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**New Workforce-based Models of Primary Care and an evaluation of the quality of
evidence underpinning them**

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1. Introduction

Strengthening primary care by extending workforce roles and skills within health systems is one way to meet the increasing demands upon the health system.

Although there is consensus that health systems with strong primary care orientations are associated with improved equity, increased access and appropriate services at lower costs and improved population health (Starfield 1994; Atun 2004), it is widely recognised that the primary care workforce is facing key challenges. These include mal-distribution, sub-optimal skills, training and knowledge, variable support for team work, and other models of care, and a lack of enhanced clinical inter-professional education and training opportunities. These challenges are also being exacerbated by a wide range of factors including changing burden of disease; changes in service delivery, changing workforce expectations and specialisation, an ageing population and workforce, increased prevalence of complex, chronic, long term conditions and multi-morbidity, new e-health technology, increasing health system complexity and fragmentation; and the recognition that no profession alone can meet all population health needs.

Strengthening the primary care workforce is advocated to address current and future patient and health system demands such as patient accessibility and continuity of care and quality of care. A wide range of policy options have been considered including those designed to improve retention (via workforce organisational and management policies) others to increase the efficiency of the skill mix (via developing new or advancing or revising existing practitioner roles – e.g., Practice Nurses, Physician Assistants, Medical Assistants, Nurse Practitioners, Allied Health Assistants) and to improve productivity (via linking payment to performance (Dal Poz et al 2006; Dubois, CA & Singh, 2009)). Of all these policy directions, there is less evidence about the ‘ideal workforce of a team-based primary care practice’ or how to increase the efficient skill mix via new or revised professional roles within team-based primary care (Tedeschi, 2009, Laurant et al 2010).

The lack of evidence to support new directions in primary care is surprising given that evidence based medicine is well accepted within clinical medicine as a way of ensuring the highest quality of patient care. It is well understood that evidence based medicine is important to ensure that the gap between research evidence and clinical practice is minimised, reducing the introduction of expensive, ineffective or even harmful treatments (Rosenberg and Donald 1995).

Since evidence does exist that workforce role expansion utilising new or revised roles can maintain and even improve the quality of care and the outcomes for patients (Laurant et al 2010), it is essential to assess the available evidence for each new or revised workforce-based models of primary care, and to conduct well designed rigorous evaluations for those where evidence is lacking. This includes gathering evidence on the impact of the role and contribution of a range of health professionals delivering innovative models of care within team-based primary care.

In this paper we will summarise the evidence of models of primary care using different workforce arrangements, provide a framework for assessing evidence about models of primary care and using the framework, evaluate the quality of that evidence in relation to models of diabetes care in the primary care setting.

2. Overview of workforce arrangements and models of primary care

Given the recognised importance of workforce skill-mix in primary care (WHO, 2000;2008), we have adapted a typology¹ proposed by Sibbald et al (2006) and referred to by Buchan & Dal Poz (2002) and Laurant et al (2010) to describe types of workforce-based models of primary care : namely:

- **Innovation** – refers to the creation of new jobs by introducing new types of workers. For example, Physician Assistant² and Nurse practitioners
- **Supplementation/enhancement-** refers to increasing the depth of a job by extending the role or skills of workers. For example, Allied Health Professionals, Allied Health Assistants)
- **Substitution/delegation** - refers to either expanding the breadth of a job by working across professional divides or moving tasks up or down a traditional unidisciplinary ladder. For example, Practice nurses, Medical Assistants

Primary care workforce models generally:

- contribute to changing the primary care workforce skill-mix,
- build multidisciplinary team-based primary care;
- seek to enhance patient access to a broader range of primary care providers;
- have a focus on improving quality of primary care through developing new roles in existing or/new professionals; and
- include clinical and practice capacity building roles.

Table 1 below briefly summarises key features of these workforce-based models.

¹ We do recognise that debate exists about the use of typologies to classify workforce roles, and depending on the classification criteria – workforce roles may be able to be classified into more than one type.

² Although Physician Assistants(PAs) are a recognised new workforce-based model internationally (especially in the US), in Australia PAs are yet to be established and utilised in primary care settings., thus are not discussed further in the paper.

Table 1 Summaries of Australian Workforce-based models of Primary Care

Workforce-based models	Examples-	Evidence
Innovation	Nurse Practitioners (NPs) - a registered nurse educated for advanced practice who is an essential member of an interdependent health care team and whose role is determined by the context in which s/he practices	The NP role has been demonstrated to have a beneficial effect on the health outcomes of the serviced populations both internationally and in Australia, without compromising cost effectiveness ³
Supplementation/enhancement	Allied health professionals (AHPs) e.g., psychologists; dieticians, physiotherapist etc) are providing or improving access to new or existing services to meet unmet needs. Specific primary care e.g., psychologists are providing focused psychological strategies for anxiety and depression.	Due to limited and variable workforce data, limited evidence of effectiveness and cost-effectiveness of AHPs on health outcomes ⁴ .
	Allied Health Assistants (AHAs) support the delivery of allied health services, under the direction of Allied Health Professionals (AHPs). May include: Allied health assistant; Therapy assistant Physiotherapy assistant; Podiatry assistant Occupational therapy assistant Speech pathology assistants	Due to limited and variable workforce data, limited evidence of effectiveness and cost-effectiveness of AHAs on health outcomes.
Substitution/delegation	Practice nurses (PNs) are enhancing GP access to other providers especially in areas of workforce shortage, improving affordability and quality of care and assisting integration with other services in the local area.	Australian studies concur that there is considerable potential to use practice nursing to improve the delivery of services in general practice. However, many issues exist related to funding models, education, recruitment, retention & leadership ⁵ .
	Medical assistants (MAs) - are trained specifically to perform delegated tasks at the direction of the supervising practitioner. MAs can provide basic clinical and administrative assistance including: applying wound dressings, to measuring BP, pulse, temperature, respirations, and recalls and reminders	Limited evaluative evidence exists as to the optimal place of the medical assistants role's in Australian primary care and to determine its impact on the effectiveness and efficiency ⁶

3. Assessing the quality of evidence of new models of primary care

3.1 A framework for assessing the quality of evidence of new models of primary care

When determining whether to introduce a new model of care it is important to know what the quality of the evidence for that model is. In particular it is critical to know whether it is likely to achieve the aims of the new model and whether this represents value for money. New

³ Nurse Practitioner Project: Phase 2 External Evaluation (Latrobe Uni)-

http://www.health.vic.gov.au/_data/assets/pdf_file/0004/17608/finalreport13august.pdf

⁴ <http://www.health.qld.gov.au/ahwac/docs/moc-finalreport.pdf>

⁵ Practice nursing in Australia- Dr Rhonda Jolly, Social Policy Section,

http://www.wagpnetwork.com.au/client_images/125238.pdf

⁶ Medical assistants - A primary care workforce solution? -

<http://www.racgp.org.au/afp/200908/200908anderson.pdf>

models of care may seek to provide greater health gain for less (or no more) cost than standard care, the same health gains for less cost; or greater health gain for an additional cost deemed worth paying (NHMRC, 2001)

There are a number of dimensions to the assessment of medicine that can be gained from evidence based medicine principles and applied to the assessment of models of primary care (see Table 2).

The first question to ask is whether the studies are relevant to the proposed intervention. And in particular, was the study designed so that it is clear what outcome would be achieved and whether it was appropriately measured. For example, was the new model of care intended to improve health outcomes, save money but produce no worse health outcomes (non-inferiority), or improve patient compliance with treatment recommendations. Furthermore, the study should have a reasonable hypothesis and scientific explanation with evidence underpinning a theoretical framework which would explain why the desired effect might be expected to result from the intervention.

The design of studies can vary markedly. The highest standard of evidence as defined by the NHMRC is from systematic reviews of randomised controlled trial evidence (Level I). Systematic reviews determine whether an effect can be replicated and by pooling the results of studies gives the best estimate of the magnitude of treatment effect (NHMRC, 2000).

The second highest level of evidence is at least one properly designed randomised controlled trial because randomisation minimises bias that could occur if patients were otherwise allocated to the intervention or control group, by minimising confounding due to the unequal distribution of factors which may impact on the effect of the intervention between groups (Level II). Patients and clinicians may be blinded so that one or both do not know who is being given the intervention and who is receiving standard care, however it is more difficult to do this in primary care interventions than in drug trials for example where patients may be given a medication of similar appearance in both the intervention and control group.

The third level of evidence includes pseudo randomised controlled trials, comparative studies case control studies and cohort studies. These studies designs may introduce bias including confounding in the treatment comparisons thus compromising the findings of the study (Level III).

The fourth level of evidence includes evidence from case series such as pre and post test studies. These studies suffer from the problems caused by lack of randomisation including non-comparability of control and treatment groups resulting from the methods of selection of which group patients are allocated to, the likelihood of medical management received by the groups being compared and potentially difference outcome measurement used in each of the groups (Level IV).

The lowest level, now excluded by NHMRC, is expert opinion and consensus from expert committees as they do not have a scientific basis for evidence (Level V).

While a study may have a statistically significant effect, it is important to know whether this effect is clinically important. For example, a program to help patients reduce weight may do so but would the scale of the weight be regarded as clinically important if for example it was less than 1 kilogram? In such an intervention, it is also important to know if the outcome was

sustained or whether the difference between the intervention and control groups became insignificant over time. While interventions may have benefits it is also important that studies identify and measure any harms.

It is well accepted that health care funds should be allocated efficiently. As funding becomes increasingly scarce in an environment where governments are in deficit and internationally we are facing a global financial crisis and economic uncertainty, ensuring the introduction of new models of care represents value for money is critical.

Table 2: A framework for assessing the quality of evidence of models of primary care

Evidence	Purpose
Relevant and replicable e	Were the study design outcomes appropriate and relevant? Has the design been specified clearly enough so that it could be repeated?
Theoretical framework	Is there a logical scientific reason the intervention would have the desired effect?
Strength of the evidence	Did the study design eliminates bias and did the p value or confidence interval reasonably exclude chance?
Size of the effect	Was the effect size clinically important?
Transferability and representative	What are the benefits and harms and do they differ for patient groups? Is the study representative of the population in which the model of care is to be applied?
Duration	Is the effect sustained?
Value for money	Was the model of care cost effective relative to standard care?

3.2 Assessing the quality of evidence of new models of primary care for diabetes care

The following is a summary of models of primary care designed to improve diabetes care and an assessment of how they fit within the general types of models of care described in section 2 and the quality of the evidence they offer (Table 3).

3.2.1 Point of care testing along the Mallee Track

This study by Shephard et al (2005) reports on a before and after study of 49 patients in 7 rural towns who were offered “one-stop shop” care. Standard care was described as a disjointed and uncoordinated approach to care with the intervention provided being a new multidisciplinary service including a single appointment with the local GP appointment, a diabetes educator and podiatrist and onsite testing conducted by a nurse. There was a significant reduction in haemoglobin A1c (HbA1c) but only percentage reductions were reported for other measures and no p values were reported. Assessments were repeated at follow-up GP visits. It is not clear, but it may have been that the sample size was too small to show a significant difference. No cost effectiveness study was undertaken.

3.2.2 Diabetes model of care - WA

This is a grey literature report by the WA Department of Health on a recommended model of care from health promotion through GP-coordinated multidisciplinary prevention and management, to specialist care. The model is described including the role of the WA government and Divisions of General Practice. Intended outcomes were described such as reduced rates of diabetes, reduced complications, and reduced ED presentations and hospital admissions. However there is no evaluation of the effectiveness or cost of the program.

3.2.3 Pharmacy diabetes care

Krass et al (2007) reported a multisite control vs intervention study involving 56 pharmacies (28 interventions, 28 control) across four Australian states and urban and rural areas. Intervention pharmacists received a 2 day workshop and were given a manual for self-directed learning. The patients were delivered the service over four visits to the pharmacy. The study followed 335 participants with 299 completing the study. Patients were followed over a six month time period and were found to have a significant reduction in HbA1c.

3.2.4 'QAAMS' Point of Care testing model for diabetes management

Shepherd M (2006) reported on clinical effectiveness of the 'QAAMS' Point of Care testing model for diabetes management in Australian diabetes medical services, a program now embedded in 65 aboriginal medical services. The program (POCT) involved clinical staff, aboriginal health care workers and allied health professionals. Based on two medical services there was a statistically significant reduction in HbA1c in 74 patients 12 months after commencing POCT.

3.2.5 Greater green triangle diabetes prevention project

Laatikainen et al (2007) and Kilkinen et al (2007) report on a study of 237 subjects with at least moderate risk of developing type 2 diabetes participated in a dietary and physical activity intervention in this pre and post test study. Patients were recruited by a specially trained study nurse in GP clinics using the Diabetes Risk Score tool. The study was carried out in three rural towns in Southeast Victoria. The model consisted of six group counselling sessions facilitated by trained study nurses, a dietician and a physiotherapist. After 12 months patients experienced a significant reduction on a number of measures including weight, mean fasting glucose and plasma glucose.

3.2.6 Enhanced primary care

Foster et al (2008) describe the Australian government initiative to introduce Chronic disease management items on Medicare, which allow Medicare rebates to be paid for eligible patients including those with diabetes to have a coordinated care plan developed by the patient's GP which may include referral to up to five allied health visits per year. A number of potential adverse outcomes of the program were identified and illustrative hypothetical case studies (not based on an actual data) claiming possible serious perverse incentives were identified. The possible adverse effects included prevention of allied health professionals providing care in line with recommended clinical guidelines and requirements for allied health professional to engage in pro bono to be part of a care plan meeting. However, as there is no study of actual patients, the extent of these possible unintended outcomes and any health consequences are not measured.

3.2.7 Chronic disease management in primary care

Dennis et al (2008) undertook a systematic review of Australian and international studies of chronic disease management in primary care. They reported that multidisciplinary team care,

self management interventions and adherence to guidelines had a positive relationship with health outcomes. They included 141 studies and 23 systematic reviews. The study had the benefit of seeking objective measurement of measures of disease control and a range of other measures including patient and practitioner satisfaction and adherence to guidelines. Although economic measures were sought in the review, no summary of cost effectiveness was given in the paper. The main limitation of the study is that it is very broadly defined including studies using a range of methods for many different types of models of care using different outcome measures, applied to different patient groups, for different conditions for which there may have been a range of conclusions which may not be universally applicable to all patients and all models of care. Ideally, to be reliably replicable and applied in a policy setting, the review would have pooled the results of outcomes for specific patients for a clearly specified intervention to determine its relative effect and cost-effectiveness over a specific standard care comparator.

Table 3. Summary of models of care and the strength of their evidence

Model of care	Relevant and replicable	Theoretical framework	Strength of the evidence	Size of the effect	Transferable and representative	Sustained effect	Value for money
Point of care testing Shephard et al(2005)	Few details of the intervention specified	-	IV	P value on one clinical measure HbA1c	Small sample size in 7 rural communities	10 months	-
Diabetes model of care – WA (2008)	High level program description	-	V	-	Potentially high if the study were conducted state-wide	-	-
Pharmacy diabetes care Krass et al (2007)	Defined protocol	Loose description of pharmacy role in disease management	II	Significant reduction in HbA1c	Yes	6 months	-
POCT Shephard (2006)	A brief description given	-	IV	Significant reduction in HbA1c	Aboriginal rural communities	12 months	-
Greater green triangle diabetes prevention project Laatikainen et al (2007) and Kilkinen et al (2007)	Yes, based on the Finn study	Yes, based on the Finn study	IV	Significant reduction in cholesterol, plasma levels, BMI, weight	3 rural communities in Victoria	12 months	-
Enhanced primary care Foster et al (2008)	Medicare Enhanced primary care program	Yes, based on Wagner's chronic care model-	V	Case studies were illustrative not actual patients claiming perverse incentives	-	-	-
Chronic disease management in primary care Dennis et al (2008)	Systematic review – but very broadly defined	Yes, based on Wagner's chronic care model-	(I)	Multidisciplinary team care, self management interventions and adherence to guidelines had a positive relationship with health outcomes	Review of Australian and international studies of chronic disease interventions	-	-

4 Discussion

The current primary care policy reform context emphasises the need to provide Australians with access to cost-effective, integrated and connected community-based primary care.

A key policy strategy is to support and strengthen a well-trained multidisciplinary team-based primary care workforce (Commonwealth of Australia, 2009). The Commonwealth Government is investing in several key priority areas (Commonwealth of Australia, 2010) within primary care, including:

- additional **training places** for GPs and medical specialists and support for nurses in both primary care and aged care;
- establishing **Medicare Locals** (independent primary health care organisations) across Australia, to work with the full spectrum of General Practice, allied health and community health care providers and improve access to care and drive integration between services; and
- Improving **PHC service delivery** by funding 23 new GP SuperClinics and upgrading and extending 425 existing PHC facilities to improve team-based care and extend the delivery of GP Super Clinic style services.

The Commonwealth Government is also **piloting new approaches** for the flexible delivery of primary health care services through general practice for the treatment and ongoing management of people with diabetes. In recognition of the increasing evidence that people with diabetes struggle to navigate the health system and that they require coordinated, integrated, multidisciplinary diabetes care and support – in July 2011, the Commonwealth Government committed \$30.2m over 3-4 years to a **Coordinated Care for Diabetes Pilot** (Roxon, 2010) in the primary care setting. The pilot will test the validity and effectiveness of a model of prepaid funding for coordinated care of patients with diabetes in general practice. The pilot seeks to develop systems to manage prepaid funds within general practice. Patients register with a general practice that undertakes to coordinate their care, and practices will manage pre-allocated funds to provide services instead of billing Medicare. Pritchard (2011) contrasts the Australian Government proposal for registration of patients with diabetes with current practice. Under the new initiative practices would receive \$1200 for each registered patient comprising \$250 for purchase of allied health services and \$950 for a year of services from the practice. Practice resources can be directed towards health care, prevention, coordinated care and implementing public health measures “in the hope of yielding better health outcomes” with reference to a number of Australian and international studies where coordinated care led to better health outcomes for chronic disease including diabetes. The pilot will also examine structured multidisciplinary diabetes patient education packages for people with diabetes. To date no details are available as to the workforce model of care (skill mix) that will be used in the pilot, however, with good study design it could yield valuable evidence about the relative merits of the intervention in diabetes outcomes.

Given the emphasis on evidence-informed policy making, and the importance of taking contextual factors into account for policy implementation (Lavis et al 2009) the Government needs to be transparent, and accountable for its decisions and actions. A recent editorial in the Medical Journal of Australia (Naccarella et al 2011) questioned: ‘What role is evidence playing in current primary health care workforce reforms?’ and argued that to meet Australia’s health system challenges and respond to changing population and workforce needs and expectations, evidence needs to inform planning, implementation and evaluation of the new policy investments. Further they argued that until we have a better understanding of how evidence is being used, there will be limited knowledge about what makes policy implementation work, for whom and in what circumstances.

The studies of primary care reviewed in this paper suggest that in Australia there is need for a much higher standard of evidence about the merits of models of primary care. Few studies are designed to

the highest standard of evidence, and thus risk the introduction of bias that may result in incorrect conclusions. A number of the studies were for very small geographic areas limiting the extent to which findings were representative of what might be found for other populations. A number of studies did not clearly define the intervention so that it could not be replicated with certainty. None of the studies included an assessment of cost effectiveness. An important consideration is whether the effect of the intervention justifies the cost and where public funds are limited those treatments which represent the best value for money are identified (Drummond et al 2005).

5. Conclusions

While there is a proliferation of new models of primary care in Australia, there is a need for more robust studies to assess whether these interventions are effective in producing improved health outcomes and whether effective interventions represent value for money before they are introduced into clinical practice or government policy.

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