at the 5% level of significance.

(a) Indirectly age-standardised to the Australian-born male and female populations in 1995–96 to 1998–99 and 2000–01 to 2003–04. The standardised separation ratio is the ratio of the observed number of hospital separations to the number expected if overseas-born Australians experienced the same age-sex-specific hospital separation rates as the Australian born population.

Source: AIHW National Hospital Morbidity Database.

Although there is some evidence that certain overseas-born women are at high risk of GDM (Hsu-Hage & Yang 1999), there are limited data available regarding the impact of ethnicity on the development of complications of GDM.

Factors that contribute to the development of complications in people with diabetes include age and possibly sex and genetic factors (AIHW 2002). Modifiable factors include obesity, physical activity, high blood pressure, high cholesterol, tobacco smoking, hyperglycaemia, poor management of diabetes and a lack of access to appropriate care. Another important factor in the development of complications is the duration of diabetes.

In addition to the data on obesity, physical activity and age discussed above, Australians from culturally and linguistically diverse backgrounds appear to be at a high risk for complications of diabetes principally because they may face many barriers in accessing health care services (DiFrancesco et al. 1999; von Hofe et al. 2002). These barriers include language barriers and literacy rates, effects of stigmatisation, lack of access to culturally specific care, religious beliefs and cultural practices.

Language is one of the primary barriers to Australians from culturally and linguistically diverse backgrounds benefiting from health care services. This has been found in many language groups, particularly in relation to diabetes care in Italian, Spanish, Vietnamese, Russian, and Chinese communities (Worthington Di Marzio & Cultural Partners Australia 2001; von Hofe et al. 2002; Powell et al. 2003).

In addition, people are often reluctant to admit that they are illiterate, and some may be illiterate in their native language as well as in English. For example, Cameron (2002) provides a case study of a general practitioner who provided information to Vietnamese women on GDM, in Vietnamese, but when he later asked the women about the information they were not able to answer his questions. He concluded that because for many of them their country was war-torn at the time they would have been at school, their ability to read—even in their own language—was limited. Limited education may also affect their understanding of how the body works and the effects of diabetes. Illiteracy may also affect peoples' ability to self-monitor their diabetes as they are unable to read written instructions accompanying monitoring devices (Cameron 2002). This might leave them vulnerable to complications arising from poorly controlled diabetes but this would depend on the way that diabetes education is provided to them by health professionals.

The impact of religious and cultural factors on diabetes risk and care

Diabetes care for Australians from culturally and linguistically diverse backgrounds may also have to take into account cultural or religious practices that affect patients' ability to self-manage diabetes or to comply with advice from health care providers. These communities may be proficient in English, but nevertheless may have trouble communicating their needs to health care providers.

A common issue encountered by professionals providing diabetes care is that of Muslims desiring to fast during Ramadan. Much of this literature is UK-based, but as there are over 280,000 Islamic people in Australia (ABS 2002a), this may be a relevant issue. Fasting, if done carefully, can be safe for people with diabetes (Burden 2001; Khodabukus 2003). However, it has been documented that some Islamic people avoid contact with their health professional at this time due to fear of being told not to fast (Burden 2001).

Cultural factors can also influence peoples' ability to self-manage their diabetes. For example, South Pacific Islanders and people from sub-Saharan Africa have often been taught that being overweight is a sign of wealth or happiness (IDI 2000; Renzaho 2004). Also, Ethiopian people have culturally based perceptions of the causes of diabetes, such as psychosocial factors (e.g. worry or stress) or being wealthy (Rozman 2001).

Australians from culturally and linguistically diverse backgrounds may also be at risk of poor management of diabetes, resulting in an increased risk of complications, because culture can be a determinant of motivational factors for self-management. For example, a housewife born in Southern Europe may not be motivated to self-manage her diabetes if she is simply told that it will help her to stay well, but if it is pointed out that by staying well—controlling her diabetes—she will be better able to look after her household, then this may provide more relevant motivation (Cameron 2002). Economic constraints may also cause problems for Australians from culturally and linguistically diverse backgrounds in managing their diabetes, particularly for a working man or woman (often the only wage-earner in the family) with poor English. Such people may also fear job loss resulting from taking time off work to seek diagnosis and advice (Conquest 2001).

Culturally specific health education, such as information brochures, can assist understanding of diabetes management and attendance at appointments (Burden 2001; Naeem 2003).

3 Demographic characteristics of culturally and linguistically diverse groups at high risk for diabetes

Scope

Demographic information about Australians from culturally and linguistically diverse backgrounds is presented here on the basis of language spoken at home, because the project is intended for educational and information dissemination purposes. The data reported here have come from CDATA 2001, which is a geographic information system mapping program combined with the 2001 Census data developed jointly by the ABS and MapInfo Australia. It should be noted that CDATA 2001 provides information for only the top 32 language groups. Additional data have been obtained from Dr Sandra Kipp (see Appendix A for details).

High risk Australians from culturally and linguistically diverse backgrounds have been identified using the information on prevalence and risk presented above, which has been summarised in the tables contained in Appendix C (Tables A8 to A17). A brief summary of the primary locations of these populations is outlined below, with the location of communities from culturally and linguistically diverse backgrounds given at the state and Statistical Subdivision (SSD) level.

Languages other than English spoken at home

In 2001, the 20 most commonly reported languages other than English spoken at home were (in order of frequency) Italian, Greek, Cantonese, Arabic (including Lebanese), Vietnamese, Mandarin, Spanish, Tagalog (Filipino)[1], German, Macedonian, Croatian, Polish, Turkish, Serbian, Hindi, Maltese, Dutch, French, Korean and Indonesian. Together these 20 languages accounted for over three-quarters of all languages other than English spoken at home.

Proficiency in spoken English

Since 1981, the Census of Population and Housing has included a question about proficiency in spoken English for those people who speak a language other than English at home. In 2001, the majority of people who spoke a language other than English at home also reported speaking English 'well' or 'very well' (Table 7). However, there were certain groups with quite low proficiency in English, particularly people speaking Asian languages. ABS 2001 Census data by sex indicate that overall, women were much more likely than men to report speaking English 'not well' or 'not at all'. Further, for some language groups, particularly European languages, the proportion of people aged 45 years and over who reported having a low proficiency in spoken English was very high (Table 7). This has implications for education and preventive strategies for this very high-risk group.

It should be noted that the assessment of how well a person speaks English is subjective and depends on how the respondent interprets the question or how a person who answers for the respondent assesses the respondent's proficiency in English (ABS 1999).

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1 In the census, the category Tagalog includes the Filipino language and it is not possible to disaggregate the two. Filipino is the planned national language of the Philippines, based largely but not solely on Tagalog. Tagalog is the most widely used of the 85 Filipino languages and the regional language of the area around Manila. Note that there are also other Filipino languages that have been coded separately.

Table 7: Language groups with more than 10% of people speaking English 'not well' or 'not at all'

Language other than English spoken at home	Number	Per cent of total Australian population	Per cent born overseas	Per cent speaking English 'not well' or 'not at all'	Number speaking English 'not well' or 'not at all'	Per cent of people aged 45 years and over speaking English 'not well' or 'not at all'
Vietnamese	174,237	1.0	75.2	37.9	66,036	36.7
Cantonese	225,307	1.3	80.5	27.6	62,185	54.1
Italian	353,606	2.1	58.5	15.6	55,163	90.4
Greek	263,717	1.5	50.6	17.3	45,623	87.2
Mandarin	139,286	0.8	88.1	25.8	35,936	45.5
Arabic (incl. Lebanese)	209,372	1.2	58.3	15.9	33,290	42.8
Spanish	93,592	0.5	77.9	15.4	14,413	72.0
Korean	39,533	0.2	88.7	35.9	14,192	34.9
Macedonian	71,995	0.4	62.4	18.9	13,607	80.4
Turkish	50,699	0.3	61.8	23.5	11,914	46.7
Japanese	28,282	0.2	78.2	28.2	7,976	20.5
Khmer	21,995	0.1	80.8	35.8	7,874	40.2
Polish	59,048	0.3	80.6	13.1	7,735	83.9
Russian	34,789	0.2	84.6	22.0	7,654	78.9
Chinese, nfd	14,559	0.1	84.0	31.9	4,644	43.3
Portuguese	23,697	0.1	78.1	19.5	4,621	72.7
Indonesian	38,723	0.2	86.0	10.1	3,911	28.5
Hungarian	24,477	0.1	81.9	12.4	3,035	87.8
Ukrainian	10,721	0.1	70.7	15.0	1,608	86.4
Somali	4,736	<0.1	84.7	23.8	1,127	14.1
Hokkien	8,294	<0.1	91.6	12.6	1,045	72.6
Malay	9,426	0.1	70.2	10.8	1,018	49.8
Chinese, nec (incl. Chang Chow, Hunan, Kan)	750	<0.1	72.0	38.8	291	61.9
Lithuanian	2,540	<0.1	76.3	11.4	290	86.6
Tigrinya	987	<0.1	87.9	16.6	164	29.3

Notes

1. Table ordered by number speaking English 'not well' or 'not at all'.
2. nec—not elsewhere classified; nfd—not further defined.

Source: Data provided by Dr Sandra Kipp from ABS 2001 Census data.

Where do high-risk CALD groups live in Australia?

Information indicating the main CALD groups relevant to this report is presented below in Tables 8–12. Similar information for some of the other CALD groups living in Australia are included in Appendix Tables A18–A24.

Southern and South-Eastern European

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 Victoria, they mainly live in Melbourne, and also in parts of Shepparton, Mildura and Goulburn. 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. In South Australia, Italian-speaking people live almost solely in Adelaide, and in Western Australia in areas of Perth. In Queensland, they live predominantly in Brisbane and the Gold Coast.

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).

Table 8: Languages spoken at home and place of residence: Southern and South Eastern European languages

Language spoken at home	Size of community (Australia)			Place of residence		
	Males	Females	Persons	State	Persons	Ratio M/F
Italian	175,358	178,249	353,607	NSW	96,790	1.0
				VIC	149,185	1.0
				QLD	24,741	1.0
				WA	36,549	1.0
				SA	40,176	1.0
				TAS	1,464	1.1
				ACT	3,713	1.0
				NT	983	1.3
Greek	131,764	131,954	263,718	NSW	90,180	1.0
				VIC	122,351	1.0
				QLD	11,518	1.0
				WA	5,397	1.0
				SA	27,363	1.0
				TAS	1,270	1.1
				ACT	2,817	1.0
				NT	2,819	1.2

Source: AIHW analysis of the 2001 Census of Population and Housing, using CDATA 2001.

Middle Eastern and North African

In Australia, Arabic-speaking people live predominantly in parts of Sydney, New South Wales, with a substantial population also living in Wollongong. They also live in Victoria, primarily in Melbourne.

Turkish-speaking people live mainly in Victoria and New South Wales. In Victoria they are clustered in Melbourne, and in New South Wales in Sydney.

Table 9: Languages spoken at home and place of residence: Middle Eastern and North African languages

Language spoken at home	Size of community (Australia)			Place of residence		
	Males	Females	Persons	State	Persons	Ratio M/F
Arabic	108,728	100,644	209,372	NSW	145,620	1.1
				VIC	47,182	1.1
				QLD	4,752	1.3
				WA	5,543	1.2
				SA	4,455	1.2
				TAS	413	1.5
				ACT	1,257	1.1
				NT	147	1.5
Turkish	25,704	24,989	50,693	NSW	19,139	1.0
				VIC	28,441	1.0
				QLD	1,340	1.0
				WA	956	1.1
				SA	572	1.1
				TAS	46	1.2
				ACT	164	1.1
				NT	35	1.5

Source: AIHW analysis of the 2001 Census of Population and Housing, using CDATA 2001.

Southern Asian

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 (FECCA 2004), and are most likely Indo-Fijians.

Table 10: Languages spoken at home and place of residence: Southern Asian languages

Language spoken at home	Size of community (Australia)			Place of residence		
	Males	Females	Persons	State	Persons	Ratio M/F
Hindi	24,370	23,447	47,817	NSW	28,160	1.0
				VIC	10,723	1.2
				QLD	5,613	1.0
				WA	1,094	1.2
				SA	951	1.1
				TAS	216	0.8
				ACT	922	1.0
				NT	138	1.1
Sinhalese	10,756	9,904	20,660	NSW	5,376	1.1
				VIC	11,641	1.1
				QLD	1,454	1.0
				WA	1,098	1.1
				SA	354	1.2
				TAS	57	1.0
				ACT	579	1.0
				NT	101	0.9
Tamil	12,144	11,930	24,074	NSW	12,087	1.0
				VIC	7,968	1.0
				QLD	1,149	1.0
				WA	1,368	0.9
				SA	536	0.9
				TAS	82	1.2
				ACT	751	1.0
				NT	126	0.9

Source: AIHW analysis of the 2001 Census of Population and Housing, using CDATA 2001.

South-East Asian

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. In Victoria Tagalog-speaking people live mainly in parts of Melbourne.

Vietnamese speaking people are also clustered in parts of Melbourne and Sydney.

Table 11: Languages spoken at home and place of residence: South-East Asian languages

Language spoken at home	Size of community (Australia)			Place of residence		
	Males	Females	Persons	State	Persons	Ratio M/F
Tagalog (Philippines)	30,751	48,127	78,878	NSW	42,849	0.7
				VIC	18,010	0.7
				QLD	9,292	0.4
				WA	3,110	0.4
				SA	3,077	0.5
				TAS	351	0.2
				ACT	996	0.6
				NT	1,190	0.5
Vietnamese	86,116	88,119	174,235	NSW	67,870	1.0
				VIC	63,816	1.0
				QLD	14,367	1.0
				WA	12,064	1.0
				SA	12,582	1.0
				TAS	143	1.3
				ACT	2,690	1.0
				NT	703	1.1

Source: AIHW analysis of the 2001 Census of Population and Housing, using CDATA 2001.

South Pacific

The main South Pacific language spoken at home in Australia is Samoan. This population group mainly lives in parts of Sydney and Brisbane.

Table 12: Languages spoken at home and place of residence: South Pacific languages

Language spoken at home	Size of community (Australia)			Place of residence		
	Males	Females	Persons	State	Persons	Ratio M/F
Samoan	10,913	11,798	22,711	NSW	10,974	0.9
				VIC	4,062	1.0
				QLD	7,195	0.9
				WA	188	1.1
				SA	56	1.2
				TAS	21	1.3
				ACT	201	0.9
				NT	14	1.3

Source: AIHW analysis of the 2001 Census of Population and Housing, using CDATA 2001.

4 Gaps and recommendations

This section identifies the main gaps and limitations in the national data available for this report, and proposes some changes that could address these limitations. Here the focus is on data that are particularly useful for disease monitoring and for service provision. There may also be a need for more detailed information not covered here, but that is outside the scope of this report. It is likely that much of this more detailed information would be best collected in targeted research projects, rather than through national data collections.

Gaps in data/literature

The crucial gap in the available data and literature is that of specific diabetes prevalence rates for culturally and linguistically diverse (CALD) communities. While the regional data available from the NHS are helpful, it is apparent that there may be variations in diabetes prevalence within these regions. In addition, there are some regions which were grouped or cannot be separately identified in the 2001 National Health Survey (either because of small sample sizes or possibly because they were not represented at all) and as a result there are no country-specific prevalence rates for these regions. These regions include Southern Europe, Eastern Europe, Central Asia, North Africa, the Middle East, North Asia and the South Pacific. Similarly, there is little data on gestational diabetes mellitus among these populations.

In addition, some overseas-born groups have a large representation in the Australian population and appear to be at a high risk of diabetes, but as noted above do not have any specific diabetes prevalence data available; for example, people born in Vietnam, Lebanon, the Philippines and India. Similarly, there is little existing literature or data for population subgroups in communities that appear to be at high risk, such as North African populations. The communities that have the least available data and which may have a high risk of diabetes include North African immigrants, Sub-Saharan African immigrants (particularly refugees), South American immigrants, and small immigrant communities from countries such as Mauritius.

Another major gap in the available data regarding CALD Australians is that the prevalence of diabetes based on measured blood glucose in these groups is not known. The 1999–2000 AusDiab study, which collected this information for the Australian population, was not specifically designed to provide information for CALD groups. The sample size for people born overseas is therefore insufficient to be able to analyse these data by country of birth, or even region. It would be helpful to be able to determine whether there is not only a higher prevalence of known diabetes in these groups, but also a higher prevalence of undiagnosed diabetes. Finding out which groups are most at risk from undiagnosed diabetes would assist in targeting those at highest risk.

There is also little information on the prevalence of diabetes complications by CALD groups. For example, Payne (2000) investigated the rate of lower limb amputations due to diabetes, but was unable to report data from all states and territories regarding country of birth.

To clearly identify particular CALD communities, quite detailed data on language proficiency and particular cultural attributes would be needed. However, such detailed information is unlikely to be available in most national data collections, and is more appropriately examined through detailed research studies. Where possible throughout this

report, information has been presented based on main or preferred language spoken. This does provide valuable information relevant to CALD groups. However, some data collections do not contain this information (such as the national hospital data), though many do contain information on country of birth. While census information allows identification of people who speak a language other than English at home, it does not specify whether that language is the main or preferred language.

Recommendations

This section outlines suggested changes to resolve some of the gaps identified in the previous section. The relative importance of these suggestions against each other and against other priorities in health information is outside the scope of this report.

The main gaps identified above and potential ways these could be improved are outlined below.

- Lack of prevalence data:
  - Data on prevalence could be obtained either through population-based studies, or studies focusing on specific CALD communities, or a combination of both. For example, it may be appropriate to further identify regions at risk using population-based studies, and then identify more specific high-risk communities as a second stage. Potentially, over-sampling of high-risk groups in regular health surveys could fill this gap.
  - Some information indirectly related to prevalence could be obtained through health service data such as hospital admissions, and use of other relevant services such as interpreter services. However, the information would be affected by service use patterns (e.g. some CALD groups may be less likely to seek and obtain specific services) and cannot be directly regarded as prevalence information. In addition, much of this information is not available by main language spoken, but is available by country of birth.
  - Another valuable source of information related to prevalence could come from the most recent version of the NDSS registration form. That form contains a field 'Main language spoken at home', which if filled out accurately would provide a very valuable addition to the currently available information.
  - As the National Diabetes Register (NDR) becomes more established, the number of people on the NDR who are still alive will be able to be used to supplement prevalence data, and eventually provide a measure of prevalence for insulin-treated diabetes.
- Lack of data on complications from diabetes:
  - This information for particular populations is usually collected as part of a specific diabetes survey. In order to obtain information on particular CALD groups, oversampling or surveys targeted specifically at these groups would need to be undertaken.
  - Some relevant information could be obtained from health service data, such as hospitalisations.
- Lack of data on 'measured' diabetes:
  - Oversampling or surveys targeted specifically at these groups would need to be undertaken to fill this gap.

- Lack of information to clearly specify particular CALD communities:
  - For national monitoring and service provision information, a potential strategy would be to collect information on an individual's preferred language or language spoken at home, in addition to information on country of birth. Consideration of this issue could be taken up by some of the main administrative data collections, such as the national hospital data.

Appendix A: Data sources

Australian Bureau of Statistics 1995 and 2001 National Health Surveys

The 1995 and 2001 National Health Surveys were conducted by the ABS. They were designed to obtain national information on the health status of Australians, their use of health services and facilities, and health-related aspects of their lifestyle. The 1995 survey collected information from a sample of 57,600 people (ABS 1996) and the 2001 survey collected information from approximately 26,900 respondents (ABS 2002b).

Australian Bureau of Statistics 2001 Census of Population and Housing

The 2001 Census of Population and Housing was conducted by the ABS. Its objective was to measure the number and key characteristics of people in Australia on census night (7 August 2001).

Census data were obtained from the CDATA 2001 Expanded Community Profile software, held by the Australian Institute of Health and Welfare, and from Dr Sandra Kipp, a member of the Steering Committee, who provided further tables regarding language spoken at home and country of birth.

Australian Diabetes, Obesity and Lifestyle Study (AusDiab Study)

The AusDiab Study was conducted in 1999–2000, by the International Diabetes Institute and was partially funded by the then Commonwealth Department of Health and Aged Care. It is the most comprehensive survey to date on the prevalence and impact of diabetes. The survey collected information on self-reported and measured diabetes and cardiovascular risk factors, health knowledge, attitudes, and health service utilisation and practices. The study collected information from 11,247 adults aged 25 years and over throughout Australia (excluding the Australian Capital Territory).

National Diabetes Register

The National Diabetes Register, held at the Australian Institute of Health and Welfare, is a database that holds information about people who use insulin as part of their treatment of diabetes. It includes people who began to use insulin from 1 January 1999. Data for the register are obtained from two main sources: the National Diabetes Services Scheme, administered by Diabetes Australia, and the Australasian Paediatric Endocrine Group State-based registers. At December 2001, the register contained information on approximately 23,000 people.

National Mortality Database

The National Mortality Database, held at the AIHW, contains information on the cause of death supplied by the medical practitioner certifying the death or by a coroner. Registration of deaths is the responsibility of the state and territory Registrars of Births, Deaths and Marriages. Registrars provide the information to the ABS for coding of cause of death using the International Statistical Classification of Diseases and Related Health Problems (ICD) codes (WHO 1992) and compilation into aggregate statistics. On 1 January 1997, the ABS introduced automatic coding software, which is used to code multiple causes of deaths.

National Hospital Morbidity Database

The National Hospital Morbidity Database contains demographic, diagnostic, procedural and duration of stay information on episodes of care for patients admitted to hospital. The data items are supplied by state and territory health authorities to the AIHW for storage and custodianship. The database provides information on the number of hospitalisations for a particular condition or procedure and therefore it is not possible to count patients individually. These data are classified using the ICD-9-CM (Australian edition) (1993–94 to 1998–99) and ICD-10-AM (1999–00 to 2003–04) for principal or additional diagnoses of diabetes. Diabetes mellitus is represented in ICD-9-CM by category 250 and in ICD-10-AM by categories E10, E11, E13 and E14. It should be noted that there was a change in coding practice in 1999–00, which makes direct comparison with prior years problematic.

Appendix B: Methods

Age-standardised rates

Age-standardised rates are used to remove the influence of age when comparing populations with different age structures by applying age-specific rates to a standard population. This report uses the 2001 Australian population as the standard population and 5-year age groups for age-specific rates.

Direct age standardisation

Direct age standardisation is the most common method of age standardisation, and is used in this report for incidence, hospital morbidity and mortality data. The calculation of direct age-standardisation comprises three steps:

Step 1: Calculate the age-specific rate for each age group.

Step 2: Calculate the expected number of cases in each age group by multiplying the age-specific rate by the corresponding standard population for each age group.

Step 3: Sum the expected number of cases in each age group and divide this sum by the total of the standard population to give the age-standardised rate.

Indirect age standardisation

In situations where populations are small or where there is some uncertainty about the stability of age-specific prevalence rates, indirect standardisation has been used. This effectively removes the influence of the age structure, but does not provide a measure of prevalence in terms of a rate. Rather, the summary measure is a comparison of the number of observed cases compared with the number expected if the age-specific prevalence rates of the standard population are applied to the study population. The method used for this calculation is composed of three steps:

Step 1: Calculate the age-specific prevalence rates for each age group in the standard population.

Step 2: Apply these age-specific rates to the number in each age group of the study population and sum to derive the total expected number of cases for the study population.

Step 3: Sum the observed cases in the study population and divide this number by the expected number derived in Step 2 to calculate the standardised prevalence ratio (SPR).

An SPR of 1 indicates the same number of observed cases as were expected (suggesting rates in the study and standard populations are similar). A result greater than 1 indicates more cases than expected. A result less than 1 indicates fewer cases than expected.

Geographical regions

The Australian Standard Classification of Countries for Social Statistics (ASCCSS) (ABS 1990) and the Standard Australian Classification of Countries (SACC) (ABS 1998), were used to specify which countries would populate the geographic regions of study. More detail is available from the ABS <www.abs.gov.au>.

As the National Health Surveys are conducted by the ABS, they use the ASCCSS and SACC (1995 and 2001 respectively). The AusDiab Study country of birth variable was collected in a text format, and manually mapped to the regions in ASCCSS. In 1999–00, the National Hospital Morbidity Database used ASCCSS to code country of birth. The National Mortality Database also used the ASCCSS during the years of analysis. The National Diabetes Register incidence data used a combination of SACC and ASCCSS.

Appendix C: Statistical tables

Table A1: Standardised prevalence ratios for self-reported diabetes by region of birth and sex, people aged 20 years and over, 2001

	Prevalence ratios	
Region of birth	**Males**	**Females**
Middle East and North Africa	3.60[(a)]*	2.43[(a)]
South-East Asia & Southern Asia	1.87[(a)]*	1.54[(a)]
Southern & Eastern Europe & Central Asia	0.85	1.46*
Australia	1.00	1.00
UK & Ireland	1.17	0.71
Northern & Western Europe	1.26[(a)]	0.55[(a)]
All other countries	1.56	0.57[(a)]

* Significantly different from 1.00 (Australian-born) at the 5% level of significance.

(a) Estimate has a relative standard error of between 25% and 50% and should be interpreted with caution.

Note: Ratios were estimated using the indirect method of standardisation and standardised to the 2001 Australian-born male and female populations.

Source: AIHW analysis of the ABS 2001 National Health Survey.

Table A2: Standardised prevalence ratios for self-reported diabetes by region of birth and sex, people aged 20 years and over, 1995

	Prevalence ratios	
Region of birth	**Males**	**Females**
Southern Europe	1.99*	2.53*
Middle East	3.01*	0.54[(a)]
Southern Asia	2.15*	1.20[(b)]
Other Europe	1.24	1.76*
Western Europe	1.97*	0.73
Southeast Asia	1.67*	0.82[(b)]
UK & Ireland	1.01	1.25*
Australia	1.00	1.00
Northeast Asia	0.21*[(a)]	1.63[(b)]
New Zealand	0.39*[(b)]	0.33*[(b)]
All other countries	2.84*	2.20*

* Significantly different from 1.00 (Australian-born) at the 5% level of significance.

(a) Estimate has a relative standard error of greater than 50% and is considered too unreliable for general use.

(b) Estimate has a relative standard error of between 25% and 50% and should be interpreted with caution.

Note: Ratios were calculated using the indirect method of standardisation and standardised to the Australian-born male and female 1995 NHS populations.

Source: AIHW analysis of the ABS 1995 National Health Survey.

Table A3: Standardised prevalence ratios for measured diabetes, persons by birthplace, 1999–2000

Region of birth	Prevalence ratios
South-East Asia & Southern Asia	1.76[(a)]
Eastern & other Europe	1.15[(a)]
Southern Europe	1.10
Australia	1.00
UK & Ireland	0.89
All other countries	1.41

(a) Estimate has a relative standard error of between 25% and 50% and should be interpreted with caution.

Note: Ratios were estimated using the indirect method of standardisation and standardised to the 2001 Australian-born male and female populations.

Source: AIHW analysis of the 1999–2000 AusDiab Study.

Table A4: National Diabetes Register, registrants aged 15 years and over at diagnosis by region of birth and sex, 1999–2001

	Males		Females	
Region of birth	Number	Average annual rate per 100,000 population	Number	Average annual rate per 100,000 population
Middle East & North Africa	267	79.8*	276	93.3*
Southern & Central Asia	200	78.4*	242	91.9*
Southern & Eastern Europe	1,344	61.4*	1,050	53.7*
South-East Asia	223	54.2	337	55.3*
Oceania (excluding Australia)	244	44.5	326	54.5*
North-East Asia	134	42.8	213	53.4
Other Africa	86	52.9	75	41.2
Australia	6,713	46.2	6,629	40.5
Americas	98	46.5	82	39.8
Northern & Western Europe	909	32.9*	757	29.9*

* Indicates significantly different from Australia.

Note: Rates age-standardised to the Australian population at 30 June 2001.

Source: AIHW: Holdenson et al 2003.

Table A5: Age-standardised rate of diabetes-related hospital separations (1999–00) and diabetes-related mortality (1997–2000) by region of birth, people aged 20 years and over

	Separations per 100,000 population		Deaths per 100,000 population	
Region of birth	**Males**	**Females**	**Males**	**Females**
South Pacific Islands	5,384*	7,133*	208*	169*
Middle East	5,025*	4,141*	181*	142*
North Africa			155*	125*
Southern Europe	3,712*	3,041*	131*	109*
Southern Asia	3,043*	3,103*	122*	84*
Australia	2,422	2,727	92	57
South-East Asia	1,672*	3,129*	81	66
Northern & Western Europe	2,204*	2,431*	99	71*
Americas	2,459	2,087*	68*	45*
Other Africa	2,422	2,089*	93	49
Eastern Europe & Central Asia	2,633*	1,907*	117*	77*
UK & Ireland	1,919*	1,733*	80*	49*
North-East Asia	1,348*	1,834*	75*	54*
New Zealand	1,589*	1,368*	61*	43*

* Indicates significantly different from Australia.

Notes

1. Rates age-standardised to the Australian population at 30 June 2001.
2. Shaded area represents combined region of birth.

Source: AIHW: Holdenson et al. 2003.

Table A6: Overseas-born population: top 12 birthplace groups 1976 to 2001

Countries	1976	Countries	1986	Countries	1996	Countries	2001
	Per cent		Per cent		Per cent		Per cent
UK & Ireland	41.1	UK & Ireland	34.7	UK & Ireland	28.7	UK & Ireland	26.4
Italy	10.3	Italy	8.0	New Zealand	7.1	New Zealand	8.8
Greece	5.7	New Zealand	6.4	Italy	6.1	Italy	5.3
Yugoslavia	5.3	Yugoslavia	4.7	Former Yugoslav republics	4.4	Former Yugoslav Republics	4.6
Germany	4.0	Greece	4.3	Vietnam	3.6	Vietnam	3.8
Netherlands	3.4	Germany	3.6	Greece	3.4	China	3.5
New Zealand	3.2	Netherlands	3.0	Germany	2.8	Greece	3.0
Poland	2.1	Vietnam	2.6	China	2.5	Germany	2.6
Malta	2.1	Poland	2.1	Hong Kong & Macau	2.3	Philippines	2.5
USSR	1.9	Malta	1.8	Netherlands	2.3	India	2.3
India	1.4	Lebanon	1.8	Malaysia	2.3	Netherlands	2.0
Lebanon	1.2	India	1.5	Philippines	2.2	Malaysia	1.9
Other	18.3	Other	25.6	Other	32.2	Other	33.3
Total	**100.0**	**Total**	**100.0**	**Total**	**100.0**	**Total**	**100.0**
Main English speaking countries	*46.5*	*Main English speaking countries*	*44.1*	*Main English speaking countries*	*39.5*	*Main English speaking countries*	*39.1*
Non-English-speaking countries	*53.5*	*Non-English-speaking countries*	*55.9*	*Non-English-speaking countries*	*60.5*	*Non-English-speaking countries*	*60.9*

Notes

1. Former Yugoslav Republics consists of Bosnia-Herzegovnia, Croatia, Slovenia and the former Yugoslav Republics of Macedonia, Serbia and Montenegro.
2. Main English speaking countries consists of UK & Ireland, New Zealand, Canada, United States of America & South Africa.
3. Non-English-speaking countries consists of all overseas countries except UK & Ireland, New Zealand, Canada, United States of America & South Africa.

Sources: 1976–1996 from ABS 1997a; 2001 from Estimated Resident Population data for 2001.

Table A7: Median age of Australian residents by countries of birth at selected censuses

	Median age at census year										
Birthplace	**1901**	**[e]1911**	**[e]1921**	**[e]1933**	**[e]1947**	**[e]1954**	**[e]1961**	**1971**	**1981**	**[f]1991**	**[f]1996**
Australia[a]	n.a.	20	22	25	28	28	27	25	26	29	30
Austria	n.a.	(b)	(b)	(b)	(b)	(b)	30	37	45	51	54
Canada	n.a.	(b)	(b)	(b)	(b)	(b)	40	28	29	33	35
Chile	n.a.	(b)	(b)	(b)	(b)	(b)	(b)	25	31	33	38
China	n.a.	45	51	58	43	35	33	37	45	39	40
Cyprus	n.a.	(b)	(b)	(b)	(b)	(b)	32	35	36	44	48
Czechoslovakia	n.a.	(b)	(b)	(b)	(b)	(b)	38	43	51	49	(c)
Denmark	n.a.	51	56	58	61	55	34	32	38	43	47
Egypt	n.a.	30	25	27	33	29	33	36	43	47	50
Fiji	n.a.	(b)	(b)	(b)	(b)	(b)	29	28	29	31	34
Germany	n.a.	52	57	59	53	24	27	33	41	48	52
Greece	n.a.	30	32	35	43	36	30	33	42	50	55
Hong Kong	n.a.	39	44	34	23	24	24	24	27	28	31
Hungary	n.a.	(b)	46	38	42	34	36	44	51	56	59
India	n.a.	39	45	46	[h]42	37	39	35	39	41	41
Indonesia	n.a.	(b)	(b)	(b)	(b)	(b)	29	35	35	33	32
Ireland (Republic)	n.a.	(d)	(d)	(d)	(d)	53	49	44	45	44	47
Italy	n.a.	34	37	34	43	31	32	37	46	54	58
Korea	n.a.	(b)	(b)	(b)	(b)	(b)	(b)	31	30	29	29
Latvia	n.a.	(b)	(b)	(b)	(b)	(b)	42	50	58	67	70
Lebanon	n.a.	[g]34	[g]40	[g]43	[g]47	31	30	27	30	35	38
Malaysia	n.a.	n.a.	24	23	21	23	22	21	25	31	34
Malta	n.a.	n.a.	32	32	43	25	26	31	38	47	51
Netherlands	n.a.	40	36	45	44	26	27	35	42	50	54
New Zealand	n.a.	31	37	43	47	48	47	30	28	32	35
Papua New Guinea	n.a.	(b)	(b)	(b)	(b)	(b)	13	14	17	24	29
Philippines	n.a.	36	44	52	38	27	27	25	31	33	35
Poland	n.a.	(b)	50	40	42	34	41	49	57	55	54
Singapore	n.a.	(b)	(b)	(b)	(b)	(b)	22	22	26	31	30
South Africa	n.a.	20	21	30	43	48	48	36	32	35	38
Sri Lanka	n.a.	41	45	51	(h)	31	33	32	36	37	39
Sweden	n.a.	48	54	57	60	56	40	31	35	36	37
Turkey	n.a.	(b)	(b)	(b)	(b)	(b)	47	28	31	33	36
UK	n.a.	[d]51	[d]46	[d]46	[d]52	49	46	38	41	46	49
USA	n.a.	41	42	45	42	39	39	27	31	35	36
USSR	n.a.	(b)	(b)	(b)	(b)	(b)	51	57	58	(c)	(c)
Ukraine	n.a.	(b)	(b)	(b)	(b)	(b)	40	49	59	68	69

(continued)

Table A7 (continued): Median age of Australian residents by countries of birth at selected censuses

	Median age at census year										
Birthplace	**1901**	**[e]1911**	**[e]1921**	**[e]1933**	**[e]1947**	**[e]1954**	**[e]1961**	**1971**	**1981**	**[f]1991**	**[f]1996**
Vietnam	n.a.	(b)	(b)	(b)	(b)	(b)	(b)	(b)	22	30	34
Yugoslavia	n.a.	n.a.	35	34	44	34	32	32	39	46	(c)
Other overseas	n.a.	42	43	42	47	35	35	32	34	33	37
Total overseas	**n.a.**	**49**	**46**	**45**	**50**	**41**	**37**	**36**	**41**	**41**	**44**
Not stated	n.a.	40	40	(i)	(i)	(i)	(i)	(i)	34	29	32
Total population	**n.a.**	**24**	**26**	**28**	**31**	**30**	**29**	**28**	**30**	**32**	**34**

(a) Prior to the 1996 Census does not include Norfolk Island, Christmas Island or the Cocos (Keeling) Islands. Excludes only Norfolk Island in the 1996 Census.

(b) Included in Other overseas.

(c) Country no longer exists.

(d) Prior to the 1954 Census persons born in the UK and Ireland are presented together in UK.

(e) Excludes full-blood Aborigines.

(f) Excludes Overseas visitors.

(g) Lebanon and Syria recorded together.

(h) India and Sri Lanka (Ceylon) recorded together in India.

(i) Distributed after further analysis.

Source: DIMA 2001.

Summary of demographic data with epidemiological information presented in this report

Table A8: Southern and South-Eastern Europe—summary of demographic information

Countries of birth	Number of people	Languages spoken at home[(a)]	Number of people
Italy	218,676	Italian	181,077
		English	34,697
Malta	46,940	Maltese	27,791
		English	17,938
Portugal	15,477	Portuguese	12,201
		English	2,692
Spain	12,715	Spanish	8,570
		English	3,192
Macedonia, FYROM[(b)]	43,505	Macedonian	38,315
		English	2,029
Greece	116,529	Greek	102,999
		English	8,235

(a) Languages spoken at home among those born overseas (2001 Census, data provided by Dr Kipp).

(b) FYROM is an abbreviation of 'Former Yugoslav Republic of Macedonia'

Epidemiological data are available for Italian- and Greek-born people, and for the region as a whole. These data show a high prevalence of diabetes and a high incidence of insulin-treated diabetes in these communities, compared with Australian-born people. Risk factors include the older age of the population and a high rate of overweight and obesity. Language groups with a low proficiency in English[2] are Serbian, Macedonian and Portuguese.

Table A9: Northern and Western European—summary of demographic information

Countries of birth	Number of people	Languages spoken at home[(a)]	Number of people
France	17,152	French	9,004
		English	6,307
Germany	108,267	English	58,434
		German	40,997
Netherlands	83,337	English	52,185
		Netherlandic (i.e. Dutch)	29,240

(a) Language spoken at home among those born overseas (2001 Census, data provided by Dr Kipp).

Epidemiological data are only available for the region as a whole. These data show that the prevalence of diabetes and incidence of insulin-treated diabetes in these communities are not significantly different to that of the Australian-born population. The main risk factor for diabetes is the older age of the population.

[2] Defined as greater than 2% of those speaking the language speaking English 'not at all'.

Table A10: Eastern Europe and Central Asia—summary of demographic information

Countries of Birth	Number of people	Languages spoken at home [(a)]	Number of people
Hungary	22,761	Hungarian	13,513
		English	7,959
Poland	58,056	Polish	41,222
		English	12,922
Russian Federation	15,071	Russian	11,438
		English	2,008
Ukraine	14,091	Russian	6,153
		Ukrainian	5,078
		English	1,906

(a) Language spoken at home among those born overseas (2001 Census, data provided by Dr Kipp).

Epidemiological data are only available for the region as a whole. These data show that the prevalence of diabetes and incidence of insulin-treated diabetes in these communities are not significantly different to that of Australian-born people. Russian language speakers have reported a low proficiency in English[3].

Table A11: Middle East and North Africa—summary of demographic information

Countries of Birth	Number of people	Languages spoken at home [(a)]	Number of People
Turkey	29,841	Turkish	24,341
		English	2,122
Iraq	24,856	Arabic	10,824
		Assyrian[(b)]	10,192
		English	902
Lebanon	71,329	Arabic	64,698
		English	4,398
Egypt	33,413	Arabic	15,669
		English	7,256

(a) Language spoken at home among those born overseas (2001 Census, data provided by Dr Kipp).

(b) (FECCA 2004)

Epidemiological data are available for Turkish-born and Arabic-speaking people, and for the region as a whole. These data show a high prevalence of diabetes and incidence of insulin-treated diabetes in these communities, compared with Australian-born people. The main risk factor is the high rate of overweight and obesity. Language groups with a low proficiency in English[3] are Arabic, Turkish and Persian.

[3] Defined as greater than 2% of those speaking the language speaking English 'not at all'.

Table A12: Southern Asia—summary of demographic information

Countries of Birth	Number of people	Languages spoken at home [(a)]	Number of people
India	95,484	English	45,486
		Hindi[(b)]	14,856
		Tamil	5,242
		Other	28,270
Sri Lanka	53,450	English	21,587
		Sinhalese	17,364
		Tamil	12,893

(a) Language spoken at home among those born overseas (2001 Census, data provided by Dr Kipp).

(b) (FECCA 2004)

Epidemiological data are available for the region as a whole. These data show high mortality from diabetes and high incidence of insulin-treated diabetes in these communities, compared with Australian-born people. The main risk factor is the high rate of overweight and obesity.

Table A13: North Asia—summary of demographic information

Countries of Birth	Number of people	Languages spoken at home [(a)]	Number of people
Taiwan	22,320	Mandarin	19,547
Japan	25,462	Japanese	20,320
		English	4,315
Korea, Republic of (South)	38,987	Korean	33,673
		English	4,310
Hong Kong (SAR of China)[(b)]	67,054	Cantonese	57,642
		English	6,886
China (excludes SARs and Taiwan Province)[(b)]	142,819	Mandarin	68,485
		Cantonese	52,500
		Chinese nfd	8,380
		English	6,115

nfd no further detail.

(a) Language spoken at home among those born overseas (2001 Census, data provided by Dr Kipp).

(b) SAR is an abbreviation of 'Special Administrative Region'. SARs comprise Hong Kong and Macau (SARs of China).

Epidemiological data are available for the region as a whole. These data show a low prevalence of diabetes and a low incidence of insulin-treated diabetes in these communities, compared with Australian-born people. Language groups with a low proficiency in English[4] are Cantonese, Mandarin, other Chinese, Korean and Japanese.

[4] Defined as greater than 2% of those speaking the language speaking English 'not at all'.

Table A14: South-East Asia—summary of demographic information

Countries of Birth	Number of people	Languages spoken at home [(a)]	Number of People
Vietnam	154,858	Vietnamese	119,609
		Cantonese	25,955
		English	3,730
Cambodia	22,956	Khmer	14,627
		Cantonese	2,748
		Mandarin	1,023
Indonesia	47,084	Indonesian	31,629
		English	7,736
		Mandarin	2,670
Philippines	103,963	Tagalog	69,295
		English	28,479
Malaysia	78,892	English	28,316
		Cantonese	22,480
		Mandarin	12,892
		Hokkien	4,922
Singapore	33,541	English	16,397
		Mandarin	7,737
		Cantonese	4,172

(a) Language spoken at home among those born overseas (2001 Census, data provided by Dr Kipp).

Epidemiological data are available for Vietnamese- and Philippine-born people, and for the region as a whole. These data show a high prevalence of diabetes and a low incidence of insulin-treated diabetes in these communities, compared with Australian-born people. Language groups with a low proficiency in English[5] are Vietnamese and Khmer.

Table A15: South Pacific—summary of epidemiological and demographic information

Countries of Birth	Number of people	Languages spoken at home [(a)]	Number of people
Samoa	n.a.	Samoan	10,894
Fiji	44,261	Hindi	24,070

n.a. not available

(a) Language spoken at home among those born overseas (2001 Census, data provided by Dr Kipp).

Epidemiological data are available for the region as a whole. These data show a high prevalence of diabetes, along with high mortality and a high rate of hospitalisations, in these communities compared with Australian-born people. The main risk factor is the high rate of overweight and obesity.

[5] Defined as greater than 2% of those speaking the language speaking English 'not at all'.

Table A16: South America—summary of demographic information

Countries of Birth	Number of people	Languages spoken at home [(a)]	Number of people
Brazil	4,657	Portuguese	2,973
		English	1,121
Chile	23,429	Spanish	20,137
		English	2,854
Argentina	10,752	Spanish	8,063
		English	1,825
Other South America	24,218	Spanish	18,627
		English	4,460

(a) Language spoken at home among those born overseas (2001 Census, data provided by Dr Kipp).

Epidemiological data are available for the region as a whole. These data show a high prevalence of diabetes in these communities, compared with Australian-born people. Spanish speakers have reported a low proficiency in English[6].

Table A17: Other Africa—summary of epidemiological and demographic information

Countries of birth	Number of people	Languages spoken at home[(a)]	Number of people
Mauritius	16,994	French	9,782
		English	4,643

(a) Language spoken at home among those born overseas (2001 Census, data provided by Dr Kipp).

There is very little epidemiological data available for this region. As a result, little is known about the burden of diabetes and risk factors for this community.

[6] Defined as greater than 2% of those speaking the language speaking English 'not at all'.

Location of other language groups

Table A18: Languages spoken at home and place of residence: North and West European languages

Language spoken at home	Size of community (Australia)			Place of residence		
	Males	Females	Persons	State	Persons	Ratio M/F
French	18,934	20,707	39,641	NSW	14,380	0.9
				VIC	11,093	0.9
				QLD	6,542	0.9
				WA	4,410	0.9
				SA	1,577	1.0
				TAS	373	0.9
				ACT	950	0.9
				NT	312	0.9
German	35,672	40,771	76,443	NSW	22,154	0.9
				VIC	20,253	0.8
				QLD	14,368	0.9
				WA	7,057	0.9
				SA	8,690	0.8
				TAS	1,363	0.9
				ACT	1,755	0.8
				NT	800	1.2
Dutch	18,286	21,901	40,187	NSW	9,683	0.8
				VIC	10,621	0.8
				QLD	8,410	0.9
				WA	5,606	0.9
				SA	3,634	0.8
				TAS	1,230	0.8
				ACT	682	0.8
				NT	321	0.9

Source: CDATA 2001 (ABS).

Table A19: Languages spoken at home and place of residence: Southern European languages

Language spoken at home	Size of community (Australia)			Place of residence		
	Males	Females	Persons	State	Persons	Ratio M/F
Portuguese	11,700	11,987	23,687	NSW	13,082	1.0
(Countries of birth: Portugal (15,441); East Timor (9,392))				VIC	3,895	1.0
				QLD	1,462	0.9
				WA	3,642	1.0
				SA	650	1.0
				TAS	46	1.3
				ACT	408	1.0
				NT	502	0.8
Croatian	35,207	34,644	69,851	NSW	26,006	1.0
				VIC	25,555	1.0
				QLD	4,374	1.1
				WA	6,693	1.0
				SA	3,977	1.0
				TAS	328	1.2
				ACT	2,848	1.0
				NT	70	1.5
Macedonian	36,559	35,435	71,994	NSW	30,658	1.0
				VIC	32,632	1.0
				QLD	1,131	1.0
				WA	6,184	1.1
				SA	798	1.0
				TAS	33	1.2
				ACT	547	1.0
				NT	11	1.8
Maltese	20,494	20,898	41,392	NSW	16,251	1.0
				VIC	21,488	1.0
				QLD	1,760	1.0
				WA	448	1.0
				SA	1,235	0.9
				TAS	27	1.7
				ACT	159	1.0
				NT	24	1.4

(continued)

Table A19 (continued): Languages spoken at home and place of residence: Southern European languages

Language spoken at home	Size of community (Australia)			Place of residence		
	Males	Females	Persons	State	Persons	Ratio M/F
Serbian	24,767	24,436	49,203	NSW	20,510	1.0
				VIC	16,036	1.0
				QLD	3,379	1.0
				WA	3,838	1.1
				SA	4,009	1.0
				TAS	147	1.1
				ACT	1,206	1.0
				NT	78	1.5
South Slavic nfd	7,164	7,442	14,606	NSW	4,666	1.0
				VIC	4,626	0.9
				QLD	1,960	1.0
				WA	1,867	1.0
				SA	1,232	1.0
				TAS	69	1.2
				ACT	159	0.7
				NT	27	2.9

nfd no further detail

Source: CDATA 2001 (ABS).

Table A20: Languages spoken at home and place of residence: Eastern European and Central Asian languages

Language spoken at home	Size of community (Australia)			Place of residence		
	Males	Females	Persons	State	Persons	Ratio M/F
Hungarian	11,374	13,111	24,485	NSW	8,695	0.8
				VIC	8,913	0.9
				QLD	3,064	1.0
				WA	1,203	0.9
				SA	1,943	0.9
				TAS	139	1.0
				ACT	432	0.8
				NT	96	1.5
Polish	27,108	31,949	59,057	NSW	17,045	0.9
				VIC	19,576	0.8
				QLD	5,362	0.8
				WA	6,927	0.9
				SA	7,750	0.9
				TAS	921	0.8
				ACT	1,335	0.8
				NT	138	0.9
Russian	15,594	19,195	34,789	NSW	13,830	0.8
				VIC	13,911	0.8
				QLD	2,936	0.8
				WA	995	0.6
				SA	2,438	0.8
				TAS	152	1.1
				ACT	491	0.8
				NT	36	1.4

Source: CDATA 2001 (ABS).

Table A21: Languages spoken at home and place of residence: North-East Asian languages

Language spoken at home	Size of community (Australia)			Place of residence		
	Males	Females	Persons	State	Persons	Ratio M/F
Cantonese	108,230	117,077	225,307	NSW	120,752	0.9
				VIC	60,583	0.9
				QLD	17,648	1.0
				WA	15,329	0.9
				SA	6,801	1.0
				TAS	714	1.1
				ACT	2,498	0.9
				NT	825	0.9
Mandarin	67,047	72,239	139,286	NSW	65,841	0.9
				VIC	38,880	0.9
				QLD	16,048	0.9
				WA	11,112	0.9
				SA	3,924	1.0
				TAS	557	1.1
				ACT	2,121	0.9
				NT	421	0.8
Other Chinese	17,541	19,223	36,764	NSW	15,074	0.9
				VIC	13,666	0.9
				QLD	2,252	0.9
				WA	3,371	0.9
				SA	1,175	0.9
				TAS	71	1.1
				ACT	314	0.8
				NT	765	1.0
Japanese	12,151	16,134	28,285	NSW	11,105	0.8
				VIC	5,153	0.8
				QLD	7,606	0.7
				WA	2,569	0.8
				SA	974	0.7
				TAS	247	0.7
				ACT	513	0.8
				NT	115	0.5

(continued)

Table A21 (continued): Languages spoken at home and place of residence: North-East Asian languages

Language spoken at home	Size of community (Australia)			Place of residence		
	Males	Females	Persons	State	Persons	Ratio M/F
Korean	19,013	20,515	39,528	NSW	30,094	0.9
				VIC	3,186	0.9
				QLD	3,810	0.9
				WA	1,169	1.0
				SA	491	1.0
				TAS	172	1.0
				ACT	559	0.9
				NT	47	1.0

Source: CDATA 2001 (ABS).

Table A22: Languages spoken at home and place of residence: South-East Asian languages

Language spoken at home	Size of community (Australia)			Place of residence		
	Males	Females	Persons	State	Persons	Ratio M/F
Indonesian	18,539	20,183	38,722	NSW	18,065	0.9
				VIC	9,138	0.9
				QLD	2,607	0.9
				WA	6,701	0.9
				SA	890	1.0
				TAS	136	0.9
				ACT	504	0.9
				NT	673	0.8
Khmer	10,621	11,361	21,982	NSW	8,231	0.9
				VIC	8,546	0.9
				QLD	1,146	1.0
				WA	871	0.9
				SA	2,840	1.0
				TAS	9	1.3
				ACT	232	0.8
				NT	107	0.9

Source: CDATA 2001 (ABS).

Table A23: Languages spoken at home and place of residence: Middle Eastern and North African languages

Language spoken at home	Size of community (Australia)			Place of residence		
	Males	Females	Persons	State	Persons	Ratio M/F
Persian	13,426	11,812	25,238	NSW	12,273	1.1
				VIC	5,875	1.1
				QLD	1,625	1.1
				WA	2,920	1.2
				SA	1,968	1.4
				TAS	105	1.5
				ACT	441	1.0
				NT	31	1.4

Source: CDATA 2001 (ABS).

Table A24: Languages spoken at home and place of residence: South American languages

Language spoken at home	Size of community (Australia)			Place of residence		
	Males	Females	Persons	State	Persons	Ratio M/F
Spanish	45,213	48,379	93,592	NSW	49,315	0.9
(Countries of birth: Chile (23,420); Argentina (10,763); Spain (12,662))						
				VIC	22,874	1.0
				QLD	9,542	0.9
				WA	5,338	0.9
				SA	3,184	0.9
				TAS	585	1.0
				ACT	2,466	0.9
				NT	288	1.1

Source: CDATA 2001 (ABS).

Glossary

Age standardisation: A method of removing the influence of age when comparing populations with different age structures. This is usually necessary because the rates of many diseases vary strongly (usually increasing) with age. The age structures of the different populations are converted to the same 'standard' structure, then the disease rates that would have occurred with that structure are calculated and compared.

Age-specific rate: A rate for a specific age group. The numerator and denominator relate to the same age group.

Body mass index (BMI): The most commonly used method of assessing whether a person is healthy weight, underweight, overweight or obese. It is calculated by dividing the person's weight (in kilograms) by their height (in metres) squared, that is, kg ÷ m^2. For both men and women, underweight is a BMI below 18.5, healthy weight is from 18.5 to less than 25, overweight is 25 and above (includes obese), and obese is 30 and over.

Cause of death: From information reported on the medical certificate of cause of death, each death is classified by the underlying cause of death according to rules and conventions of the 10th revision of the International Classification of Diseases. The underlying cause is defined as the disease that initiated the train of events leading directly to death. Deaths from injury or poisoning are classified according to the circumstances of the accident or violence which produced the fatal injury, rather than to the nature of the injury.

Cohort: A group of individuals being studied who have experienced the same event at a specified period in time; for example 'birth cohort' refers to people born in the same year.

Complication: A secondary problem that arises from or occurs with a disease or its treatment (such as surgery), worsening the patient's condition and making treatment more complicated.

Confidence intervals: Confidence intervals are an indication of the amount of variation associated with an estimate. For example, a 95% confidence interval indicates that if the process that led to the estimated value were repeated many times, in 95% of cases the true population value would fall within that confidence interval.

Diabetes (diabetes mellitus): A chronic condition in which the body makes too little of the hormone insulin or cannot use it properly. This raises the blood level of the body's major energy source, the sugar glucose, and causes other widespread disturbance of the body's energy processes.

Epidemiology: The study of the patterns and causes of health and disease in populations, and the application of this study to improve health.

Gestational diabetes mellitus: Diabetes which is first diagnosed during pregnancy (gestation).

Glycosuria: Sugar in the urine.

Health status: An individual's or population's overall level of health, taking account of various aspects such as life expectancy, amount of disability, levels of disease risk factors and so forth.

Impaired glucose tolerance: Condition in which blood glucose levels are higher than normal but less than required for a diagnosis of diabetes, and which signals an increased risk of developing Type 2 diabetes.

Impairment: Any loss or abnormality of psychological, physiological or anatomical structure or function.

Incidence: The number of new cases of a disease arising in the population in a given time period.

Insulin: Hormone that is produced by the pancreas and regulates the body's energy sources, most notably the sugar glucose.

International Classification of Diseases: The World Health Organization's internationally accepted classification of diseases and health related problems. The 10th Revision (ICD-10) is currently in use.

Median: The midpoint of a list of observations ranked from the smallest to the largest.

Medicare: A national, government-funded scheme that subsidises the cost of personal medical services for all Australians and aims to help them afford medical care.

Morbidity: Refers to ill health in an individual and to levels of ill health in a population or group.

Mortality: Death.

Obesity: Marked degree of overweight, defined as body mass index of 30 and over.

Overweight: Defined as a body mass index of 25 and over.

Ponderal index: an index of body mass calculated by dividing the person's weight (in kilograms) by their height (in metres) cubed (i.e. kg ÷ m^3).

Prevalence: The number of cases of a disease in the population at a specified point in time.

Risk factor: Any factor which represents a greater risk of a health disorder or other unwanted condition or event. Some risk factors are regarded as causes of disease, others are not necessarily so.

Statistical significance: An indication from a statistical test that an observed difference or association may be significant or 'real' because it is unlikely to be due just to chance. A statistical result is usually said to be 'significant' if it would occur by chance only once in twenty times or less often.

Type 1 diabetes: A form of diabetes usually arising in childhood or youth ('juvenile onset'), marked by a complete lack of insulin and needing insulin replacement for survival.

Type 2 diabetes: The most common form of diabetes, occurring mostly in people aged 40 years and over and marked by reduced or less effective insulin.

Underlying cause of death: The condition, disease or injury initiating the sequence of events leading to death, that is, the primary, chief, main or principal cause.

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