ARC Linkage

Primary Health Care Workforce Planning Project

Briefing Paper 1

Sub-populations with diabetes mellitus

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Purpose

The aim of Briefing Paper 1 is to identify which subgroups of people with diabetes may necessitate a significantly different approach to the management of their condition. The purpose of this classification is to ensure that the project's estimate of total service needs – the primary goal of the research project - reflects the particular requirements of diverse groups and not just that of the 'archetypal' patient.

Background

The appropriate management of diabetes mellitus is now described in clinical practice guidelines (CPGs). These guidelines are informed by the best available evidence - ideally from randomised control trials, using consensus of expert opinion only if higher quality evidence is unavailable. Clinical practice guidelines are published with the expectation of promoting a more consistent and cost-effective approach to disease management, to achieve high quality of care and better patient outcomes (Bahtsevani, Uden & Willman 2004). However, there is consistent evidence that not all practitioners follow these guidelines in clinical practice. A number of studies conducted in Singapore (Tan 2006), Canada (Harris, Stewart, Brown, Wetmore, Faulds, Webster-Bogaert & Porter 2003), United States (Coon & Zulkowski 2002; Lawler & Viviani 1997; Mottur-Pilson, Snow & Bartlett 2001) and Australia (McDermott, Tulip & Schmidt 2004; Yong, Phillipov & Phillips 2007) have shown that physician adherence to recommendations from diabetes CPGs is poor. Inconsistencies with CPGs are observed across most areas of management, including prescribing (eg of anti-hypertensives, anti-diabetic agents including insulin), referral (to dieticians and other allied health providers etc.) and screening (eg for microalbuminuria, for diabetes-related foot conditions and retinopathy.

Elements that may contribute to the poor uptake of CPGs can be categorized into patient, practitioner, organisational and guideline factors. While the overall focus of the research project is with structural factors, specifically the role of the health workforce in accessing care consistent with clinical guidelines, the focus of this paper is primarily the patient specific factors that might influence care needs. These factors fall into two broad categories: i) those that challenge self care capacity, with implication for the clinician role in assisting patient compliance with CPGs, and ii) factors that influence the sub-set or mix of CPGs that are pertinent. The latter relate essentially to clinical sub-groups defined primarily by stage of diabetes and presence of specific complications and comorbidities that require specific adjustments to and/or selected components of CPGs. The approach to clinically defined sub-groups (such as newly diagnosed diabetics) will sometimes be explicitly identified and written into the published CPGs. The former include a complex set of intrinsic factors (for instance to do with patient preference, attitude to compliance, health literacy, and cognitive and functional capacity), and extrinsic factors relating primarily to cultural and socioeconomic attributes.

The challenge for the study and the purpose of this paper is to determine which sub-populations require a distinct approach to diabetes care that implies a noticeably different skill mix, range of health services, and/or frequency and duration of consultations in order to assess the total service needs across a diverse patient population. These subgroups will underpin the on-going research tasks; of estimation of sub-populations with diabetes and determination of unique management protocols by subgroup.

Identifying subpopulations with diabetes mellitus

The research team have conducted a selective review of the literature on the management of diabetes in primary care (Diabetes Australia 2007; National Collaborating Centre for Chronic Conditions 2008), also accessing some of the clinical practice guidelines (American Diabetes Association 2008; Australian Centre for Diabetes Strategies 2004; Canadian Diabetes Association (CDA) guidelines for the prevention and management of diabetes CDA 2008; International Diabetes Federation clinical guidelines task force 2006; National Collaborating Centre for Chronic Conditions 2008b; New Zealand Guidelines Group 2003; Singapore Ministry of Health 2006). The literature review has been supplemented by discussions with diabetes experts, to develop a provisional list of pertinent patient and clinical factors.

The team has developed a subjective ranking to assist in the selection of subpopulations for the project and has completed a preliminary assessment against these criteria:

1. Distinct management approach: concerns the likelihood that the patient-related factor requires a distinct approach to the management of diabetes in the primary care setting – described as high (✶✶✶), medium (✶✶) or low (✶) likelihood.
2. Potential access to data: described as high (✶✶✶), medium (✶✶) or low (✶) access.
3. Quality of data: described as high (✶✶✶), medium (✶✶) or low (✶) quality data.

The team proposes that these three criteria be treated in a hierarchical fashion, such that an attribute must score at least ✶✶ or ✶✶✶ against criterion one, after which access to data (criterion 2) and then quality of data (criterion 3) are considered as next order issues.

Whilst the range of potential subpopulations is diverse, they have been categorised into one of eight groups; i) stage of diabetes, ii) type of diabetes, iii) risk factors for diabetes, iv) co-morbidities, v) diabetes-related complications, vi) challenges capacity for self-management, and vii) factors affecting health care supply. (This latter category is included not because of a presumed influence on desirable care, but because of a possible influence on how competencies may best be translated into occupations and services).

The 'performance' of potential sub-groups has been assessed against the abovementioned criteria. We have also identified potential data sources and made a preliminary assessment of whether the sub-group should be identified as a separate sub-population for this study. See the set of Tables 1 to 7 below.

1. Stage of diabetes

	Distinct management approach	Potential access to data	Quality of data	Inclusion as a subpopulation
Pre-diabetic (ie: impaired glucose tolerance, impaired fasting glucose)	✶✶✶	✶✶ (2,6)	✶ (6)	**???**
Newly diagnosed diabetes	✶✶✶	✶✶✶ (1,2,3,6,7)	✶✶ (6,7)	**Yes**
Established diabetes	✶✶✶	✶✶✶ (1,2,3,6,7)	✶✶ (6,7)	**Yes**

✶✶✶ = High; ✶✶ = Medium; ✶ = Low.

1=Medicare / Department of Veterans Affairs (DVA); 2=SA division of general practice (SADGP); 3=Royal District Nursing Service (RDNS); 4=Pharmaceutical Benefits Scheme (PBS) / Repatriation Pharmaceutical Benefits Scheme (RPBS); 5=Hospital separation data; 6=AusDiab data; 7=National Diabetes Services Scheme (NDSS); 8=SA Monitoring and Surveillance System (SAMSS); 9=National Health Survey (NHS) 2004/05

2. Type of diabetes

	Distinct management approach	Potential access to data	Quality of data	Inclusion as a subpopulation
Type 1 diabetes mellitus	✶✶✶	✶✶✶ (2,3,5,7)	✶✶✶ (5,7)	**Yes**
Type 2 diabetes mellitus	✶✶✶	✶✶✶ (2,3,5,7)	✶✶✶ (5,7)	**Yes**
Gestational diabetes	✶✶✶	✶✶✶ (2,3,5,7)	✶✶✶ (5,7)	**???**

✶✶✶ = High; ✶✶ = Medium; ✶ = Low.
1=Medicare/DVA; 2= SADGP; 3= RDNS; 4=PBS/RPBS; 5=Hospital sep data; 6=AusDiab; 7=NDSS; 8=SAMSS; 9=NHS

3. Diabetes at risk groups

	Distinct management approach	Potential access to data	Quality of data	Inclusion as a subpopulation
Aboriginal / Torres Strait Islander ≥ 35 years			✶✶	**No#**
High risk ethnic groups (including people from Pacific Islands, Indian subcontinent, China and ≥ 35 years)	*# These groupings are pertinent if study scope is extended to include persons with pre-diabetes and at risk of diabetes. It is also relevant if we were to undertake a sophisticated estimation of future cases of diabetes. These purposes are considered outside study scope at this stage.*			
Obese and ≥ 45 years				
Hypertension and ≥ 45 years	*Note these attributes are picked up elsewhere (under co-morbidities and self care capacity where pertinent)*			
Clinical CVD in all ages				
PCOS and obesity in all ages				

✶✶✶ = High; ✶✶ = Medium; ✶ = Low.
1=Medicare/DVA; 2= SADGP; 3= RDNS; 4=PBS/RPBS; 5=Hospital sep data; 6=AusDiab; 7=NDSS; 8=SAMSS; 9=NHS

4. Presence of co-morbidities

	Distinct management approach	Potential access to data	Quality of data	Inclusion as a subpopulation
Depression	✶✶✶	✶✶✶ (2,3,5,8,9)	✶✶✶ (5,8,9)	**Yes**
Anxiety	✶✶	✶✶✶ (2,3,5,9)	✶✶✶ (5,9)	**Yes**
Obesity	✶✶	✶✶✶ (2,3,5,6,9)	✶✶✶ (5,9)	**???**
Drug & alcohol addiction	✶✶	✶✶ (2,3,5)	✶ (5)	**???**
Multiple co-morbidities	✶✶✶	✶✶✶ (2,3,5,8,9)	✶✶✶ (5,8,9)	**???**

✶✶✶ = High; ✶✶ = Medium; ✶ = Low
1=Medicare/DVA; 2= SADGP; 3= RDNS; 4=PBS/RPBS; 5=Hospital sep data; 6=AusDiab; 7=NDSS; 8=SAMSS; 9=NHS

5a. Presence of diabetes-related complications – macrovascular disease

	Distinct management approach	Potential access to data	Quality of data	Inclusion as a subpopulation
Hypertension	✶	✶✶✶ (2,3,5,6,9)	✶✶✶ (5,9)	**No** *(does not meet threshold for criterion 1, Management to address these problems part of standard diabetes care*
Dyslipidaemia	✶	✶✶✶ (2,3,5,6,9)	✶✶✶ (5,9)	
Peripheral arterial disease	✶	✶✶✶ (2,3,5)	✶✶✶ (5)	
Myocardial infarction	✶	✶✶✶ (2,3,5,9)	✶✶✶ (5,9)	
Cerebrovascular accident (CVA)	✶✶	✶✶✶ (2,3,5,9)	✶✶✶ (5,9)	**Yes** *(see disability)*

✶✶✶ = High; ✶✶ = Medium; ✶ = Low
1=Medicare/DVA; 2= SADGP; 3= RDNS; 4=PBS/RPBS; 5=Hospital sep data; 6=AusDiab; 7=NDSS; 8=SAMSS; 9=NHS

5b. Presence of diabetes-related complications – microvascular disease

	Distinct management approach	Potential access to data	Quality of data	Inclusion as a subpopulation
Retinopathy	✶✶✶	✶✶✶ (2,3,5,6)	✶✶ (5)	**Yes** *(See disability)*
Peripheral neuropathy	✶✶	✶✶✶ (2,3,5)	✶✶ (5)	
Nephropathy	✶✶	✶✶✶ (2,3,5,6)	✶✶ (5,6)	**???** *(Does this require a distinct approach to management in primary care)*
Erectile dysfunction	✶✶	✶✶✶ (2,3,5)	✶✶ (5)	
Peripheral vascular disease	✶✶	✶✶✶ (2,3,5)	✶✶ (5)	
Diabetic foot ulceration	✶✶✶	✶✶✶ (2,3,5,6)	✶✶ (5)	**Yes**

✶✶✶ = High; ✶✶ = Medium; ✶ = Low
1=Medicare/DVA; 2= SADGP; 3= RDNS; 4=PBS/RPBS; 5=Hospital sep data; 6=AusDiab; 7=NDSS; 8=SAMSS; 9=NHS

6. Challenges to self-management

	Distinct management approach	Potential access to data	Quality of data	Inclusion as a subpopulation
Ethnicity / poor English proficiency	✶✶✶	✶✶✶ (1,2,3,4,5,7,8,9)	✶✶✶ (5,7,8,9)	**Yes**
Aboriginal / Torres Strait Islander	✶✶✶	✶✶✶ (1,2,3,4,7,8,9)	✶✶✶ (7,8,9)	**Yes**
Socioeconomic status (ie: income, education, employment)	✶✶✶	✶✶ (2,3,5,8,9)	✶✶ (8,9)	**Yes**
Psychosocial issues (ie: social support, family/work commitments)	✶✶✶	✶✶ (2,3,8,9)	✶ (8,9)	**Yes**
Health literacy	✶✶✶	✶ (-)	✶ (-)	**No** *(paucity of data)*
Cognitive ability	✶✶✶	✶✶ (2,3,5)	✶ (5)	**Yes**
Functional capacity (physical or intellectual disability, retinopathy, peripheral neuropathy, arthritis, CVA)	✶✶✶	✶✶ (2,3,5,9)	✶✶ (5,9)	**Yes**

✶✶✶ = High; ✶✶ = Medium; ✶ = Low
1=Medicare/DVA; 2= SADGP; 3= RDNS; 4=PBS/RPBS; 5=Hospital sep data; 6=AusDiab; 7=NDSS; 8=SAMSS; 9=NHS

7. Reduced access to health care services

	Distinct management approach	Potential access to data	Quality of data	Inclusion as a subpopulation
Geographical location (ie: rural/remote vs. urban)	✶✶ (translation of competencies into occupations)	✶✶✶ (1,2,4,5,7,8,9)	✶✶✶ (5,7,8,9)	**Yes**

✶✶✶ = High; ✶✶ = Medium; ✶ = Low
1=Medicare/DVA; 2= SADGP; 3= RDNS; 4=PBS/RPBS; 5=Hospital sep data; 6=AusDiab; 7=NDSS; 8=SAMSS; 9=NHS

As noted above this paper has identified several factors that may demand a unique approach to the management of diabetes in the primary care setting. These fall broadly into one of two groupings:

i. Factors that suggest different CPGs / combination of CPGs related to type and stage of diabetes, complications and co-morbidities (1 to 6 above) and

ii. Factors that suggest the need for a unique approach to the translation of CPGs into clinical protocols. These can be further identified as cultural/language factors (eg Aboriginal/Torres Strait Islander origin, English proficiency, cultural diversity); psycho-social status (including depression, cognitive ability, social support, social responsibilities); socioeconomic status (including income, education, employment and health literacy), and functional capacity that affects ability to self care (which may be physical (ie: serious visual impairment) or intellectual) (See Figure 1).

The former factors are frequently recognised in published CPGs and as such, their identification as sub-populations need not be further explained. Whether they warrant separate identification is more to do with their relevance to the primary care setting and scope of the Project. The latter factors are less frequently recognised in CPGs or incorporated into service planning and thus a brief discussion is provided below.

Challenges to self-management

Indigenous population

Persons of Aboriginal or Torres Strait Islander descent are at increased risk of developing diabetes, as well as receiving poorer standards of care. A number of studies examining urban and remote populations of indigenous Australians have shown that indigenous adults with confirmed diabetes have lower rates of diabetes education, insulin treatment, self-monitoring of blood glucose levels, podiatry referrals and mean glycated haemoglobin levels, together with a greater risk of micro- and macrovascular complications (Davis, McAullay, Davis & Bruce 2007; McDermott, Tulip & Schmidt 2004; Thomas, Weekes & Thomas 2007). One of the reasons for these poorer outcomes may possibly stem from reduced physician compliance with CPGs, as alluded to earlier. Other factors may relate to affordability and access to culturally appropriate care, availability of equipment, family or cultural needs, education, income, housing and literacy (Davis, McAullay, Davis & Bruce 2007; McDermott, Tulip & Schmidt 2004; Thomas, Weekes & Thomas 2007).

Ethnicity / poor English proficiency

Some ethnic minority groups are at increased risk of developing diabetes and associated complications, particularly persons from the Pacific Islands, Indian subcontinent, and China. People with poor English proficiency may be at further risk of receiving substandard care due to difficulties with communication. To illustrate this point, a survey of 1262 patients with type 2 diabetes from the Fremantle diabetes study found residents non-fluent in the English language were significantly less likely to attend diabetes education programs ($p<0.001$) and more likely to demonstrate poorer diabetes knowledge scores ($p<0.0001$) than those fluent in English (Bruce, Davis, Cull & Davis 2003).

In relation to ethnicity, an outpatient-based survey comparing 232 Caucasians born in the UK to 268 patients born in the Indian subcontinent found a significantly lower awareness of diabetes complications, knowledge of the disease, nutritional content of the diet, and perceived importance of controlling diabetes amongst the ethnic-minority group ($p<0.005$). Multivariate analysis demonstrated that these differences were more closely associated with race rather than income or education level (Pardhan & Mahomed 2004). Similar findings relating ethnicity to poor diabetes management and knowledge have also been reported in Kashmiri immigrants (Naeem 2003). In terms of diabetic outcomes, a systematic review of 51 studies has reported worse intermediate outcomes of care, such as glycated haemoglobin, and poorer quality of life among diabetic patients from ethnic minority groups, particularly African-Americans (Lanting, Joung, Mackenbach, Lamberts & Bootsma 2005). These findings suggest that language and cultural background demand greater consideration in the overall management of diabetes.

Socioeconomic status

A myriad of social and economic determinants have been shown to influence both the incidence and the management of diabetes. A socioeconomic gradient with prevalence of diabetes is observed from an analysis of the 2001 Australian National Health Survey. For example, the prevalence of diabetes in the 25-64 year age group was found to be 2.28 times higher in the fifth compared to the first quintile of socioeconomic disadvantage (Glover, Hetzel & Tennant 2004). Large population surveys in the United States, Israel and among groups of indigenous Australians have also demonstrated an inverse relationship between diabetes incidence and income (Jotkowitz, Rabinowitz, Segal, Weitzman, Epstein & Porath 2006) as well as level of education (Beckles & Thompson-Reid 2002; Cunningham, O'Dea, Dunbar, Weeramanthri, Shaw & Zimmet 2008; Robbins, Vaccarino, Zhang & Kasl 2005).

As well as the relationship between income and diabetes prevalence, a number of smaller studies have also found an association between poor socioeconomic status and reduced adherence to dietary regimes and physical activity recommendations (Cox, Carpenter, Bruce, Poole & Gaylord 2004; Raphael, Anstice, Raine, McGannon, Rizvi & Yu 2003). By contrast, a large national study in Israel found people with diabetes from low socioeconomic backgrounds demonstrated greater adherence to annual diabetes health assessments than diabetics from high socioeconomic backgrounds (Jotkowitz et al 2006). Nevertheless, given that socioeconomically disadvantaged diabetics in this study also exhibited poorer lipid and glycaemic control, suggests that improved diabetes screening among lower socioeconomic groups may not translate into better health outcomes. The role of socioeconomic status in relation to management is therefore complex, and may be better captured in other more specific attributes with which it is correlated.

Geographical location (rural/remote vs. urban)

Studies examining the prevalence of diabetes mellitus report higher prevalence rates within rural/remote regions when compared to urban or city locations (Population Research & Outcome Studies Unit 2007; Simmons, McKenzie, Eaton, Shaw & Zimmet 2005). In terms of management, however, the picture is more complex. Even though a review of Medicare data in New South Wales, Australia, found access to diabetes specialist services in rural areas was comparatively lower than urban areas, the level of diabetes monitoring between regions was similar (Overland, Yue & Mira 2001). The absence of a significant difference between place of residence and compliance with diabetes self-management recommendations was also reported in a US survey of 196 Caucasians and African-Americans enrolled in a food stamp nutrition education program (Cox et al 2004). Even so, a more appropriate surrogate endpoint of effective diabetes management would be glycaemic control, which a more recent study has examined. An investigation of 6305 patients from 250 Australian GP practices found no significant difference in glycated haemoglobin (HbA1c) levels between patients living in urban and rural locations (Wan, Harris, Powell-Davies, Jayasinghe, Flack, Georgiou, Burns & Penn 2007).

Rural residents did, however, demonstrate an increased risk of cardiovascular disease when compared to urban residents, as evidenced by comparatively higher serum triglyceride levels (OR 1.23), body mass index (OR 1.16), and rates of smoking (OR 1.36). Therefore, the prevention of cardiovascular disease (CVD) among diabetic patients living in rural and remote locations may require a more targeted approach. Although it might be argued that attention to these risk factors for CVD are already present in existing guidelines, the question is whether there are locational factors that impinge on guideline implementation. It may, for instance, be desirable to identify persons in rural and remote communities because of differentiated access to health professionals, for this may have implications for the translation of clinical protocols and competencies into occupations and services.

Health literacy

Health literacy, or the ability to acquire, comprehend and communicate health information, directly affects an individual's capacity to self manage diabetes. Evidence suggests physician explanations of conditions and processes of care are in too technical language or in other ways not tailored to the person with poor health literacy, resulting in a lack of understanding (Schillinger, Bindman, Wang, Stewart & Piette 2004). Not surprisingly, patients with inadequate health literacy demonstrate poorer knowledge of diabetes (Kim, Love, Quistberg & Shea 2004; Powell, Hill & Clancy 2007; Williams, Baker, Parker & Nurss 1998), and possibly, poorer health outcomes. To illustrate this point, a survey of 408 ethnically-diverse adults with type 2 diabetes from two primary care clinics in San Francisco, California, found poor health literacy was independently associated with inadequate glycaemic control ($p=0.02$), retinopathy ($p=0.01$) and cerebrovascular disease ($p=0.04$) (Schillinger, Grumbach, Piette, Wang, Osmond, Daher, Palacios, Sullivan & Bindman 2002). Conversely, a study involving 1002 predominantly white, English-speaking adults with diabetes found no significant association between literacy and glycaemic control (Morris, MacLean & Littenberg 2006). Given that both studies controlled for potential confounders, and similar methods were used to measure literacy, it is possible that differences in diabetic type and population were responsible for the conflicting findings in these reports, as well as differences in other studies (Powell, Hill & Clancy 2007; Williams, Baker, Parker & Nurss 1998). Studies also do not attempt to assess whether providers have strategies in place to deal with differential levels of health literacy. In short, the literature is equivocal in terms of the importance of this variable in care outcomes, although this is not to say that it should not be considered in describing care protocols.

Depression & Anxiety

Emerging evidence indicates that depression and anxiety are not only co-morbidities of diabetes (Ali, Stone, Peters, Davies & Khunti 2006; Li, Barker, Ford, Zhang, Strine & Mokdad 2008), but also significant risk factors for the onset of the disease (Engum 2007; Knol, Twisk, Beekman, Heine, Snoek & Pouwer 2006). It is also established that the psychological health and quality of life of a person with diabetes who are depressed or anxious is significantly lower than for persons with diabetes who do not suffer from these disorders (Eren, Erdi & Sahin 2008; Kohen, Burgess, Catalan & Lant 1998). In terms of diabetes management, however, the relationship between anxiety and metabolic control is inconclusive (Ikeda, Aoki, Saito, Muramatsu & Suzuki 2003; Paschalides, Wearden, Dunkerley, Bundy, Davies & Dickens 2004). Depression, on the other hand, has been associated with poor patient adherence to diabetic medications, diet, and prescribed exercise (Eren, Erdi & Sahin 2008; Gonzalez, Safren, Cagliero, Wexler, Delahanty, Wittenberg, Blais, Meigs & Grant 2007; Kilbourne, Reynolds, Good, Sereika, Justice & Fine 2005; Lin, Katon, VonKorff, Rutter, Simon, Oliver, Ciechanowski, Ludman, Bush & Young 2004; Nau, Aikens & Pacholski 2007). It thus seems that there is an adverse effect of depression on diabetes management, which could lead to poorer health outcomes, including higher rates of diabetic complications (Bruce, Davis, Starkstein & Davis 2005; de Groot, Anderson, Freedland, Clouse & Lustman 2001) and worse glycaemic control (Eren, Erdi & Sahin 2008).

The solution to this problem is uncertain, however, as the effect of depression management on diabetes outcomes has been inconsistent (Bogner, Morales, Post & Bruce 2007; Lin, Katon, Rutter, Simon, Ludman, Von Korff, Young, Oliver, Ciechanowski, Kinder & Walker 2006), while for anxiety management, evidence has been lacking (Rose, Firestone, Heick & Faught 1983). Nevertheless, it may suggest that individuals with these disorders need to be identified as it would seem that specific management strategies are warranted, which have immediate workforce implications.

Cognitive ability

Diabetes mellitus is associated with poorer cognitive function, including a significant reduction in intelligence, speed of processing, psychomotor efficiency, visual and sustained attention, cognitive flexibility and visual perception (Brands, Biessels, de Haan, Kappelle & Kessels 2005; Coker & Shumaker 2003). Collectively, these changes are likely to affect a person's capacity to self manage diabetes, although, the correlation between cognitive ability and glycaemic control has been poorly investigated. What is also unclear is whether poor cognitive function is a consequence, or a risk factor of diabetes. A large longitudinal study of 9113 British children indicates poorer cognitive function in childhood increases the adjusted odds of developing type 2 diabetes after the age of 16 years (Olsson, Hulting & Montgomery 2008). Even so, it cannot be ruled out that underlying insulin resistance or glucose intolerance contributed to the cognitive decline at baseline. Regardless of causal pathways or incidence, the question here is whether cognitive ability denotes a specific approach to management that warrants this group being separately identified.

Functional capacity / disability

The complications of diabetes, including retinopathy, peripheral neuropathy, foot ulceration, stroke and coronary heart disease, are all associated with varying degrees of physical disability (Bruce, Davis & Davis 2005; Gregg, Beckles, Williamson, Leveille, Langlois, Engelgau & Narayan 2000; Wray, Ofstedal, Langa & Blaum 2005), and these disabilities may impinge on capacity to self-manage the disease. More generally, physical and intellectual disabilities are likely to impact on a person's ability to self-manage diabetes. This is suggested by data reporting that persons with diabetes with a disability (physical or intellectual) are more likely than those without a disability to be less physically active, obese, hypercholesterolemic and hypertensive ($p<0.001$), and thus, at higher risk of cardiovascular complications (Okoro, Denny, Greenlund, Benjamin, Strine, Balluz & Mokdad 2005). Yet, a retrospective cohort study of 5110 diabetic veteran woman under 65 years of age, found no statistically significant difference in glycaemic or lipid control between those with and without disability (Tseng, Sambamoorthi, Tiwari, Rajan, Findley & Pogach 2006). These conflicting findings suggest that the association between physical or intellectual disability and diabetic-related outcomes warrants further investigation, and perhaps, the identification of a more stringently defined sub-group.

Psychosocial issues

The capacity of an individual to manage their diabetes can be influenced by a range of psychosocial factors, including a person's psychological health, family and work commitments, and the availability of social support. These factors may not only impact on diabetes management, but may be also implicated in the pathogenesis of diabetes. In support of the latter, a longitudinal cohort study of 10,300 Australian elderly woman found low social support, the absence of a current partner and an abnormal mental health index all predicted a new diagnosis of diabetes within a three-year period (Strodl & Kenardy 2006). The correlation between psychosocial factors and diabetes onset in males and younger Australians, however, is uncertain.

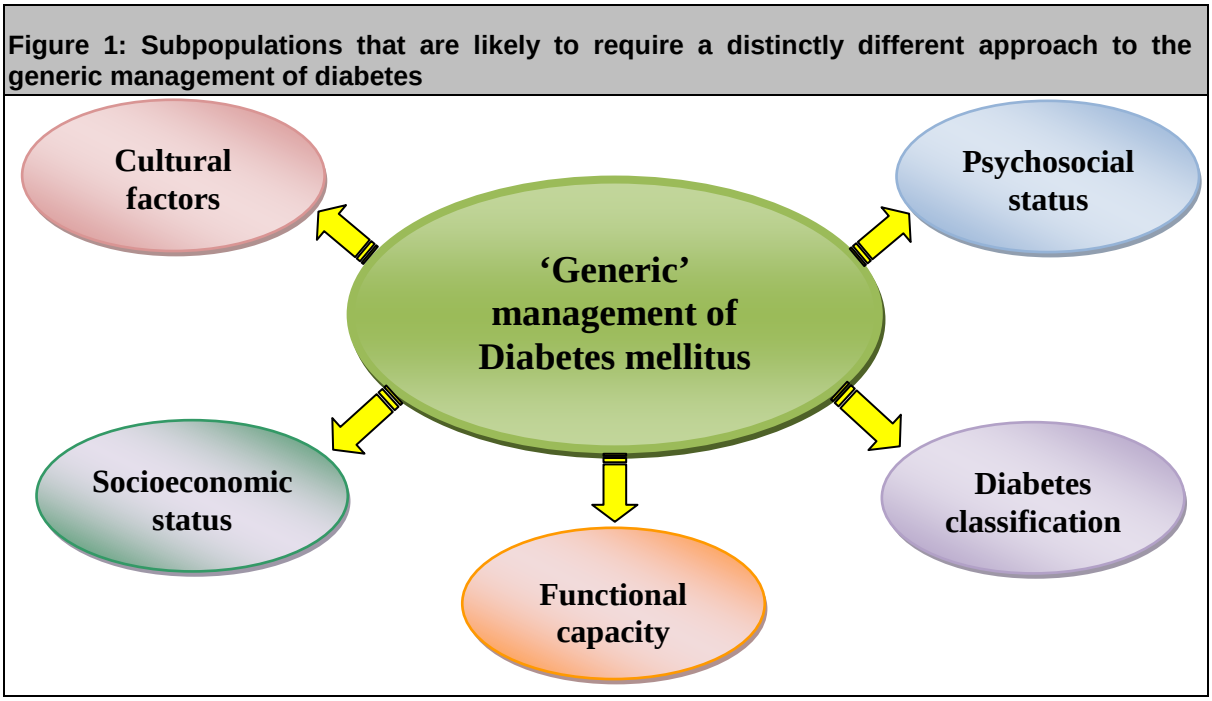
In terms of the impact that psychosocial factors have on diabetes management, a number of studies in adults and adolescents with type 1, type 2 and gestational diabetes have shown that lower social support, single-parent families, and increased family conflict are significantly correlated with reduced treatment compliance and poorer glycaemic control (Akimoto, Fukunishi, Kanno, Oogai, Horikawa, Yamazaki & Morokuma 2004; de Wit, Delemarre-van de Waal, Bokma, Haasnoot, Houdijk, Gemke & Snoek 2007; Garay-Sevilla, Nava, Malacara, Huerta, Diaz de Leon, Mena & Fajardo 1995; Nakahara, Yoshiuchi, Kumano, Hara, Suematsu & Kuboki 2006; Ruggiero, Spirito, Bond, Coustan & McGarvey 1990). Given that these factors are also positively associated with depressive symptoms (Zhang, Chen & Chen 2007) this suggests that psychosocial factors and depression may be mutually dependent. As identification of a suitable measure of psychosocial 'health' is problematic, an option is to ignore this as a separate category, and instead, capture much of the sub-population under the depression sub-category.

Summary and next steps

The proposition of this research grant is that certain diabetes sub-populations require a noticeably different skill mix and/or frequency and duration of consultations in their plan of care, which needs to be taken into account when planning future services. In this paper, the diabetes sub-populations that might inform workforce and services planning have been discussed. In the following paper, briefing paper two, the possible approaches to estimation of the identified sub-populations are examined.

Briefing Paper three, to be prepared, will consider clinical practice guidelines and their translation into care protocols, in terms of clinician input in the primary care setting, by broad competency, for each sub-population. This is particularly important as the research team recognise this cannot be directly taken from published CPGs.

Figure 1: Subpopulations that are likely to require a distinctly different approach to the generic management of diabetes



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