Models of Diabetes Education in General Practice

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2008
Acknowledgements

The preparation of this report has been in collaboration with Ipswich & West Moreton Division of General Practice (IWMDGP) as the Project Lead Agent in a Queensland Health funded Connecting Healthcare in Communities (CHIC) Initiative.

This report was produced with the commitment and assistance of many individuals and organisations. The Healthy Communities Research Centre (HCRC) acknowledges the following who shared their clinical experiences in trying to make a difference in the lives of those challenged with diabetes type 2.

Ms Leigh Barnetby,
Ms Oriole Paul,
Ms Bernadette O’Brien,
Ms Christine Sheehan,
Ms Sarah Black and
Mrs Trish Pryor

Also the members of the IWMDGP Better Health Diabetes Partnership, Ms Stacey Menear (Healthy Communities Research Centre), for their support and Ms Jacqui Young (University of Queensland) and Dr Andrew Lok (General Practitioner) who reviewed this report.
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## Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>ADEA</td>
<td>Australian Diabetes Educators Association</td>
</tr>
<tr>
<td>AHW</td>
<td>Aboriginal Health Worker</td>
</tr>
<tr>
<td>APCC</td>
<td>Australian Primary Care Collaboratives</td>
</tr>
<tr>
<td>APNA</td>
<td>Australian General Practice Network</td>
</tr>
<tr>
<td>BP</td>
<td>Blood Pressure</td>
</tr>
<tr>
<td>CDE</td>
<td>Credentialled Diabetes Educator</td>
</tr>
<tr>
<td>CVD</td>
<td>Cardio Vascular Disease</td>
</tr>
<tr>
<td>DPM</td>
<td>Diabetes Program Manager</td>
</tr>
<tr>
<td>GP</td>
<td>General Practitioner</td>
</tr>
<tr>
<td>GPMP</td>
<td>GP Management Plan</td>
</tr>
<tr>
<td>HARP</td>
<td>Hospital Admission Risk Program</td>
</tr>
<tr>
<td>HbA1C</td>
<td>Glycated Haemoglobin</td>
</tr>
<tr>
<td>MBS</td>
<td>Medicare Benefits Schedule</td>
</tr>
<tr>
<td>NCDS</td>
<td>National Chronic Disease Strategy</td>
</tr>
<tr>
<td>NP</td>
<td>Nurse Practitioner</td>
</tr>
<tr>
<td>PIP</td>
<td>Practice Incentive Program</td>
</tr>
<tr>
<td>PN</td>
<td>Practice Nurse</td>
</tr>
<tr>
<td>POC</td>
<td>Point of Care</td>
</tr>
<tr>
<td>RCT</td>
<td>Randomised Controlled Trial</td>
</tr>
<tr>
<td>SIP</td>
<td>Service Incentive Program</td>
</tr>
<tr>
<td>SWPE</td>
<td>Standardised Whole Patient Equivalent</td>
</tr>
<tr>
<td>TCA</td>
<td>Team Care Arrangement</td>
</tr>
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</table>
Executive Summary

The purpose of this report is to identify practice models for the implementation of sustainable nurse led diabetes education in Australian General Practice settings. Both Australian Commonwealth and State Governments’ developed Strategies to address chronic disease is detailed. Through these initiatives funding is made available to develop responses to Chronic Disease Management by general practitioners and other primary carers.

Effective care of patients with diabetes type 2 includes education and support in developing self-management skills. Clinical professionals have the opportunity to complete tertiary education studies in diabetes education and undergo a credentialing process to fulfil a standardised quality service.

Credentialed diabetes nurse educators deliver education to individuals or groups. Evidence based knowledge and skills underpin this education.

Diabetes education in General Practice is present in many forms. Presentation of diabetes education occurs along a continuum, ranging from a sole GP providing education to Diabetes Nurse Educators (DNEs) working as an employee of either the general practice or their local Division of General Practice, to a DNE being self-employed.

Viable provision of diabetes education necessitates an informed and implemented business model. Planned components of this business model are: Business and clinical processes; Roles of the GP, practice nurse, DNE, practice nurse and practice manager; and quality assurance measures (p. 25-27).

Available evidence demonstrates positive patient and monetary outcomes of systematic diabetes education. On reading this report, general practitioners can decide which diabetes education and business model is most appropriate for their practice and patients.
INTRODUCTION

Diabetes Education, conducted by a credentialled diabetes nurse educator in a primary care setting, can contribute to improved health and self management of those with type 2 diabetes, limiting associated chronic disease complications and reducing avoidable hospital admissions (National Health Priority Action Council, 2006b). The purpose of this report is to identify practice models for the implementation of sustainable nurse led diabetes education in Australian General Practice settings.

In 2004-05, the number of Australians with type 2 diabetes was reported to be 582,800, with prevalence estimates ranging from 0.3% in the 25-34 year age group to 23.6% in people over 75 years of age (Australian Bureau of Statistics, 2008). The incidence of type 2 diabetes has increased dramatically, with the number of people diagnosed predicted to double by 2010 from 2001. Moreover, while diabetes type 2 has usually been found in those individuals over 40 yrs of age, it is now increasingly being diagnosed in younger people (National Health Priority Action Council, 2006b). The increase of those diagnosed with type 2 diabetes changes across socioeconomic status, so that it is about double amongst the population’s lowest quartile when compared with those in the highest quartile (Australian Bureau of Statistics, 2008).

The Ipswich West Moreton Division of General Practice’s population is no exception to this national trend. Indeed, in a region which has a significantly lower socioeconomic status population, the need for a practical and evidence based response through workable models in the general practice settings becomes a regional priority (PHIDU, 2005). Of the Division’s population of 180,813 in 2004-05, an estimated 4,665 people have Diabetes type 2. There is also evidence that the prevalence of obesity, a key risk factor for diabetes type 2, within the regional population is greater than the percentage of obesity in the Australian population (PHIDU, 2005).

In this report, collaborative models for Diabetes Nurse led education in General Practice are developed in two parts. Part I will explore the National and State strategies relevant to chronic diseases, the funding issues that surround diabetes education, the required education for nurses, and the evidence base for education in diabetes type 2. This provides the essential policy and evidence based context for practical models. Part II details currently implemented models of education and the necessary business components for implementing a diabetes nurse educator as part of the team in general practice. The purpose is to assist in the implementation and sustainability of practice models across different types of general practice settings.

Presentation of these details is represented diagrammatically on page 7.
Diagram 1: Diabetes Nurse Educators in General Practice

**POLICY CONTEXT**

**COMMONWEALTH**
- National Chronic Disease Strategy
- National Service Improvement Framework for Diabetes
- National Integrated Diabetes Program

**STATE**
- Divisions of General Practice

**PRACTICE ARRANGEMENTS**

**FUNDING**
- National Integrated Diabetes Program
- Practice incentive program
- Service incentive program
- MBS Item numbers
- Health checks

**QUALITY ASSURANCE**
- Education for Diabetes Educator, Practice Nurse
- Role and Scope of practice of DE and PN

**EVIDENCE BASED COMPONENTS**
- Self management intervention
- Individual education
- Group education
- Reinforcement frequency
- Preventative measures

**GPs as SOLE DIABETES MANAGER**

**DIABETES EDUCATION IN TEAM CARE ARRANGEMENTS**
- Urban and rural considerations
- Indigenous Australian communities

**BUSINESS MODELS**
Components:
- Financial viability
- GP & Educator role and functions
- Business & Clinical processes
- Quality assurance

**DIABETES EDUCATION POTENTIAL**
- Diabetes Nurse Educator led clinics
- Government and Pharma Foundation funding

**Concept of value adding**
- Point of care pathology testing

**OUTCOMES**

**PATIENT OUTCOMES**
- Clinical measures
- Quality of Life
- Self management
- Satisfaction with DE clinics

**GP, PN, DE OUTCOMES**
- Work satisfaction

**PRACTICE MANAGEMENT OUTCOMES**
- Cost neutral / profit

**PUBLIC HEALTH / SYSTEMS OUTCOMES**
- Decrease in hospital admissions
- Decrease in severity and incidence of disease related illnesses
SEARCH METHODS
Models were investigated through two primary sources – research literature, including policy and practice documents, and key informant interviews. With respect to documents and research evidence this report is limited to key reviews of evidence and government and professional organisations’ reports. An extensive number of systematic reviews in this field, combined with a lack of practice documentation suggests an approach which builds on the existing evidence base and translates this into workable models for the Australian General Practice setting.

Those involved in patient diabetes education, primarily practice nurses, were contacted and their advice informally sought as part of a verification process. Advice was sought from 10 practice nurses in Queensland and other States. A number of key others from Diabetes Australia, Divisions of General Practice inter and intrastate, Diabetes program Coordinators and Diabetes Educators.

To gain an understanding of and evidence for Models of Diabetes type 2 education in primary care, relevant studies for the report were identified by Electronic searches. These were:

a) Electronic databases of the Cochrane Library for systematic reviews;

b) Screening references given in the systematic reviews and peer reviewed papers.

The search terms included:
1. diabetes educat*
2. general practice
3. family practice
4. 1 and 2
5. 1 and 3
6. 4 and Australia
7. 5 and Australia
8. models diab* educat*
9. 1 and 8
10. practice nurse and Australia
11. 10 and 1
12. self management and diabetes
13. 12 and 1
14. diabetes clinic
15. 14 and Australia
16. cost / effect* and general practice
17. cost / effect* and clinic
18. cost / effect and nurse led clinic
19. 16 and 18
20. patient satisfaction and diabetes
21. work satisfaction and general practice
22. Aboriginal and diabetes.

The search terms were refined following initial experience.
c) Searching Grey literature:
   i) Government documents
   ii) Professional bodies’ Standards and Competencies, and
   iii) Postgraduate education details from Australian universities

(Appendix 1 outlines the accepted ratings for Level of Evidence.)

In all, 90 key documents were sourced. The information was categorised as outlined in the model on page 7. In summary, healthcare in Australia is directed by government policy, thus Commonwealth and State Strategies and Programs for chronic diseases and diabetes type 2 are outlined. These strategies and programs in turn influence funding initiatives for general practice to implement chronic disease management and employ practice nurses.

The education, regulation, role and scope of practice of practice nurses and diabetes educators which assure that quality interventions occur are outlined. The principles of diabetes education are evidence-based and are employed by diabetes nurse educators.

Reports of the many models of diabetes education are categorised in sequential order from the general practitioner solely providing diabetes education through to an independent nurse led clinic. Within each of these models are key aspects of a business model and these are identified and elaborated upon in this report. And lastly, data relating the outcomes for the planned, funded, and structured interventions are detailed.

The draft models were reviewed by Roslyn Henney, Project Officer, IWMDGP, Jacqui Young, The University of Queensland, and Dr Andrew Lok, General Practitioner.

**PART I**

The strategic planning, regulation, management and funding of healthcare in Australia is delivered by the Australian Government, State Government and private providers through a set of complex arrangements. For example, while individual states and territories plan and implement many healthcare initiatives to suit local population needs, general practitioners’ services are largely funded by the Commonwealth Government through Medicare. It follows that policy and strategy need to account not only for healthcare needs but also these complex arrangements for the delivery and funding of services. This is also the case for nurse led diabetes education. A brief summary of national strategic policy for Chronic Diseases is detailed first, and then the state of Queensland’s Strategic response for preventing and managing chronic diseases, which includes diabetes type 2, is then outlined.

It is because the effectiveness of primary care is pivotal in implementing, preventing and managing diabetes that we have taken this approach to model building. In other words, we take it that practice models depend on national and state healthcare policies and funding arrangements as well as practice structures and regulations.
1.0 POLICY CONTEXT

1.1 NATIONAL

The National Chronic Disease Strategy (NCDS) (National Health Priority Action Council, 2006a) outlines Australia’s policy approach to the prevention of and care for those with chronic diseases, which includes diabetes type 2. Of central importance in Australia’s national approach are steps to be taken to increase the self-management abilities of individuals with chronic diseases. Principles of self-management for those who have a chronic disease have been identified as key to maximising quality of life whilst also reducing their risk of complications and avoidable hospital admissions.

Supporting the NCDS are the National Service Frameworks for the five national health priority areas, of which Diabetes is one (National Health Priority Action Council, 2006b). The National Service Improvement Framework for Diabetes identifies key strategies for educating patients in self-management and providing support to:
- prevent and limit progression of diabetes
- slow onset of complications
- reduce preventable hospital admissions
- reduce variations in care (across different clinicians, geographical areas, social advantage).

The Strategy and Framework are generic policy guides and do not contain implementation strategies. Implementation strategies are to be developed by state/territory and local levels to meet local needs.

The Australian Government provided funding for implementation of the developed Strategies and Improvement Framework for Diabetes is through the National Integrated Diabetes Program (Department of Health and Ageing, 2006b). Initiatives within this program are discussed in section 2.1.

1.2 STATE

The Queensland Strategy for Chronic Disease 2005-2015 provides the framework for the prevention, diagnosis and management of chronic diseases in Queensland (Queensland Government & Queensland Health, 2005). This strategy integrates the system elements of policy, community capacity, health systems organisation, information systems delivery system design, decision support and self-management to enable interventions to be effectively implemented for the consumer, family/carer and community centred care.

The Primary Care sector is a vital member of the healthcare system and is involved across all care continua. Determining the structure and provision of professional healthcare providers’ activities with the Primary Care sector is pertinent and addressed in this report.

2.0 FUNDING

2.1 DEPARTMENT OF HEALTH AND AGEING

The National Integrated Diabetes Program (Department of Health and Ageing, 2006b) has provided funding for an integrated national approach to detect diabetes and
systematically progress early and aggressive diabetes management. Program initiatives include:

1. Incentives to General Practice (within target areas) to employ practice nurses and/or Aboriginal health workers and to maintain electronic records, through the Practice Incentive Program (PIP) payments (for vocationally registered GPs) (General Practice Queensland, 2007a, 2007b). These payments are in recognition of practices providing comprehensive, quality care.

2. Infrastructure and support for Divisions of General Practice include the Service Incentive Payments (SIP) and Standardised Whole Patient Equivalent (SWPE) which are paid when the general practitioner (GP) signs on a patient and completes the recommended diabetes annual cycle of care (General Practice Queensland, 2007c).

3. Engagement of consumers whereby information, education resources and tools will be developed for use of those at risk and with diabetes.

4. Supporting changes in healthcare for reviewing current processes and healthcare professionals that could provide improved health outcomes for clients.

Another program initiative is the introduction of Medical Benefits Schedule (MBS) item numbers for a Chronic Disease Program to support systemised and multidisciplinary care of people with chronic disease in general practice (see Appendix 2 for MBS Item numbers). Item numbers are allocated for the GPs’ care planning in preparing a GP Management Plan (GPMP) (annual) and review (six monthly). When the GP determines collaborative allied health interventions would benefit the patient, documentation is completed and item numbers for Coordination of Team Care Arrangements (TCA) (and review) are also allocated (Department of Health and Ageing, 2006a). Additionally, when a Practice Nurse or registered Aboriginal Health Worker provides a Chronic Disease Management service under the supervision of a GP and the patient has a GPMP and TCA in place, an item number is also claimable.

GP referrals using Team Care Arrangements are for patients to individually access eligible diabetes educators, exercise physiologists and dieticians for education, support and development of self management skills, and occupational therapists, audiologists and podiatrists for clinical care up to five times per calendar year (Department of Health and Ageing, 2008b). Credentialled Diabetes educators can claim an MBS Item number for their services. The Department of Veterans Affairs also recognise services provided by Credentialled Diabetes Educators (Australian Diabetes Educators Association, 2007). Furthermore, patients may also be referred by the GP to group allied health services without a TCA in place. Group services have an allocated MBS Item number and can be claimed for up to eight sessions per calendar year (separate to the five individual visits) (Department of Health and Ageing, 2007).

Also, as a preventative and early intervention initiative, the Australian Government has initiated MBS item numbers for 40-49 Year Old Type 2 Diabetes Risk Evaluation and 45-49 year old Health Checks (Department of Health and Ageing, 2008c, 2008d). The examination includes factors to assess likelihood or presence of diabetes type 2 and actions the patient could undertake to prevent onset of this disease.

Likewise, health checks to detect and diagnose preventable conditions for Aboriginal and Torres Strait Islanders aged 15-54 years inclusive also have listed MBS item
numbers (Department of Health and Ageing, 2008a). Part of the examination is a urinalysis, blood sugar and when recommended, lipid testing, to determine diabetic profile. A strategy for good health is also developed with the individual (National Health Priority Action Council, 2006b).

Lastly, an item number has been allocated for practice nurses and Aboriginal health workers to provide service consistent with the GP Management Plan or Team Care Arrangements (TCAs), under the supervision of the GP (five times per calendar year).

Thus, a range of funding initiatives has been implemented to enable early detection and management of diabetes type 2. MBS Item numbers have been allocated for medical practitioners:

- to develop a plan of care in concert with allied health professionals
- for early detection through health assessments at an earlier age for those at risk
- and, for the other members of the healthcare team, the practice nurses and Aboriginal health workers.

### 3.0 QUALITY ASSURANCE

Successful healthcare initiatives necessitate care provision by appropriately prepared professionals. Diabetes nurse educators, practice nurses and Aboriginal health workers form an integral part of the collaborative model to further the health of people with diabetes type 2. Outlined in the following is the education, roles and competency requirements of these groups.

#### 3.1 EDUCATION

Health care professionals from nursing, dietetics, pharmacology, medicine and podiatry are eligible to enrol in post graduate Diabetes Education courses. Accredited post graduate courses, either Graduate Certificates or Graduate Diplomas are available at five Australian tertiary education institutions (Australian Diabetes Educators Association, 2008a). Enrolment is either by off- or on-campus attendance for 12 months part time for the graduate certificate and two years part time for the graduate diploma. Some on-campus attendance and clinical placements is required. Fees for the courses range from $2,307 - $11,200. Successful completion of these courses fulfils one of the criteria for recognition as a Credentialled Diabetes Educator (CDE) with the Australian Diabetes Educators Association (ADEA) (see Appendix 3).

The ADEA is the professional organisation that regulates credentialling of CDEs, ensures role uniformity nationally, and benchmarks excellence in the practice of diabetes education and care (Australian Diabetes Educators Association, 2007). The credentialling process entails:

- completion of the Graduate Certificate or Diploma from accredited institutions,
- holding current profession registration with individual’s relevant registering body,
- completion of 1800 hours of practice in diabetes self-management education,
- provision of documentation outlining professional development activities undertaken in the 12 months prior to application,
There are approximately 52 CDEs in Queensland, 76 in New South Wales and 114 in Victoria (Australian Diabetes Educators Association, 2008b).

The ADEA also provides a non-credentialled course for registered nurses, enrolled nurses and Aboriginal health workers that work in general practice to further their knowledge of diabetes (Australian Diabetes Educators Association, 2008c). The course is available in face-to-face and online delivery, covering topics such as introduction to diabetes, lifestyle issues, diabetes medication and chronic complications. A Certificate III in Aboriginal and/or Torres Strait Islander Primary Health Care is also available for those who wish to further care of this group (TAFE Queensland, 2008).

3.2 ROLE & SCOPE OF PRACTICE
As the Australian peak professional registering body of Diabetes Educators, the ADEA has documented the Role and Scope of Practice for CDEs. This enables clear understanding of the service a CDE provides, and practitioners are required to maintain these standards. Likewise, registered and enrolled nurses’ registering bodies define their generic role and scope of practice. Role and competency standards have also been developed for nurses in general practice.

The Role of the Credentialled Diabetes Educator in Australia
The Credentialled Diabetes Educator is an integral member of the chronic disease healthcare team and is capable of autonomous practice. The CDEs’ role involves adopting a client centred approach in providing diabetes self-management education to help people:

- understand their personal health risks,
- explore the meaning and implications of these risks in the context of their personal, social and cultural world and in terms of their current behaviour; and to
- determine a comprehensive self-management plan that will maximise their health outcomes (Department of Health and Ageing, 2007, p. 9).

Scope of Practice
Credentialled Diabetes Educators practice and maintain professional development in the domains of clinical practice, research, education, counselling, leadership and management. Systematic care by CDEs in supporting clients to manage their diabetes includes providing direct clinical care, assessments and interventions (within their primary health discipline scope of practice), monitoring progress, acting as care coordinators and providing comprehensive self-management education. The CDE assesses an individual’s needs, cognitive abilities and the social context in which they live, and provides education which is based in well-grounded learning theory. This devised education program aims to contextualise care so that it can be personalised to circumstances and need (Department of Health and Ageing, 2007).

Credentialled diabetes education aims to empower clients and to help them recognise the relationship between their psychological state and ability to self-manage the
chronic disease. CDEs are encouraged to use validated psychological assessment tools, empathetic and reflective listening with clients and assess risk behaviours. Clients are referred to other appropriate professionals as needed (Department of Health and Ageing, 2007).

The CDEs’ practice is underpinned by evidence based information. They also assess interventions and outcomes of their own care provision. Continuous quality improvement in practice is paramount, participating in research as applicable. CDEs liaise with other health professionals and the community, and act as role models and mentors for their peers (Department of Health and Ageing, 2007).

The educator’s workplace or role can influence the focus of the domain practised. All CDEs’ practice reflects the National Core Competencies for Diabetes Educators and are modelled on the National Standards of Practice for Diabetes Educators (Australian Diabetes Educators Association, 2001, pp. 9-13, 2003).

**Practice Nurses in General Practice**

Registered and enrolled nurses are now recognised as key members of the healthcare team and are employed in nearly 60% of General Practices (Australian Practice Nurses Association, 2008b). While nurses’ practice is underpinned by the State registering body (Australian Nursing and Midwifery Council, 2005a, 2005b), Competency Standards for the Registered Nurse and Enrolled Nurse in General Practice have also been implemented (Australian Nursing Federation, 2005a, 2005b).

Practice nurses fulfil a clinical role and manage clinical care systems, which includes providing support with better management of chronic diseases, coordinating care, conducting clinics and health assessments, providing health promotion information, undertaking population health activities and providing clinical support to general practitioners (Australian Nursing Federation, 2005c).

The general practice is able to claim for practice nurses and Aboriginal Health Workers providing a service to a person with a chronic disease. This is with set stipulations, including the service being provided under the supervision of a medical practitioner, and that the patient has a GP Management Plan in place.

The professional organisation, Australian Practice Nurse Association (APNA) was formed to further professional growth, provide support and represent practice nurses (Australian Practice Nurses Association, 2008a). The APNA conducts workshops, provides a voice for nurses in policy decision making, information, resources, continuing professional development programs and professional indemnity.

Practice Nurses may complete a Graduate Certificate and Masters of Nursing in General Practice (University of Queensland, 2008a, 2008b)

Support for healthcare professionals has been furthered by Queensland Health’s development of Best Practice guidelines for management of type 2 diabetes (Queensland Government & Brisbane Inner South Division of General Practice, 2000) to be used in conjunction with the Diabetes Health Outcomes Plan and the General Practice Advisory Council’s Management of Diabetes Mellitus in Adults – Standard
Clinical Care pathway 2000 (Queensland Government, 2000a, 2000b), to further the effective and efficient care of patients with diabetes type 2.

4.0 EVIDENCE BASED COMPONENTS

The process and content of diabetes education is based on evidence gathered from scientific research. The cornerstone of diabetes management is for individuals to acquire self-management knowledge and skills, that is, to know what to do, how to do it, want to do it and be able to do it (Australian Diabetes Educators Association, 2008d). Facilitation of these skills is through individual and group education. Whilst Medicare funding regulates the number of education sessions available per year, GPs and CDEs determine the number and frequency of sessions an individual attends. Reinforcement of learned skills to ensure continued application is vital as inadequate management of diabetes type 2 increases the risk of macrovascular and microvascular diseases.

4.1 SELF-MANAGEMENT INTERVENTIONS

Acquisition of self-management skills is the cornerstone of care for people with diabetes type 2. Skills include:

- learning to manage their diabetes with diet and lifestyle alterations (Deakin, McShane, Cade, & Williams, 2005),
- managing the psychosocial aspects of living with a chronic disease,
- interacting with healthcare personnel and support services (National Health Priority Action Council, 2006b),
- incorporating physical activity into daily life,
- using medications effectively,
- understanding and using self blood glucose monitoring (Australian Diabetes Educators Association, 2008d).

The Royal Australian College of General Practitioners’ ‘Diabetes Management in General Practice’ (Diabetes Australia & Royal Australian College of General Practitioners, 2007) recommends patients newly diagnosed with diabetes attend diabetes education. Education of individuals with diabetes type 2 for improved self-management can be delivered either on a one-on-one individual basis or in group sessions.

4.2 INDIVIDUAL EDUCATION

Individuals’ acquisition of self-management skills for diabetes entails not only attaining new knowledge but the ability to change aspects of their way of life. Diabetes educators utilise adult education principles, behaviour change principles, and motivation concepts for effective planning and implementation of education. For example, Prochaska & DiClemente’s (1982) Transtheoretical Therapy Model, describes the stages for the process of change that can be considered in diabetes education.

Likewise, the Flinders Behaviour and Health Research Unit have developed the ‘Flinders Model’, a program which is based on cognitive behaviour therapy principles. It is a structured program which facilitates collaboration between an individual and healthcare provider (for example, a CDE) and determines person-centred needs and
goals for plan creation and review processes (Flinders University, 2006). This process can be incorporated into the Chronic Disease Management care plan.

The Queensland Government & Brisbane Inner South Division of General Practice’s guide to collaborative individual patient education sessions is presented in ‘Best practice guideline diabetes type 2 education’ as follows:

Table 1: Individual consultation variations for diabetes education

<table>
<thead>
<tr>
<th>Patient type</th>
<th>Initial session</th>
<th>Review session</th>
<th>Level of evidence (see p39)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Newly diagnosed with diabetes type 2</td>
<td>1.0-1.5 hours x 2</td>
<td>30-45 mins</td>
<td>IV</td>
</tr>
<tr>
<td>B Diagnosed with diabetes type 2</td>
<td>-</td>
<td>30 mins</td>
<td>IV</td>
</tr>
<tr>
<td>1 Annual review of management</td>
<td>1.0-1.5 hours</td>
<td>30 mins x 1 30 mins x 1 (if necessary)</td>
<td>IV</td>
</tr>
<tr>
<td>2 No education in the previous 12 months</td>
<td>30 mins x 1</td>
<td>30 mins x 1</td>
<td>IV</td>
</tr>
<tr>
<td>C Diagnosed with diabetes type 2 and requiring complications management</td>
<td>30-45 mins</td>
<td>30 mins x 1</td>
<td>IV</td>
</tr>
<tr>
<td>D Diagnosed with diabetes type 2 – undergoing change with therapy (e.g. diet to tablet therapy)</td>
<td>30-45 mins</td>
<td>30 mins x 1</td>
<td>IV</td>
</tr>
</tbody>
</table>

(Queensland Government & Brisbane Inner South Division of General Practice, 2000, p. 7).

CDEs would determine the content of these sessions as per the National Standards of Practice outlined by ADEA (Australian Diabetes Educators Association, 2003).

Efficacy of individual diabetes education has been suggested, for example, in the Cochrane review of 27 RCTs by Renders et al.’s (2000), a prospective randomised study by Ko, Li, Kan and Lo (2004), and RCTs by Aubert and Herman (1998) and New et al. (2003).

4.3 GROUP EDUCATION

Various models have been created and implemented for chronic disease group education. Of note, Stanford University’s School of Medicine designed a community based self-management program. The program comprised weekly two and a half hour sessions over six weeks. A randomised, controlled trial of the Program was conducted with results demonstrating significant improvements in a wide range of categories (Stanford University, 2008). The program is designed to enhance disease specific education and is effective as classes are highly participative. Participant’s build a mutually supportive network and develop self-confidence in their ability to self-manage.

Likewise, Davies et al.’s (2008) cluster randomised controlled study’s intervention employed a structured group education programme based on well-established models of psychological theories for person empowerment. Registered healthcare professional educators received formal training to deliver the six hour programme over either one day or two half day equivalents. The content of the curriculum was aimed at patients
who had been diagnosed with diabetes type 2 in the previous 12 weeks. The programme was presented in a non-didactic approach with a focus on lifestyle factors (food choices, physical activity, cardiovascular risk factors), consideration of medication and personal risk factors. Finally, patients chose a specific achievable goal of behaviour to work on.

Queensland Health, in ‘Best practice guideline type 2 diabetes education’ (Queensland Government & Brisbane Inner South Division of General Practice, 2000) recommends that group education sessions be used in place of individual education sessions. The timing, group numbers and format is planned by the individual educator. Consideration is given to group members’:

- literacy skills
- language barriers
- hearing impairment
- mental health issues
- cultural barriers
- individual’s choice (p. 8).

Queensland Health recommends that the number of individuals in a group is at the discretion of the CDE. Of the eight RCTs and three controlled clinical trials in Deakin et al.’s (2005) Cochrane review, the authors concluded that the apparent effectiveness of education did not seem to vary when group sizes were either 4-6 participants or 16-18 participants.

Group education programmes for individuals with diabetes type 2, incorporating the key principles of empowerment, adult learning and participation, have been found beneficial as evidenced in Davies et al.’s (2008) cluster RCT and Deakin et al.’s (2005) Cochrane review. Interestingly, a randomised study by Rickheim, Weaver, Flader, & Kendall (2002) found that group and individual education were equally effective.

4.4 REINFORCEMENT FREQUENCY

While initial diabetes education sessions for individuals may have varied duration and frequency structures, reinforcement sessions are recommended. Deakin et al. (2005) observes that annual reinforcement education results in longer lasting benefits to health and psychosocial outcomes for the individual. Similar recommendations are found in Merrill et al.’s (2008) evaluation of a chronic disease education program data which demonstrated health behaviour decay at 18 months.

Thus it is important for organisational interventions to promptly recall and review individuals with diabetes type 2 to reinforce and provide support of learned self-management skills (Renders et al., 2000). The optimum type, number and length of time for reinforcement is not clear at this time and would benefit from further research study.

4.5 PREVENTATIVE MEASURES

Effective patient education for self-management is central as improved glycaemic control in patients with diabetes type 2 decreases long-term complications of microvascular disease and cardiovascular disease (CVD) (Nathan et al., 2007) including disorders such as diabetic nephropathy, limb ischaemia, diabetic
neuropathy, diabetic autonomic neuropathy (National Health Priority Action Council, 2006b) and periodontal disease (Diabetes Australia, 2006).

Also vital to reduce the potential for development of these diseases is the implementation of screening and prevention programs for individuals at risk of developing diabetes type 2 (NPHP Diabetes Prevention Working Party, 2005). Strong evidence suggests that diabetes prevention programs are effective (Tuomilehto et al., 2001; Uusitupa et al., 2003). Participants in these research programs had impaired glucose tolerance, so were therefore at high risk of developing diabetes type 2. Prevention measures addressed the two modifiable risk factors of obesity and physical inactivity. Tailored advice of the required dietary intake of fat, saturated fats, fibre, fruit, vegetables, milk and meat products was given to individuals and reinforced seven times in the first year and then three monthly. Individual guidance was also given for increased physical activity. Supervised, individually tailored circuit type classes were also offered and accessed by 50-85 percent of participants. At the average duration of follow up at three years, participants had decreased body weight, waist circumference, fasting plasma glucose concentration, serum insulin concentration, triglyceride concentration and blood pressure. These interventions reduced the risk of developing diabetes by 58 percent.

Feasibility of prevention interventions for diabetes type 2 have been shown in the Australian primary care setting using a RCT (Laatikainen et al., 2007). Two hundred and thirty seven individuals from General Practices with moderate to high risk of developing diabetes type 2 completed a structured program of group education sessions. Trained study nurses, dieticians and physiotherapists presented five 90 minute sessions over three months followed by a final session at eight months. The intervention model included dietary and physical activity information, goal setting, regular self-assessment and social support in a group setting. At 12 months, participants’ weight, waist circumference, mean fasting glucose, plasma glucose after glucose challenge, and diastolic blood pressures were reduced.

An evidence based diabetes prevention lifestyle program was commenced in August 2007 by Diabetes Australia – Victoria, called “Life! Program” (Diabetes Australia – Victoria, 2007). Eligible participants are over 50 year of age (or younger if Aboriginal or Torres Strait Islander) identified as being at risk of developing diabetes type 2 and have been referred to the program by their GP. Participants are supported to work towards reducing their body weight by 5% through healthy eating and incorporating 30 minutes per day of moderately intensive physical activity. Groups of up to 15 people undergo six training sessions over eight months to achieve these goals. Prevention programs such as this are cost effective given the ongoing expenditure for cares required from progressive disease related complications (Walker, Colagiuri, & McLennan, 2003).
PART II

The detailed Policy contexts, national funding system, education processes and education delivery modes shape the implementation of diabetes education nationally and internationally.Outlined below are examples of such educational models.

1.0 MODELS OF DIABETES EDUCATION

1.1 The GPs as sole diabetes patient managers

General practices are traditionally owned by a medical practitioner and operated as a small business (Hastings, 1997). Personnel are employed to facilitate cost-effective process of care by the doctor, increase throughput and increase profits. Registered and enrolled nurses are employed to perform allocated tasks. Some GPs provide the patients’ education, counselling and interventions without the assistance of a PN. These GPs consider complete involvement fulfills their holistic role; while others grow to trust the PNs’ competency and delegate health promotion, quality assurance and wound care (Willis, Condon, & Litt, 2000).

A survey conducted by Pascoe et al. (2005) of 222 urban and rural PNs’ enacted role in Victoria cites 80% of participants providing diabetes education. As there are approximately 100 CDEs in Victoria, this suggests that PNs are giving information to patients about diabetes. Seventy-eight percent of this group identified needing knowledge of diabetes management (Pascoe et al., 2007). Macdonald, Rogers, Blakeman and Bower’s study likewise found that PNs articulated the need for education to effectively support patients with chronic diseases (2008).

1.2 The GP refers patients to Diabetes Educators

In Hong Kong, a one year prospective randomized study was conducted to assess the effect of regular diabetes health education on cardiovascular risk factors in Chinese patients with diabetes type 2 (Ko et al., 2004). Patients were chosen from three regional diabetes centres. Those in the intervention group were seen by trained
diabetes education nurses individually every 10-14 weeks (5 x 30 minute visits in the year). Education topics included information on CVD, smoking, dyslipidaemia, obesity and exercise, diet, glycaemic control, blood pressure and medical compliance. The control group received the same medical care but no diabetes nurse education. Results showed that regular health education reinforcement was useful in improving central obesity, blood pressure, glycaemic control and lipid profile at 1 year.

Similarly, patients from 17 primary care organisations across England and Scotland were randomly chosen to attend a structured group education program within 12 weeks of diagnosis (Davies et al., 2008). Two trained healthcare professional educators facilitated the program of six hours duration presented over one day or two half days. The content was delivered in an eliciting rather than didactic style, covering topics such as lifestyle factors (food choices, physical activity, and cardiovascular risk factors), personal risk factors, and determining achievable goals of behaviour change to be achieved. This programme was the first step in the ongoing cycle of diabetes care provided by the primary care site. Outcome measures of BP, weight, blood lipid levels, smoking status, physical activity, quality of life, illness beliefs, depression and the emotional impact of diabetes collected at baseline, 4, 8, and 12 months for the intervention group showed significant improvement. No difference was shown for HbA1c levels between the two groups. It appeared that empowering patients by providing information and enabling them to set goals for lifestyle changes had beneficial affects.

1.3 The GP and PN create GPMP, TCA and organise patients to attend DE
In Cairns, Australia, the Division of General Practice has jointly employed through a “Cooperation agreement” with Diabetes Australia Queensland the Diabetes Program Manager (DPM), who is a CDE. The DPM organises and presents a group education program for patients with diabetes type 2, to a minimum of 12 participants. Physical and Lifestyle Programs for people with diabetes have also been presented through grant funding.

Practice nurses have access to a Diabetes Resource Nurse course, which informs them for providing assistance to the GP in patients’ chronic disease management, such as completing GP Management Plans and Team Care Arrangements (which includes the group sessions run by the DPM). PN training also gives them skills to run diabetes clinics in general practice and conduct more advanced complication screening, thus supporting the GP and diabetic patients.

The GP can claim the relevant item numbers for creation of the GPMP and TCA, and the CDE claims the item number for group education sessions.

Similarly, in the Southern Highlands Division of General Practice, NSW, patients complete GPMP and TCAs with GPs and PNs, to have individual diabetes education sessions. This rural Division has developed a Diabetes and Education Management Program for patients referred by GPs. The Diabetes Educator is employed by the Division as the Program Coordinator and Educator. She works collaboratively with the GPs identifying at-risk patients, coordinating care for those diagnosed with diabetes in line with Guidelines for Diabetes Management, develops programs, manages, monitors and evaluates cares, initiates links with other programs, such as an exercise program at the local gym, and has developed a foot care program with the local private podiatrist.
Access to electronic patient management systems has been found a key factor for systematic care. She does not maintain a separate caseload but works closely with GPs.

The Practice Nurses, practice receptionist or practice manager undertake data entry, recalls, audits and transfer of patient information within the individual practices. Practice level diabetes data is maintained at eight or nine practices by the PNs. It is considered important that training and support for PNs to provide diabetes information be available. The program has accessed an estimated 60% of people with diabetes in the area as well as achieving increased improvements in diabetes control and decreases in poor control.

And lastly, the Osborne Park GP Network, Western Australia (Osborne Division of General Practice, 2007) has implemented a Diabetes Education program. In the new financial year, continuation of a pilot CDE program through the employment of a CDE will be funded by a research grant with the ADEA and managed with the local Division of General Practice for 12 months. General practitioners and PNs create GPMP and TCA to refer patients with diabetes type 2 to the CDE. Patients will have an individual session with the CDE, and then participate in a series of workshops over five weeks of self management education, to be followed with a one-on-one session with the CDE.

1.4 The GP with PN who has completed Graduate Certificate but is non-credentialled providing diabetes education

Whilst no formal papers were found, personal communication with practice nurses who have completed a Graduate Certificate in Diabetes Education and Healthcare established that in their employment as PNs, conduct formal diabetes education with patients. Given that the credentialling process entails completing 1800 hours of patient education, all graduates of the various tertiary diabetes education courses would need to be employed in a facility where they could fulfil this requirement. GPs would be able to claim GPMP, TCA and PN item numbers, but the PN, as yet uncredentialled would not be able to claim the item numbers for diabetes education.

1.5 Nurse Led Clinics / Case Management

As international healthcare system’s structure and funding varies to that of Australia, the implemented models of diabetes education are also seen to vary. Many papers (Aubert & Herman, 1998; Braddock, 2007; Chan, Yee, Leung, & Day, 2006; Phillis-Tsimikas et al., 2004) report Diabetes Educators independently managing the healthcare of patients with diabetes type 2, with beneficial outcomes for the patient and the state. Some reports are of RCTs to determine the efficacy of ‘Nurse led clinics’ or ‘Nurse case management’ for future implementation; others are reports of current models of care.

In the United States, Aubert and Herman (1998) conducted a RCT over a 12-month period of a Registered Nurse/Credentialled Diabetes Educator case managing the care of 121 patients with diabetes type 2. A written detailed management algorithm was created and followed under the direction of the general practitioner and endocrinologist. Interventions included initial assessment, two week, then quarterly follow up, weekly (insulin users) or two weekly (oral medication only) phone calls, five-week, 12-hour group diabetes education sessions, reinforcement and support, and initial, 6 and 12 monthly blood tests. Improved glycaemic control was evidenced.
Also in the US, a culturally appropriate nurse case management and peer education diabetes care model was evaluated (Phillis-Tsimikas et al., 2004). Significant improvements in clinical outcomes and patient’s self awareness and understanding of diabetes were displayed. An RN/CDE, a bilingual medical assistant and bilingual dietician travelled to different clinics to see patients. The CDE also had a protocol for Staged Diabetes Management for glucose levels; hypertension and lipid levels to follow. Visits were recommended as a minimum of four times per year, with complicated cases being followed up within two weeks. Visits consisted of the CDE reviewing self-monitored blood glucose results, self-management, guidelines and goals, recommending needed changes for medications (as per protocol), and ordering follow-up pathology and arranging return calls. Trained peer educators (community health workers), who themselves had diabetes, presented information, and provided support and encouragement to patients in a planned format.

In Hong Kong, a quasi-experimental study of a diabetes nurse clinic was conducted over 12 months (Chan et al., 2006). The intervention group clinic was run by a group of trained diabetes nurses who were supervised by endocrinologists. Patients visited monthly and with two weekly follow-up calls regarding adjusted medications. The visit program included biomedical variables, education on self-management behaviours, and providing feedback and education on patients’ monitoring and record keeping. A significant improvement in glycaemic control occurred in the nurse led clinic’s patients. The nurse led clinic had the added benefit of the diabetes educator being a registered nurse who was able to provide not only medical consultation, but nursing care also, such as education on injection technique and management of hypoglycaemia, and time and dosage of medication administration.

In the United Kingdom, Braddock (2007) details outcomes of a new diabetes service run by a nurse practitioner (NP). The clinic is linked to four general practices but a clinic GP supports the NP. Guidelines were produced and clinic protocols created to guide decisions about patients’ care. Individual care is provided to those who require insulin therapy. The structured comprehensive education programme is person-centred, valid, quality assured assessable, and auditable (including patients’ experiences). Also, patients visiting the one NP was found to be beneficial as a relationship developed, making it easier for the NP to unravel any preconceived ideas that could block patient progress, thus furthering the individual patients’ needs. PNs provide the usual diabetes clinics (content not included in the paper).

Australian Nurse Led Models of Diabetes Education in General Practice have been implemented in the Melbourne North East Division of General Practice (formerly known as the Whitehorse Division of GP) (Frizzel, 2007; Shearer, Barnethy, Wicking, Glogolia, & McLeod, 2007). Across the Division, Diabetes Educators practice in nurse led chronic disease clinics in either of two ways:

**Contracted Clinic Model**

The Division (or a company/entity owned by the Division) delivers a diabetes clinic to contracted general practices at set times for an agreed fee. The Division recruits and employs the credentialled diabetes educator and is responsible for (amongst other things) recruitment of practices to implement these chronic disease clinics. The
practice is responsible for arranging an education area and equipment, and systems support of patient appointment booking, billing, recalls and reviews.

**Practice Operated Clinic Model**

The general practice directly employs a CDE to run a diabetes clinic on set days at set times. Sessions can include patient education and creation of GPMP and TCAs. At the arranged appointments within each general practice, the DE, doctor and patient meet at the completion of the GPMP and TCA (to meet MBS requirements). This is to both formalise the documentation and share the patients’ chosen goals, self-management interventions, clinical cares and interventions for the Diabetes Annual Cycle of Care. In both models, the CDE works collaboratively with the GP and is bound by national regulations regarding prescribing and any clinical investigations required.

In this model, the Practice Nurse provides nursing support and quality care to patients with diabetes, manages and runs the clinic in conjunction with practice staff, works as part of the team and ensures systems are in place that supports the effective operation of the clinic. The DE also acts as a resource person for practice staff and GPs, providing education on diabetes management equipment and information as required. Improved clinical outcomes have been demonstrated. A comprehensive information package of implementing Nurse Led Chronic Disease Clinics is available at http://www.wdgp.com.au/Resources/Chronic%20Illness/NurseLedFINAL.pdf.

Implementation of these models of diabetes education has been partially funded by the Victorian Government’s Hospital Admission Risk Program (HARP) initiative. The State government subsidises Credentialled Diabetes Educators in General Practices to improve patients’ self-management and diabetes control, and thus reduce patients’ admission to hospital for emergency health crises or deterioration.

And lastly, entrepreneurial Credentialled Diabetes Educators may also work as an independent registered business, entering into contract arrangements with General Practice to provide individual education on site with patients.

**1.6 DNE and Aboriginal & Torres Strait Islanders**

In line with the Directions Statement 2007 of the Queensland Aboriginal and Torres Strait Islander Health Partnership (Queensland Government, 2007), provision of community controlled primary health care services to Aboriginal and Torres Strait Islander peoples with their full participation is to be achieved. Given the rural and remote nature of some Indigenous Australian communities, access to and provision of culturally appropriate health care services can influence the model of care implemented, in particular, diabetes education.

In the Northern Rivers of New South Wales, a Primary Health Care Network was funded to plan and implement a best practice diabetes management program for the local indigenous communities (Cooper et al., 2007). After consultation with elders, local communities and health professionals, a comprehensive outreach service was established for four isolated Aboriginal communities. The team of specialist physician, GP, ophthalmologist, Aboriginal health education officers, Aboriginal health workers, diabetes educator, dietician, podiatrist, laboratory scientist and a renal nurse visit the communities monthly. Figure 1 outlines the flow of patients through the clinic.
Aboriginal community members are also welcomed for diabetes screening and a small number of elders attend for screening to act as role models and leaders for their communities. From 30-50 people are seen in each clinic (verbal communication, June 11, 2008). A huge increase in healthcare access has been shown, thus increasing screening and management of diabetes in this Indigenous population.

Another example of an Indigenous diabetes education Model is the Eyre Peninsula Chronic Disease Self Management Project for Aboriginal Communities in Ceduna / Koonibba and Port Lincoln (Collins, 2003). This program was run by a registered nurse and trained Aboriginal Health Workers (AHW). AHWs’ training included concepts of self-management, and then how to link and apply them in client management. Issues surrounding client recruitment, administrative roles, and consent and data collection roles were also taught.

Planning and negotiation with Aboriginal community leaders was essential to clarify processes and goals, and ensure participation. Furthermore, Aboriginal Health Workers were key service providers and their input determined the success of the interventions.
Patients increased in confidence, attendance and further application to self-management. Social changes also resulted from the rapport patients developed with the AHWs.

As 6,520 Indigenous Australians live in the Division of Ipswich and West Moreton (Primary Health Care Research and Information Service, 2008), effective provision of healthcare and diabetes education could result from inclusion of features raised in these studies, such as involving elders in planning and implementing programs and the employment of AHWs.

This report will not discuss culturally and linguistic diverse populations as they predominantly live in Sydney, Melbourne and with smaller numbers in Brisbane (AIHW, Thow, & Waters, 2005).

2.0 BUSINESS MODELS COMPONENTS
As Australian general practices are private businesses, implementation of diabetes clinics is a financial consideration and is guided, at present, by the available MBS item numbers outlined above (p.11), conjoint funding arrangement with Divisions of General Practice and pharmaceutical companies’ funding. Presentation and implementation of the Australian Government’s National Primary Health Care Strategy may improve these constraints (Roxon, 2008). Until this transpires, irrespective of practice size, location or funding, successful implementation of a diabetes clinic entails consideration of:

- Financial viability
- GP role and function
- CDE & PN role and function
- Business and clinical processes
- Quality assurance.

Table 1 outlines the components to be considered to implement a Diabetes Nurse Education clinic in General Practice.
<table>
<thead>
<tr>
<th>Table 1  Business Model Components</th>
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<tbody>
<tr>
<td><strong>Financial viability</strong></td>
</tr>
<tr>
<td>Determine number of patients with diabetes type 2 and THEREFORE which model to implement (as outlined in Diagram 2)</td>
</tr>
<tr>
<td>Cost of GP employing Practice nurse (with CDM skills and knowledge or willing to acquire)</td>
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<tr>
<td>Training and professional development for PN and reception staff</td>
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<tr>
<td>Insurance costs</td>
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<tr>
<td>A clinic room availability</td>
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<tr>
<td>Consumables and education material for patients</td>
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<tr>
<td>Clinic overheads (electricity, telephone)</td>
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<tr>
<td><strong>General Practitioner role</strong></td>
</tr>
<tr>
<td>Identify eligible patients for diabetes clinic and promote clinic</td>
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<tr>
<td>Provide ongoing clinical management including diagnostic tests request, pathology, medications</td>
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<td>Effective communication with clinic team</td>
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<tr>
<td>Timely availability to sign off on GPMP and TCAs</td>
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<tr>
<td><strong>Practice Manager role</strong></td>
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<tr>
<td>Ensure systems are in place to support clinic’s function</td>
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<tr>
<td>Ensure reception staff support the clinic and bill correctly</td>
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<tr>
<td>Support nurse and clinic process</td>
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<tr>
<td>Case identification and regularly review process</td>
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<tr>
<td><strong>Practice Staff role</strong></td>
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<tr>
<td>Support and promote clinic</td>
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<tr>
<td>Active up to date knowledge and skills for appointments, clinic billing</td>
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<td>They may organise reminder and recalls (or the PN)</td>
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<tr>
<td><strong>Practice Nurse role</strong></td>
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<tr>
<td>Provide clinical care for patients</td>
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<tr>
<td>May prepare GPMP and TCAs</td>
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<tr>
<td>May organise and run diabetes clinic with other practice staff</td>
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<tr>
<td>May perform case identification and review</td>
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<tr>
<td>Work as a team member and support system in place</td>
</tr>
<tr>
<td><strong>Credentialled Diabetes Educator role</strong></td>
</tr>
<tr>
<td>May prepare GPMP and TCAs</td>
</tr>
<tr>
<td>May perform case identification and review</td>
</tr>
<tr>
<td>Provide individual and / or group diabetes education</td>
</tr>
<tr>
<td>Provide education and support for practice staff</td>
</tr>
<tr>
<td>Organise and run diabetes clinic with practice staff (when not an external provider)</td>
</tr>
<tr>
<td><strong>Quality Assurance</strong></td>
</tr>
<tr>
<td>Enact Plan-Do-Check-Act cycle to ensure effective quality service.</td>
</tr>
</tbody>
</table>

(Australian Primary Care Collaboratives, 2007; Frizzel, 2007; Improving Chronic Illness Care, 2005).
2.1 Financial viability
Professional financial advice is necessary to ensure all cost and income factors are considered prior to realizing a new model of diabetes care. Costs to be considered when initiating a Practice Operated Diabetes Clinic include: nurse wages and on-costs, insurance, clinic consumables such as patient equipment and educational materials, clinic overheads (electricity, telephone), training and professional development. A Contracted Diabetes Clinic is easier to cost as it is a fee for service model. It is suggested that a general practice needs 70 patients with diabetes type 2 to initiate a diabetes clinic (Frizzel, 2007).

2.2 GP role and function, Credentialled Diabetes Educator, PN, Practice Manager and staff roles and function
It is imperative that the GP, CDE, PN, Practice Manager and staff have a clear understanding of each other’s roles, collaborative managing skills, realistic expectations of goals to be achieved and effective communication abilities. Training may need to be given prior to implementing a diabetes clinic. A Manual for Diabetes Clinic should be created detailing each team members’ roles and functions as well as business and clinical processes.

2.3 Business and clinical processes
Successful implementation of a diabetes clinic relies on collaborative efforts of all staff, including:
- Receptionist for managing patients appointments
- Organised patient flow plan
- Accurate, timely billing with clear communication of item numbers to be billed
- An electronic patient record system
- Systematic reviews of data bases for patient recalls and reviews
- An allocated and resourced Clinic room
- Printed information for patients.

2.4 Quality assurance
To ensure the diabetes clinic is functioning optimally and providing a quality service, regular review and evaluation is necessary for continuous improvement. The renowned tool, the Plan - Do - Study - Act cycle can be used.

*The PDSA cycle*
“Plan – In this phase, your objectives are defined and your team makes predictions about what will happen, and why it will happen. Your team will also prepare for the next step by answering the questions of who, what, where, and when.

*Do* – In this phase, the team will carry out the plan and collect the data. This will include documenting experiences, problems, and surprises that occur during this test cycle.

*Study* – In this phase, the team will analyse the test cycle and reflect on what you have learned. You will compare results with the predictions made in the planning stage, and draw conclusions based on the collected data.

*Act* - In this last phase, the team will decide if there are any refinements or modifications needed to the plan you have tried. This may lead to additional test cycles, which starts the process all over again” (Improving Chronic Illness Care, 2005, p. 7).
To assist general practices in delivering sustainable and systematic improvements in chronic disease care through applying effective quality improvement methods, the Australian Government has funded the Australian Primary Care Collaboratives (APCC) (Australian Primary Care Collaboratives, 2007). The APCC has designed and implemented a learning tool, The Collaborative Program, to guide practices in implementing the continuous quality improvement PDSA cycle.

3.0 CONCEPT OF VALUE ADDING
Optimum diabetes care can be achieved when point of care (POC) glycaemic control (HbA1C) pathology testing for individuals is used. POC A1C results enable the diabetes educator to provide counselling attuned accurately to the patients’ current status. Petersen et al.’s (2007) retrospective cross sectional study of 16,537 A1C results over 3.5 years shows that provision of reliable, accurate and rapid results lead to individuals’ improved glycaemic control.

OUTCOMES

1.0 PATIENT OUTCOMES
As outlined in the cited papers, diabetes education presented by a diabetes nurse educator demonstrates significant patient clinical outcomes. The clinical parameters measured include:

- Glycated haemoglobin (HbA1C)
- Fasting blood glucose
- Body weight/body mass index
- Blood pressure
- Lipid profile
- Morbidity and mortality.

Systematic education presented by diabetes nurse educators to patients with diabetes type 2 has also shown to further patients’ knowledge of self-management care (Brown, Garcia, Kouzakanani, & Hanis, 2002). When patients had the knowledge of how to manage their disease process and the skills to change necessary behaviours, they felt empowered and implemented these changes (Anderson, Funnell, Fitzgerald, & Marrero, 2000). Their diabetes was then better controlled, satisfaction with treatment increased and their perceived quality of life improved (Deakin, Cade, Williams, & Greenwood, 2003).

Consideration of patients’ satisfaction with the presence and role of practice nurses in general practice is also necessary. A review of the literature by Halcomb, Davidson, Daly, Griffiths, and others (2005) found that patients were accepting of and identified the PNs’ role as including clinical interventions (dressings, injections, BP measurement etc), but fewer patients identified the PNs role as providing education, test results or health monitoring. They strongly opined that PNs were an enhancement of the GP and not to be a substitution. As Hegney, Price, Patterson, Martin-Donald, & Rees’ (2004) report of focus group metropolitan and non-metropolitan consumers describes, consumers did not want choice taken away or limits imposed on whom could be accessed. That is, the consumer wanted to be able to choose whether they saw the PN (if at all) as well as or instead of the doctor. Ultimately, informed consent must
be sought from the patient as to who they will consult so access to adequate and appropriate information is necessary (Kidd et al., 2006).

Patient satisfaction with and acceptance of Diabetic Nurse Educator led clinics is yet another aspect to be considered when implementing process changes. Meta analysis of RCTs and semi-quantitative studies by Laurant et al. (2004) reports patients’ satisfaction with nurse led care increased as nurses tended to take more time with them, give more information and recall them more frequently than doctors.

Yet, as Tabrizi, O'Rourke, Wilson, & Coyne’s (2008) results from a questionnaire completed by 603 people with diabetes found, access to increased awareness and knowledge of care provision existence, care facilities and care providers would improve their satisfaction with the healthcare system. Service quality elements within the questionnaire were: choice of care provider, communication, autonomy, continuity, support group, quality of basic amenities, dignity, timeliness (prompt attention), safety, prevention and early detection, accessibility and confidentiality.

2.0 PRACTICE MANAGEMENT OUTCOMES
The cost effectiveness of implementing diabetes nurse educators for patient care in general practice needs to be determined for business efficacy. Yet, costing is suggested to be context dependent (Richardson, Maynard, Cullum, & Kindig, 1998). The systematic review by Laurent et al. (2004) of nurses providing care as a substitute to doctors, found that direct healthcare costs may be reduced or at least cost neutral. Contextual variables to be considered include differences in doctor/nurse salary and length of consultation. Yet, Raftery, Yao, Murchie, Campbell, & Ritchie’s (2005) four-year follow-up of a randomised controlled trial found that whilst the intervention of clinic visits and drugs were higher than the control group, costs to the National Health System were not statistically significant, but importantly, the Quality Adjusted Life Years (QALY) for the patient was improved.

The Melbourne East General Practice in Victoria, Australia, has found that their developed and implemented model of CDE in General Practice can be profitable (Shearer et al., 2007).

3.0 GP / PRACTICE NURSE / DIABETES EDUCATOR OUTCOMES
Upon implementation of a proposed patient care model, understanding of interpersonal professional relationships between doctors, practice nurses and diabetes nurse educators in general practice is necessary. Historically, the nurses’ subservient role to doctors and status differences has shaped their professional relationships (Halcomb et al., 2005; Willis et al., 2000). Since the inception of nurses in Australian general practice, it appears that PNs have been undeniably accepted by GPs to augment their services, yet consider the implementation of nurse practitioners to diagnose, treat and monitor patients with chronic diseases, such as diabetes, a threat (Jolly, 2007).

As successful implementation of diabetic nurse educator model of care within general practice is strongly reliant on GPs accepting this process, employment of clear role descriptions for all staff is necessary (Kidd et al., 2006). This could aid the dual role aspect of the GP being the PNs’ employer, clinical supervisor and team member (Halcomb et al., 2005; Price, 2007) and acceptance of the DNE role and function.
Likewise, medico-legal issues of accountability with shared-care of patients concerns GPs (Willis et al., 2000).

Practice nurses described their needs to fulfil their role of facilitating patients’ self-management for long-term conditions. Included were aspects of education in the social, psychological and emotional impacts of living with a chronic disease to enable appropriate management. PNs also expressed the need for support resources (Macdonald et al., 2008).

4.0 PUBLIC HEALTH / SYSTEMS OUTCOMES
As diabetes and its complications inflict significant consequences on individuals, families, health systems and countries (World Health Organization, 2006), effective systematic care is an imperative. The cost effectiveness of CDEs’ care of people with diabetes type 2 in General Practice can be measured by a reduced rate of disease complications and attendant needed interventions, emergency department visits, hospital admissions and a decreased length of stay in hospital if admission occurs (Diabetes Prevention Working Party, 2005).

Education interventions have been shown to decrease hospital admissions. Records of 18,404 patients with diabetes (type not stated) from American public safety-net primary care clinics were followed up over a mean 4.7 years period. Patients who had received at least one diabetes education session after diagnosis had 9.18 fewer hospitalisation per 100 person-years resulting in US$6,377-16,765 less in hospital charges per person.

Decreased service utilisation was also reported by Lorig et al. (2001) of people with chronic diseases. A longitudinal study with 831 people over 40 years of age completed a seven week group chronic disease self-management education course. At two year follow-up, the outcomes of completed data for 76% of eligible participants were decreased outpatient and hospital admissions. Not only was the cost to the individual/state for hospital admission reduced, but the cost of providing the education was less than hospital care.

In Australia, the beneficial effect of diabetes education and systematic care has been evidenced by the HARP program in Victoria. HARP Chronic Disease Management Services are available across 21 health services, encompassing rural and metropolitan areas. Acute hospital utilisation decrease has been evidenced by 5.3% decrease in emergency presentations 2001/02 and 2003/04, and a 4.4% decrease in emergency admission in the same period (Cook, 2005). Of the HARP patients, 35% experienced fewer emergency attendances, 52% had fewer emergency admissions and 41% had fewer days in hospital (Pike, 2006). Further government funding has been allocated for these primary care initiatives because of the demonstrated outstanding impact for patients and on the health system.

In summary, the various ways diabetes education has been implemented, the business systems to be considered, and importantly, the resultant outcomes are graphically represented in the following:

Diagram 2: Building a Diabetes program
REFERENCES


TAFE Queensland. (2008). Certificate III in Aboriginal and/or Torres Strait Islander Primary Health Care. from http://www.tafe.qld.gov.au/dds/search/openCourse.do;jsessionid=LGVBJDL19wLyf81hhBf5M0X7bGx58QKwMYZ21sLvd6n9Flbyp4x!676642976?instituteID=&keyword=aboriginal+health+worker&callCentreMode=false&externalCallMode=false&breadCrumsBase=%3Ca+href=%22%2F%22+title=%22Home%22%3EHome%3C%2Fa%3E&accredited=true&course_id=22470&courseTypeFilter=&ins_spec=false


APPENDIX 1

LEVEL OF EVIDENCE

I  Evidence obtained from a systematic review of randomised controlled trials, providing that it includes at least two properly designed trials of moderate size or a systematic review. This does not include trials which could be reasonably argued not to effect the findings of the review.

II  Evidence obtained from at least one properly designed randomised controlled trial.

III Evidence obtained from a well designed controlled trial without randomisation, from well designed cohort or case controlled analytic studies, preferably from more than one centre or research group or from multiple time series with or without intervention.

IV Opinion of respected authorities, based on clinical experience, descriptive studies or reports of expert committees.

(Queensland Government & Brisbane Inner South Division of General Practice, 2000, p. 16).
# APPENDIX 2

**MEDICARE BENEFIT SCHEDULE ITEM NUMBERS RELEVANT TO CHRONIC DISEASE (DIABETES) MANAGEMENT**

<table>
<thead>
<tr>
<th>Item number</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>721</td>
<td>GP Management Plan (GPMP)</td>
</tr>
<tr>
<td>723</td>
<td>Team Care Arrangement (723)</td>
</tr>
<tr>
<td>725</td>
<td>GPMP Review</td>
</tr>
<tr>
<td>727</td>
<td>TCA Review</td>
</tr>
<tr>
<td>2517</td>
<td>Level B GP Consult / SIP Diabetes</td>
</tr>
<tr>
<td>2521</td>
<td>Level B Consult / SIP Diabetes</td>
</tr>
<tr>
<td>2525</td>
<td>Level D GP Consult / SIP Diabetes</td>
</tr>
<tr>
<td>740</td>
<td>Case Conference &gt; 15 minutes</td>
</tr>
<tr>
<td>742</td>
<td>Case Conference &gt; 30 minutes</td>
</tr>
<tr>
<td>744</td>
<td>Case Conference 45+ minutes</td>
</tr>
<tr>
<td>10990</td>
<td>General medical services – metro</td>
</tr>
<tr>
<td>10991</td>
<td>General medical services – rural</td>
</tr>
<tr>
<td>10951</td>
<td>Diabetes Education Service</td>
</tr>
<tr>
<td>729 &amp; 731</td>
<td>Contribution to a Multidisciplinary Care Plan</td>
</tr>
<tr>
<td>900</td>
<td>Domiciliary medication review</td>
</tr>
<tr>
<td>10997</td>
<td>CDM Practice Nurse or registered Aboriginal Health Worker</td>
</tr>
<tr>
<td>8110, 81110, 81120</td>
<td>Allied Health assessment of individual</td>
</tr>
<tr>
<td>81105, 81115, 81125</td>
<td>Allied Health group education (2-12 people) with referral from GP</td>
</tr>
<tr>
<td>713</td>
<td>40-49 year old Diabetes Risk Evaluation</td>
</tr>
<tr>
<td>710</td>
<td>15-55 year old Aboriginal / Torres Strait Islander Adult Health Check</td>
</tr>
</tbody>
</table>

(Department of Health and Ageing, 2008a, 2008c, 2008e; Frizzel, 2007; The Royal College of General Practitioners, 2007)
## ADEA Accredited Courses


<table>
<thead>
<tr>
<th>COURSE TITLE</th>
<th>INSTITUTION</th>
<th>FEES</th>
<th>PREREQUISITES</th>
<th>COURSE INFORMATION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Graduate Certificate of Diabetes Education and Management</strong></td>
<td>University of Technology New South Wales</td>
<td>Full fee paying $4,440</td>
<td>Bachelor degree in health, such as nursing or medicine, nutrition, podiatry or pharmacy, or an equivalent qualification such as hospital-trained registered nurse with experience, or an Aboriginal Health Worker qualification. The usual requirement of one year’s professional employment and it is assumed that applicants are already working in the area of diabetes education and management.</td>
<td>Offered as an off-campus course over one year with two three-day on-campus attendances required. The program has four modules and a required 40 hours of supervised clinical experience. The workshops are offered on either UTS campus Sydney or UQ Queensland.</td>
</tr>
<tr>
<td><strong>Graduate Certificate in Diabetes Education and Health Care</strong></td>
<td>Mayfield Education Melbourne, Victoria</td>
<td>$5,290</td>
<td>Bachelor degree and qualified health professionals such as Registered Nurses (Div 1), Registered Dieticians or Registered Podiatrists.</td>
<td>This course is offered at Certificate level run over an academic year, 10 to 12 months. There are five separate study block weeks on-campus at intervals during the year, together with two weeks clinical placement with Credentialled Diabetes Educators at a variety of venues. The course has eight units of study and is NOT available in off-campus mode. There are two intakes each year commencing in March or July.</td>
</tr>
<tr>
<td><strong>Graduate Certificate of Diabetes Education</strong></td>
<td>Deakin University Victoria</td>
<td>$9,228</td>
<td>Bachelor degree with health science background, including registered nurse, dieticians, and pharmacists seeking to be credentialled with ADEA. 12 months full-time clinical experiences.</td>
<td>This course is offered part-time study over one year with a five-day on-campus workshop and one week clinical experiences. The course provides flexible learning strategies via online interactive activities with teaching staff. The course articulates with other courses at diploma, masters, and doctorate levels.</td>
</tr>
<tr>
<td><strong>Graduate Certificate in Health (Diabetes Management and Education)</strong></td>
<td>Flinders University South Australia</td>
<td>2008 Commonwealth Supported Course $2,038</td>
<td>Applicants must hold a nursing degree or equivalent qualification and must be a registered general nurse holding a current practising certificate, or Aboriginal health workers or other relevant health professionals.</td>
<td>This course is offered part-time and internal mode only. Three topics require on-campus attendance, each for one week intensives. One module consists of clinical placement at recognised diabetes centres.</td>
</tr>
<tr>
<td><strong>Graduate Certificate in Diabetes Education &amp; Graduate Diploma Health Sciences (Diabetes Education)</strong></td>
<td>Curtin University Western Australia</td>
<td>Diploma - $11,200 Certificate - $5,600</td>
<td>Bachelor degree in health and allied health or by recognition of extensive work experience in a health related field.</td>
<td>Both courses are offered in a flexible delivery mode allowing students to study from home. The Diploma is one year full-time or two year part-time study and the Certificate is one year part-time. The Diploma comprises the certificate course and also prepares the students for research, projects and Master level studies in diabetes. Students are required to participate in clinical practice (2 x 2 week blocks, which can be undertake full or part-time).</td>
</tr>
</tbody>
</table>