RAPID REVIEW OF THE NURSE PRACTITIONER LITERATURE

NURSE PRACTITIONERS IN NSW 'GAINING MOMENTUM'

NSW GOVERNMENT Health

NSW MINISTRY OF HEALTH
73 Miller Street
NORTH SYDNEY NSW 2060
Tel. (02) 9391 9000
Fax. (02) 9391 9101
TTY. (02) 9391 9900
www.health.nsw.gov.au

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CHSD
centre for health service development

ahsri
australian health services research institute

UNIVERSITY OF WOLLONGONG

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Key messages

Nurse practitioners first appeared in the USA in the 1960s. There is a history of research into nurse practitioners that goes back to the early 1970s, with a particular focus on comparing the outcomes achieved by nurse practitioners to the outcomes achieved by doctors.

Over an approximately 10-year period (1994-2004), multiple government-sponsored pilot projects were conducted, to test the feasibility of introducing nurse practitioners. The results of all the pilot studies supported the implementation of nurse practitioners.

The international evidence consistently demonstrates that care by nurse practitioners results in processes and outcomes that are either equivalent to or better than those achieved by doctors, with the strongest evidence for increased patient satisfaction.

The nursing literature emphasises that nurse practitioners are grounded in a set of nursing values, knowledge, theories and practice, and that nurse practitioners provide a service that is qualitatively different to doctors.

There is a basic contradiction in much of the research evidence: if nurse practitioners provide a different type of service to doctors, then it makes no sense to be constantly comparing the two professions.

Existing reviews of the literature contain virtually no Australian studies, a product of the very recent origins of authorised nurse practitioners in this country. The first authorised nurse practitioner was appointed in Australia as recently as 2001.

The only systematic review (of qualitative studies about the experience of being an advanced practice nurse) to include only Australian studies, includes no studies involving nurse practitioners.

Nurse practitioners working in emergency departments comprise 25-30% of the nurse practitioners in Australia, by far the largest group. This is reflected in the number of Australian studies which have involved research into the nurse practitioner role in emergency departments. This research has focused almost entirely on the role of nurse practitioners in fast track units and minor injury clinics.

Australian research in settings other than emergency departments is quite diverse, but there are only two areas of practice with more than one study: mental health and aged care.

There is a significant gap in the literature in terms of studies investigating nurse practitioners in rural and remote locations in Australia.

The nature of the nurse practitioner role – particularly the ability to prescribe, order and interpret diagnostic investigations and refer to other providers – has the potential to improve continuity of care and reduce fragmentation. There has been virtually no Australian research focusing on this aspect of the nurse practitioner role.

Inherent in the nurse practitioner role is the issue of clinical leadership. In general, the role of nurse practitioners as clinical leaders has not been investigated in Australia.

There is a notable absence of theory in the Australian research undertaken to date, either to inform the research or to develop theory based on the findings of the research.

In the Australian literature there is an almost complete absence of drawing on the lessons learnt from the broader literature in areas such as organisational change and implementation science. This seems like a lost opportunity to learn from a vast literature in these other fields.

No Australian studies were identified which had conducted an economic evaluation of nurse practitioner services, which is a major gap in the literature.

SECTION ONE

Introduction

Much of the development of the nurse practitioner role is based on the assumption that such a role will improve access to health services, with access framed in a variety of ways: shortage of providers, particularly medical practitioners; geographic isolation; cost of services (i.e. nurse practitioners can provide more affordable health care) (Carryer et al., 2007, Duffield et al., 2009, Pearson and Peels, 2002). Nurse practitioner (NP) positions were typically introduced into primary health care but have expanded significantly over the years into hospital-based care. The role of nurse practitioner was first developed in primary care in the USA and Canada during the 1960s. Nurse practitioners were introduced into the UK in the 1980s.

Work to explore the feasibility of the role in Australia commenced in the early 1990s in New South Wales, culminating in the first nurse practitioners to be authorised (in December 2000) and the first nurse practitioner to be appointed (in 2001) to work as a Nurse Practitioner (Remote Generalist) in the health service at Wanaaring in remote north west NSW. Other jurisdictions adopted the nurse practitioner role over a period of several years, with extensive pilot projects in Victoria (Parker et al., 2000, Pearson et al., 2004), the Australian Capital Territory (ACT Health, 2002) and Queensland (Queensland Health, 2003), building on the original pilot projects undertaken in NSW (NSW Department of Health, 1996). Details of these pilot projects are included in Appendix A. Legislation to enshrine the role of nurse practitioner was enacted over an 11-year period from 1998 (NSW) to 2007 (Northern Territory), culminating in national legislation regarding nurse practitioners with the establishment of the Nursing and Midwifery Board of Australia in 2010. The history of the early development of nurse practitioners, both in Australia and overseas, has been well documented by Foster in her recent PhD thesis, with a particular emphasis on the events in NSW (Foster, 2010).

For nurses working in advanced nursing roles, some countries (e.g. Australia, Canada, New Zealand, the United Kingdom, the United States of America) primarily use the title of nurse practitioner, whereas others (e.g. South Korea, Singapore, Switzerland) use the title of advanced practice nurse (Pulcini et al., 2010). Some countries use either term consistently (e.g. Australia with national registration and national definitions and standards for nurse practitioners) whereas other countries have their own internal variations. For example, in the UK there is some interchange between the terms 'specialist' and 'nurse practitioner' (Pulcini et al., 2010). In the USA, there are different legislative requirements for nurse practitioners between states: in 2008, the boards of nursing in 24 states had sole authority to define the scope of practice of nurse practitioners with no medical oversight; in 20 states the scope of practice of nurse practitioners required medical collaboration, in 3 states medical supervision was required and in 4 states the scope of practice had to be authorised by both nursing and medical boards (Foster, 2010). In Australia, although the definition and competency standards for nurse practitioners are now standardised there is not an equivalent level of consistency for other advanced practice nursing roles (Duffield et al., 2009).

The literature on nurse practitioners is diverse and plagued by a multiplicity of terms, definitions and roles across the various parts of the world that have proceeded down the path of advancing the practice of nurses. There are continual references in the literature to 'confusion' over definitions and roles of advanced practice nurses or nurse practitioners; for example, Duffield et al. (2009), Dowling et al. (2013) and Stasa et al. (2014). To add to the confusion, there are also references in the literature to advanced nurse practitioners (Mantzoukas and Watkinson, 2007). Despite this confusion, the essence of the role is that nurse practitioners are 'expected to exercise higher levels of judgment, discretion and clinical decision making in clinical care than the registered nurse who is not in this role' (Parker et al., 2000, p. 192).

To keep the task of conducting a literature review within the bounds of the time and resources available, a rapid review of the literature was

undertaken to summarise what is known about nurse practitioners. Rapid reviews also go by the name of Rapid Evidence Assessments which 'provide a balanced assessment of what is already known about a policy or practice issue, by using systematic review methods to search and critically appraise existing research'.[1] Rapid reviews employ a variety of techniques to restrict some aspects of the review e.g. conducting a review of existing reviews, restricting the amount of grey literature or focusing on specific aspects of the topic under review.

The two questions which the literature review sought to answer were:

- What do nurse practitioners look like i.e. how are nurse practitioner roles used or deployed, in what contexts, what do they do and what outcomes can be attributed to nurse practitioners?
- What factors influence successful implementation of nurse practitioners?

The findings from the literature review are structured as follows:

- The concept of nurse practitioners.
- The evidence from the international literature, in the form of existing reviews of the literature.
- A summary of the research undertaken in Australia on nurse practitioners.
- Use of the Australian literature to answer the questions:
  - Where do nurse practitioners work?
  - What do they do?
  - What outcomes do they achieve?
- Consideration of factors influencing successful implementation of nurse practitioners in Australia.

Synthesising evidence to inform policy is less about providing definitive answers and recommendations and more about identifying options for consideration. This perspective informed the approach to the literature review.

1 Definition of Rapid Evidence Assessments used by the UK Civil Service, available at http://www.civilservice.gov.uk/networks/gsr/resources-and-guidance/rapid-evidence-assessment/what-is

SECTION TWO

Methods

Searching the literature included database searching of the academic literature and searching the web sites of relevant government departments, professional organisations and universities, with a particular focus on Australian web sites but also including web sites from the UK, USA and Canada. Systematic methods for searching the literature are necessary but not sufficient to find all the relevant literature, particularly for complex interventions such as nurse practitioners. Database searching was supplemented with snowball searching (pursuing references of references and tracking citations forward in time).

The review focused on the period 2000-2013 and three main sources of evidence:

- Existing reviews of the literature.
- Primary studies undertaken in Australia to evaluate nurse practitioners.
- Papers that propose conceptual or theoretical frameworks that may assist with understanding the nurse practitioner role.

Given the broad scope of the literature review, the focus was on identifying all types of Australian literature. The aim was to provide a snapshot of current (and recent past) literature regarding nurse practitioners and to be as inclusive as possible. Australian studies were included based on the potential to inform answers to the two questions that the literature review sought to answer. For example, a Walk-in Centre was implemented in the Australian Capital Territory, with the model of care including roles for both nurse practitioners and advanced practice nurses. However, when the evaluation was conducted, only the advanced practice nursing roles had been implemented. The role of the nurse practitioners was limited to providing education and support for the advanced practice nurses, rather than fulfil the role of a nurse practitioner (Parker et al., 2011). This evaluation was included in the review because of the potential to inform the issue of what factors influence implementation of nurse practitioners.

A list of Australian studies which were excluded from the review is included in Appendix B.

To the 193 papers retrieved from searching the academic literature, 16 reports were added from searching websites, together with 40 journal articles located as a result of snowball searching. Reviewing the full text of all these documents resulted in the identification of 68 papers reporting Australian studies and 28 literature reviews for inclusion in the review. The methodological quality of the Australian studies was assessed using the Mixed Methods Appraisal Tool (Pluye et al., 2011), which resulted in the exclusion of one study (see Section 5.1).

The pdf files for the papers reporting Australian studies were imported into NVivo which was then used to facilitate synthesis of the findings across all the papers, using the coding structure outlined in Appendix C. Further details of the literature searching are included in Appendix D.

SECTION THREE

The concept of nurse practitioners

The guidelines for implementing the role of nurse practitioners, issued by NSW Health in May 2012, note that 'defining exactly what reflects advanced practice leading to endorsement as a Nurse Practitioner is not always straightforward or uniform' (p. 7) but is expected to include comprehensive health assessments, sound clinical reasoning and analysis, critical and reflective thinking, a high degree of autonomy, clinical leadership and a high level of knowledge and skills. In NSW, a nurse practitioner is defined as follows:

> A nurse practitioner is a registered nurse educated and authorised to function *autonomously* and *collaboratively* in an *advanced* and *extended* clinical role. The nurse practitioner role includes assessment and management of clients using nursing knowledge and skills and may include but is not limited to the *direct referral of patients* to other health care professionals, *prescribing medications* and *ordering diagnostic investigations*. The nurse practitioner role is grounded in the nursing profession's values, knowledge, theories and practise and provides innovative and flexible health care delivery that complements other health care providers. The scope of practice of the nurse practitioner is determined by the context in which the nurse practitioner is authorised to practise. [emphasis added]

The definition incorporates both 'advanced' and 'extended' practice, a situation that is mirrored at the national level in the Australian Nursing and Midwifery Council competency standards where the definition of a nurse practitioner also includes reference to both advanced and extended roles. It has been argued that 'entangling' both extended practice and advanced practice within the definition of a nurse practitioner 'inhibits clarity of what is meant by advanced practice' and that the reference to extended practice should be removed from the definition (Scanlon et al., 2012, p. 658).

The national competency standards for nurse practitioners were replaced from 1 January 2014 with the nurse practitioner standards for practice (Nursing and Midwifery Board of Australia, 2013). There are four standards, each supported by what are referred to as 'orientating statements' (Table 1).

Table 1 National nurse practitioner standards for practice

Standard	Orientating statements
Assesses using diagnostic capability	Conducts comprehensive, relevant and holistic health assessment. Demonstrates timely and considered use of diagnostic investigations to inform clinical decision making. Applies diagnostic reasoning to formulate diagnoses.
Plans care and engages others	Translates and integrates evidence into planning care. Educates and supports others to enable their active participation in care. Considers quality use of medicines and therapeutic interventions in planning care. Refers and consults for care decisions to obtain optimal outcomes for the person receiving care.
Prescribes and implements therapeutic interventions	Prescribes indicated non-pharmacological and pharmacological interventions. Maintains relationships with people at the centre of care. Practises in accordance with federal, state and territorial legislation and professional regulation governing nurse practitioner practice.
Evaluates outcomes and improves practice	Evaluates the outcomes of own practice. Advocates for, participates in, or leads systems that support safe care, partnership and professional growth.

Interestingly, the new standards make no mention of either advanced or extended roles that are specific to nurse practitioners. Rather, advanced nursing practice is seen as 'a level of practice and not a role' that is applicable to all types of regulated nurses (registered nurses, enrolled nurses, nurse practitioners). Advanced nursing practice:

> is a continuum along which nurses develop their professional knowledge, clinical reasoning and judgement, skills and behaviours to higher levels of capability (that is recognisable). Nurses practising at an advanced level incorporate professional leadership, education and research into their clinically based practice. Their practice is effective and safe. They work within a generalist or specialist context and they are responsible and accountable in managing people who have complex health care requirements (Nursing and Midwifery Board of Australia, 2013, p. 5).

The new standards include a new, simplified, definition of a nurse practitioner:

> A nurse practitioner is an advanced practice nurse endorsed by the Nursing and Midwifery Board of Australia to practise within their scope under the legislatively protected title 'nurse practitioner' (Nursing and Midwifery Board of Australia, 2013, p. 5).

Table 2 summarises the distinguishing features of specialist, advanced and extended practice. The definitions in the table are not meant to be exhaustive, but rather seek to identify what distinguishes each type of practice from the other types of practice.

Table 2 Distinguishing features of specialist, advanced and extended practice

Term	Definition
Specialist practice	Practice characterised by increased knowledge and skills in a specific area of practice (e.g. emergency care, dementia care) which may also focus on a defined population (e.g. children, older people) or specific settings (e.g. community nursing, remote area nursing).
Advanced practice	Practice characterised by increased complexity of clinical reasoning and increasing levels of autonomy in decision-making and practice.
Extended practice	A nurse already practicing at an advanced level can extend their practice by incorporating new practices, practices not typically considered to be the norm or practices previously undertaken by other health professionals.
Nurse practitioner	Combines advanced and extended practice, typically within an area of specialisation.

Note: Table of definitions compiled after consultation of multiple sources: (Daly and Carnwell, 2003, Dowling et al., 2013, Heartfield, 2006)

As Table 2 indicates, extended practice is limited to nurse practitioners.

Two conclusions can be drawn from the historic situation at a state and national level:

- A nurse practitioner is defined in terms of advanced practice, which incorporates the concept of extended practice.
- A nurse practitioner is a nurse who practices both autonomously and collaboratively.

As Thoun (2011) has recently noted, the term 'advanced nursing practice' has appeared in an expanding volume of literature that has sought to define, delineate, guide, demonstrate, evaluate and critique advanced practice nursing, with the term encompassing a wide variety of roles, of which nurse practitioners is but one. A recent survey of 32 countries identified 13 different titles for advanced nursing practice roles (Pulcini et al., 2010). Within Australia, the main advanced nursing practice roles are clinical nurse specialists, clinical nurse consultants and nurse practitioners. Despite the multiplicity of roles, a recent review of the literature on advanced

practice in nursing concluded that 'there may be more similarity than difference in the way the various roles have been described' and that there may be little to be gained by continuing to debate the differences between the various roles and the definitions of those roles (Hutchinson et al., 2014, p. 126). It has also been argued that the terms 'extended practice' and 'expanded practice' present 'serious conceptual difficulties' and should no longer be used (Stasa et al., 2014).

As with the concepts of 'advanced' and 'extended' practice the concept of autonomy is best viewed in relative rather than absolute terms. As Harvey has argued, health workers all rely 'on someone else to share activities around care delivery' (Harvey, 2010, p. 68). Despite being a subject of considerable interest to nurses for many years, there is a lack of clarity about how to define the concept of autonomy. However, central to any consideration of autonomy are:

- the ability to direct one's own practice
- making decisions without close supervision or control
- taking responsibility for (and being accountable for) one's actions and the consequences of those actions (Varjus et al., 2011).

The increasing levels of autonomy in the practice of nurse practitioners are reflected in practical strategies such as nurse practitioner-led clinics, referral to other practitioners or agencies, prescribing and the ordering of diagnostics. This provides a basis for reducing fragmentation of care delivery by enabling nurse practitioners to provide all, or virtually all, services required for a particular episode of care e.g. attendance at an emergency department.

Much of the nursing literature emphasises that nurse practitioners operate from a nursing foundation, rather than simply acting as medical substitutes. For example, Lowe et al. state that nurse practitioners:

> combine some practice features of medicine with the fundamental aspects of nursing, but remain nursing oriented … with a focus on health promotion and health education as foundations of health care, in the context of the person in their psychosocial environment (Lowe et al., 2012, p. 679).

However, there is no getting away from the fact that nurse practitioners take on the responsibility for delivering services which were previously the domain of medical practitioners (Pearson and Peels, 2002).

SECTION FOUR

The international literature

4.1 Introduction

The literature searching identified three types of literature review of potential relevance:

1. Reviews of the literature in broad areas such as advanced nursing practice, which include studies involving nurse practitioners. For example, the review by Newhouse et al. (2011) covers four advanced nursing practice roles – nurse practitioners, clinical nurse specialists, certified nurse-midwives, and certified registered nurse anaesthetists – and includes 37 studies comparing patient outcomes resulting from care by nurse practitioners and doctors.

2. Reviews of the nurse practitioner literature. Such reviews typically focus on a specific aspect of practice (e.g. outcomes), a specific area of practice (e.g. emergency nurse practitioners) or studies from a particular country.

3. Reviews of the literature focusing on one aspect of the nurse practitioner role e.g. prescribing.

In the first and third type of literature review, included studies are not restricted to those involving nurse practitioners. Sometimes the reviews have a section dedicated to the nurse practitioner component of the literature but that tends to be the exception. A summary of the available literature reviews is included in Table 3.

Table 3 gives an indication of the extraordinary range and depth of the available literature which, in turn, is a reflection of the role itself. It also suggests that nurse practitioners cannot be treated as a homogeneous group, although much of the literature seems to assume that is the case. Despite common acceptance that nurse practitioner roles vary across the world, many literature reviews include studies from different countries with an unstated assumption that because they are all investigating something called a nurse practitioner that it is acceptable to synthesise the findings of those studies without making allowances for the differences in roles.

Table 3 Summary of literature reviews

Reviews of broad issues with a nurse practitioner component	Reviews of the nurse practitioner literature	Reviews of one aspect of the nurse practitioner role
Outcomes of advanced nursing practice (Newhouse et al., 2011)	Nurse practitioners in Canada (Sangster-Gormley et al., 2011)	Professional autonomy of nurses (Varjus et al., 2011)
Substitution of doctors by nurses (Laurant et al., 2004)	Private practice models (Currie et al., 2013)	Ordering and interpretation of diagnostic tests (Free et al., 2009)
Advanced nursing practice (Mantzoukas and Watkinson, 2007) Advanced practice nurses in long-term care (Donald et al., 2013)	Aged care (Christian and Baker, 2009, Clark et al., 2013) Critical care (Fry, 2011) Hospitals (Fry, 2009) Intensive care (Kleinpell et al., 2008) Primary care (Brown and Grimes, 1995, Horrocks et al., 2002, Naylor and Kurtzman, 2010) Emergency departments (Carter and Chochinov, 2007, Wilson et al., 2009)	Communication styles of nurse practitioners (Charlton et al., 2008) Collaboration (Schadewaldt et al., 2013)
Evaluating new roles in emergency care (Hoskins, 2011) Specialist and advanced nursing practice in acute hospitals (Lloyd Jones, 2005)		Prescribing by nurses and allied health professionals (Bhanbhro et al., 2011, Creedon et al., 2009, Gielen et al., 2014, Kroezen et al., 2011, O'Connell et al., 2009)

For example, one of the most frequently cited pieces of evidence to support the worth of nurse practitioners is the review by Horrocks et al. (2002), cited over 800 times (according to Google Scholar). The authors make the point that:

> Most recent research has been based on nurse practitioners providing care for patients requesting same day appointments predominantly for acute minor illness and working in a team supported by doctors. It cannot be assumed that similar results would be obtained by nurse practitioners working in different settings or with different groups of patients (p. 822).

This important caveat is not always reflected by those who cite this particular literature review. It has been argued that continually comparing research from different countries and contexts may have contributed to some of the confusion about advanced practice (Ramis et al., 2013).

Only one literature review was identified which focused solely on Australian research, consisting of a systematic review of qualitative studies about the experience of being an advanced practice nurse within Australian acute care settings (Ramis et al., 2013). Only four papers met the inclusion criteria for the review, none involving nurse practitioners despite the authors including studies about nurse practitioners in their searching. None of the five studies excluded from the review involved nurse practitioners either. This was one of several literature reviews excluded from this review (see Appendix E).

The findings from the reviews of the literature on prescribing and diagnostic testing are referred to in section 4.5. The extensive nature of the literature is indicated by Table 4, which summarises the dates of included studies for some of the literature reviews in Table 3.

Table 4 Dates of studies included in key literature reviews

	1970-1974	1975-1979	1980-1984	1985-1989	1990-1994	1995-1999	2000-2004	2005-2009	2010 to present
Advanced nursing practice									
Newhouse et al. (2011)					1990-2008				
Primary care									
Naylor and Kurtzman (2010)							2000-2009		
Laurant et al. (2004)		1973-2000							
Horrocks et al. (2002)		1973-2001							
Brown and Grimes (1995)	1971-1989								
Emergency departments									
Wilson et al. (2009)						1995-2008			
Carter and Chochinov (2007)		1979-2006							
Critical care									
Fry (2011)			1980-2008						
Kleinpell et al. (2008)						1990-2007			
Aged care / long-term care									
Donald et al. (2013)		1977-2002							
Clark et al. (2013)								2004-2011	

Note: The date ranges in the table are for the included studies, not the dates searched.

4.2 Outcomes achieved by nurse practitioners

The diversity of the literature presents challenges in terms of how best to report the findings. Rather than present a detailed narrative about all the literature reviews, the key aspects of each review are summarised in Table 5. The findings/conclusions summarised in Table 5 are necessarily quite selective but give an indication of the positive outcomes achieved by nurse practitioners.

Table 5 Reviews of the international literature

Title	Comments	Findings/conclusions
Advanced practice nurse outcomes 1990-2008: A systematic review (Newhouse et al., 2011)	Restricted to studies in the USA. Advanced practice roles include nurse practitioners, clinical nurse specialists, certified nurse-midwives, and certified registered nurse anaesthetists. 37 studies investigated patient outcomes by NPs compared to doctors. The results for the studies involving NPs are explored further by Stanik-Hutt et al. (2013).	When comparing NPs and doctors there is a 'high level of evidence' to support equivalent levels of patient satisfaction, equivalent levels of self-reported patient perception of health, equivalent patient functional status outcomes, equivalent levels of patient glucose control, better management of patient serum lipid levels, equivalent levels of blood pressure control, equivalent rates of ED visits, equivalent rates of hospitalisation, equivalent mortality rates.
Primary care		
The role of nurse practitioners in reinventing primary care (Naylor and Kurtzman, 2010)	Provides some additional evidence to build on the reviews by Laurant et al. (2004) and Horrocks et al. (2002)	NPs provided care that is equivalent to the care provided by doctors and, in some studies, more effective care.
Substitution of doctors by nurses in primary care (Laurant et al., 2004)	This systematic review included 16 studies, of which 7 involved NPs. Nurses in the other studies were described as practice nurse, nurse clinician or 'not clear'. The analysis assumes the different roles are equivalent.	Appropriately trained nurses can produce a similar quality of care and similar outcomes as primary care doctors. The authors said this conclusion should be treated with caution because of the limitations of the studies and lack of long-term follow-up.
Systematic review of whether nurse practitioners working in primary care can provide equivalent care to doctors (Horrocks et al., 2002)	Studies limited to Europe, North America, Australasia, Israel, South Africa, and Japan. Included 35 papers reporting 34 studies.	'Patients are more satisfied with care from a nurse practitioner than from a doctor, with no difference in health outcomes' (p. 822).
A meta-analysis of nurse practitioners and nurse midwives in primary care (Brown and Grimes, 1995)	Restricted to studies in the USA and Canada	Care by a NP in situations such as health promotion and the assessment and treatment of minor acute and stable chronic conditions, is equivalent to, or sometimes better than, care by a doctor.
Emergency departments		
Evaluating new roles within emergency care: A literature review (Hoskins, 2011)	Reviewed the literature on emergency nurse practitioners, emergency care practitioners and extended scope physiotherapists. Included six Australian studies.	Very few studies have investigated the scope of practice of NPs in EDs. NPs provide more health promotion and advice to patients, and are generally viewed positively by other health professionals.
The clinical effectiveness of nurse practitioners' management of minor injuries in an adult emergency department: a systematic review (Wilson et al., 2009)	Nine studies met the inclusion criteria, including two from Australia. Only one study addressed the issue of cost-effectiveness.	There were no significant differences between NPs and junior doctors in the effectiveness of managing minor injuries (it was noted that the quality of the evidence supporting this conclusion was 'fair to poor').
A systematic review of the impact of nurse practitioners on cost, quality of care, satisfaction and wait times in the emergency department (Carter and Chochinov, 2007).	Included 59 studies from the USA, UK, Canada and Australia (4 studies).	NPs dedicated to seeing low acuity patients 'will improve wait times for these patients as well as improve patient satisfaction, with little or no impact on quality of care' (p. 294).

Title	Comments	Findings/conclusions
Critical care		
Literature review of the impact of nurse practitioners in critical care services (Fry, 2011)	Builds on the earlier review by Fry (2009) with a focus on critical care services for adults, children and neonates. Not all of the 47 papers considered to be relevant are referred to in the paper but, of those that are, only one study is from Australia.	The majority of studies involving adults demonstrated evidence of improved outcomes (e.g. length of stay, patient complication rates). The evidence to support NPs in critical care services for children and neonates is weaker.
Hospital nurse practitioners (Fry, 2009)	49 studies were considered to be the most relevant, from the USA (27 studies), the UK (17), Canada (4) and Denmark (1), with none from Australia.	It was concluded that 'the scope of practice, independence and autonomy of Australian NPs was significantly less than international roles' (p. 5). Patient outcomes achieved by NPs and doctors showed 'no appreciable difference', with more reliable adherence to practice guidelines by NPs.
Nurse practitioners and physician assistants in the intensive care unit: an evidence-based review (Kleinpell et al., 2008)	Thirty-one research studies on the care of acute and critically ill patients by NPs and physician assistants (PA) were included in the review, of which 20 focused on NP care, 6 on both NP and PA care, and 5 on PA care.	The activities of NPs and PAs in intensive care, and the outcomes they achieve, are similar to resident physicians, without altering direct hospital costs. The authors noted the valuable role of NPs in leading research and quality improvement initiatives.
Aged care		
Advanced practice nurses in long-term care (Donald et al., 2013)	The review included four studies, all from the USA. Two of the studies involved NPs.	One study found that families were highly satisfied with the care provided by NPs. The other study showed that adding an NP to the team resulted in nursing home residents achieving more of their own goals for health care, at no additional cost.
Aged care nurse practitioners in Australia: evidence for the development of their role (Clark et al., 2013)	The review is a scoping study of relevant literature regarding NPs in aged care, including peer reviewed and non-peer reviewed literature.	The review identified very few studies of NPs in aged care and noted the paucity of Australian evidence regarding NPs more generally.
Effectiveness of nurse practitioners in nursing homes: a systematic review (Christian and Baker, 2009)	Included seven studies, all from the USA.	Each study identified a reduction in hospitalisation when NPs were included as part of the team caring for residents. Five studies found a reduction in ED presentations.

4.3 Limitations of the evidence

As is typically the case with reviews of the literature, the reviews in Table 5 include many observations about the quality of the research:

- 'There were few recent randomised trials, and the larger number of observational studies were generally of poor quality.' (Horrocks et al., 2002, p. 821)
- 'Our review was also significantly limited by the lack of large rigorous, carefully designed studies which evaluated the effectiveness of the NP role.' (Wilson et al., 2009, p. 10)
- 'Studies often involved small samples, short evaluation periods, descriptive statistics rather than correlation statistics and single sites.' (Fry, 2011, p. 64)
- 'Limitations include the heterogeneity of study designs and measures, multiple time points for measuring outcomes, the limited number of randomized designs, inadequate statistical data for calculating effect sizes, failure to describe the nature of the APRN and physician roles and the responsibilities or relationships of team members, including collaboration with physicians.' (Newhouse et al., 2011, p. 18)

Naylor and Kurtzman (2010) also drew attention to the limitations of the available research but also made the interesting observation that 'findings from the most rigorous studies reinforce those of questionable quality' (p. 895).

An important issue which limits many of the findings is the issue of attribution. Implementing a nurse practitioner role can be a complex undertaking, with multiple components. Despite the autonomous nature of their role, nurse practitioners typically practice in collaboration with other providers, all of which makes attribution of particular outcomes to the introduction of a nurse practitioner very difficult (Newhouse et al., 2011).

An additional, and important, point with regard to these reviews of the literature is that decisions about what studies to include are made on the basis of methodological quality, rather than any attempt to compare the roles being studied and ensure that they are in some way equivalent. An exception is the review by Newhouse et al. (2011) which limited itself to studies from the USA because factors such as the educational preparation and scope of practice of advanced practice roles is different in that country compared to elsewhere and they have a health care system which is quite different to other countries.

Similarly, in one of the earliest literature reviews, the crucial point was made that:

> Important questions of why and under what conditions these outcomes apply, however, could not be answered. Since the primary studies did not describe the care activities of either the nurse or physician providers, the authors of this meta-analysis could not relate the activities of the provider to any of the outcomes. This is consistent with earlier reviews of the literature; studies have been designed around the care provider, not the process of care, as the independent variable. (Brown and Grimes, 1995, p. 337)

The literature review reported here has taken a quite different approach to other literature reviews of nurse practitioners, with exclusion of studies based not on methodological quality but on whether the study is investigating a nurse practitioner role (see Appendix B for list of excluded studies).

4.4 Summary of the evidence

What is remarkable about the international evidence regarding nurse practitioners is the consistency of the findings regarding equivalent or improved outcomes (compared with doctors) and the absence of adverse findings. Care by nurse practitioners has been consistently shown to result in processes and outcomes that are either equivalent to or better than those achieved by doctors.

Existing reviews of the literature include virtually no Australian studies. It is interesting to note that the outcome measures are measures of generic outcomes (e.g. waiting times for treatment, patient satisfaction) which do not reflect a holistic, nursing-centred, approach which is seen as one of the hallmarks of the nurse practitioner role. The evidence for outcomes achieved by nurse practitioners is strongest for patient satisfaction (Table 6).

4.5 Literature reviews regarding extended practice

No literature reviews were identified that specifically examined prescribing by nurse practitioners. However, several reviews have looked at prescribing by nurses in general (Table 7). It is worth noting the observation by Gielen et al. (2014) that prescribing by nurses is embedded in other activities such as consultation, diagnosis and treatment which makes it difficult to single out the effects of nurse prescribing from the rest of what they do. The findings from the research which has been done suggest that, for nurses in general, the outcomes from nurse prescribing are comparable to doctors, but the quality of the research upon which this is based is not good.

No literature reviews were identified that specifically examined the ordering of diagnostics by nurse practitioners. The only literature review focusing on the ordering and interpreting of X-rays by nurses included 58 papers, of which eight were relevant to emergency departments, with six studies involving nurse practitioners. The authors concluded that: 'advanced specially trained nurses are able to accurately order and interpret X-rays to a level comparable to that of their medical colleagues' (Free et al., 2009, p. 13). A systematic review of whether nurse practitioners in primary care can provide equivalent care to doctors concluded that nurse practitioners were 'as accurate as doctors at ordering and interpreting X-ray films' (Horrocks et al., 2002, p. 821).

Table 6 Summary of evidence for outcomes of nurse practitioner care

Outcome measure	Evidence
Process measures	Nurse practitioners undertake more investigations and have longer consultations than doctors (Horrocks et al., 2002). Greater patient compliance with treatment recommendations was shown with NPs than with physicians (Brown and Grimes, 1995). NPs did equally well at x-ray interpretation and were better at documentation and following protocols when compared with the residents (Carter and Chochinov, 2007). NPs can reducing waiting times in emergency departments (Carter and Chochinov, 2007).
Patient satisfaction	Patient satisfaction was greater for NP patients (Brown and Grimes, 1995). Patients were more satisfied with care by an NP (Horrocks et al., 2002). High level of evidence to support equivalent levels of patient satisfaction (Newhouse et al., 2011). Patient satisfaction with care by NPs in emergency departments has been found to be 'consistently high' (Carter and Chochinov, 2007).
Health status	No difference in health status (comparing care by NPs and care by doctors) (Horrocks et al., 2002). High level of evidence to support equivalent patient functional status outcomes (Newhouse et al., 2011). High level of evidence to support equivalent levels of self-reported patient perception of health (Newhouse et al., 2011).
Other patient outcomes	High level of evidence to support equivalent mortality rates (Newhouse et al., 2011). No significant difference between the effectiveness of emergency NPs and junior doctors (Wilson et al., 2009).
Cost effectiveness	In high volume, low acuity areas, NPs may be more cost effective than in lower volume, high acuity departments (Carter and Chochinov, 2007).

Table 7 Literature reviews of prescribing by nurses

Title	Comments	Findings
The effects of nurse prescribing: A systematic review (Gielen et al., 2014)	An update of an earlier review (Van Ruth et al., 2007). The review included 35 studies, 12 involving NPs.	Compared to doctors, nurses prescribe for as many patients, prescribe comparable numbers of medications per patient visit, with few differences in the type and dose of medication prescribed, and similar clinical outcomes.
Assessing the contribution of prescribing in primary care by nurses and professionals allied to medicine: a systematic review of literature (Bhanbhro et al., 2011)	Included 17 studies, the majority from the UK. Three studies involved NPs, including the Australian study by Dunn et al. (2010).	Although most studies reported that non-medical prescribing is well accepted by patients and health professionals there has been little investigation of clinical outcomes. The review concluded that 'there are substantial gaps in the knowledge base' (p. 9).
An evaluation of nurse prescribing (Creedon et al., 2009, O'Connell et al., 2009)	The two papers reviewed 44 studies, almost all in primary care. Only 5 studies involved hospital care and only 6 involved NPs.	The views of nurse prescribers are over-reported in the literature. In general, nurses reported being confident in their prescribing. Patients had a generally positive view about nurse prescribing.
Nurse prescribing of medicines in Western European and Anglo-Saxon countries: a systematic review of the literature (Kroezen et al., 2011)	The review included 124 publications (8 involving NPs) focusing on the history of nurse prescribing and the legal, educational and organisational conditions for nurse prescribing.	Nurse prescribing varies considerably, from independent prescribing to prescribing under strict conditions and close medical supervision In most countries, prescribing is predominantly a medical role.

SECTION FIVE

The Australian literature

Implementation can be characterised as consisting of various stages:

- Exploration and adoption – making a decision to adopt an innovation and developing a plan to implement that innovation.
- Program installation – putting structures in place before the first consumer benefits from the intervention. Involves the expenditure of 'start-up costs'.
- Initial implementation.
- Full operation of the program e.g. referrals are taking place in accordance with agreed criteria. The stage at which the program becomes accepted practice.
- Innovation – adaptation of the program based on the lessons learnt e.g. changes to prevent unintended consequences.
- Sustainability – the new program reaches the point where it is sustainable long-term (Fixsen et al., 2005).

This perspective on implementation is reflected in the Australian literature on nurse practitioners:

1. Pilot or demonstration projects sponsored by state and federal governments to inform decisions about the adoption of nurse practitioners and plan for implementation. A table summarising these studies is included as Appendix A. These studies form part of the 'exploration and adoption' stage in the history of nurse practitioners in this country and were considered to be out of scope for this review. These pilot studies have been superseded by more recent studies involving nurse practitioners or those training to become nurse practitioners.

2. Reports informing the 'program installation' stage, typically including recommendations to governments for legislative changes or funding to support implementation. This literature was not included in the review.

3. Studies that have involved 'NP-like' services where nurses have not been functioning as fully-fledged nurse practitioners but still perform many aspects of the role. In New South Wales and Victoria, where most of this work has been done, this has involved transitional nurse practitioners and nurse practitioner candidates (the respective term used in each state). In essence, these studies focus on the 'initial implementation' stage and have been included in the literature review because of the potential to inform both questions underpinning the review. It seems reasonable to assume that outcomes achieved by 'NP-like' services will be improved upon by fully authorised nurse practitioners.

4. Studies involving authorised nurse practitioners working in particular settings. The extent to which some of these studies are reporting nurse practitioner positions which have been fully implemented is debatable, primarily because of the way some of the studies have been reported with a lack of detail regarding implementation. However, with this caveat, these studies have been included in the review.

5. Studies using surveys, interviews or focus groups, either in single or multiple settings, to investigate the views of nurse practitioners and the various groups of people they interact with – clients, professional colleagues and managers. These studies have been included in the review.

Lastly, two studies were identified which focused on what nurse practitioners do, one using work sampling methods (Gardner et al., 2010a) and the other (a small sub-study of the first) involving retrospective chart audits of patients cared for by nurse practitioners (Gardner et al., 2010b).

Some papers were identified which either had the appearance of being about nurse practitioners or were cited in the literature as studies of nurse practitioners but, for various reasons, were excluded from this review. For example, a study of a Hospital in the Nursing Home program where the registered nurse who was the subject of the study 'displayed

functions consistent with advanced practice nursing roles' (Crilly et al., 2011, p. 331). The paper reporting the study suggests developing the role to one of a nurse practitioner. Another example is a study involving members of the community which sought their views on nurse practitioners working in primary health care. Very few of the participants had received care from a nurse practitioner and many were not sure if they had or not (Parker et al., 2013). A table summarising the studies excluded from the literature review, and the reasons for exclusion, is included in Appendix B.

5.1 Methodological quality

The Australian literature on nurse practitioners encompasses a wide variety of studies employing many different methodologies, which presents a challenge in terms of assessing methodological quality. The recently developed Mixed Methods Appraisal Tool (MMAT) uses a simple scoring system for assessing the methodological quality of qualitative, quantitative and mixed methods studies and is the only tool currently available for this purpose. The original version of the MMAT (Pluye et al., 2009) was updated in 2011 and includes a toolkit to assist with interpretation of the criteria in the tool (Pluye et al., 2011). The MMAT is still being developed but demonstrates 'promising' inter-rater reliability and is relatively quick and easy to use (Pace et al., 2012).

The MMAT categorises studies into five types: qualitative, three types of quantitative (randomised, non-randomised, descriptive) and mixed methods. For each category, the quality score is derived from the percentage of criteria which have been met. For mixed methods studies, the three components (qualitative, quantitative, integration of quantitative and qualitative) are assessed separately, with the quality score based on the quality score of the weakest component.

The quality of each Australian study was assessed using the MMAT, with the results included in the tables on the following pages. In situations where more than one paper has been published based on the same study, the papers can be assessed collectively rather than individually. In some cases this was feasible, in others it was not. Further details of the MMAT can be found on the Wiki about the tool at:

http://mixedmethodsappraisaltoolpublic.pbworks.com/w/page/24607821/FrontPage

It is important to note that the MMAT is designed to assess the quality of a study, not the quality of the reporting of the study. Some of the quality scores in the following tables may be too low because of inadequate reporting, particularly for the qualitative and mixed methods studies which do not have generally accepted reporting standards. It is difficult to include all methodological details within the word limits imposed by many journals.

One study (a report from the 'grey' literature) was excluded because it did not meet any of the quality criteria. Given the exploratory nature of the literature review, no further studies were excluded based on quality scores.

5.2 Summary of Australian studies

The number of papers identified by the literature review are summarised in Table 8.

Table 8 Summary of Australian literature reporting research about nurse practitioners

Type of study	No. of papers
1. Studies involving 'NP-like' services	15
2. Studies involving authorised nurse practitioners in emergency departments	9
3. Studies involving authorised nurse practitioners in settings other than emergency departments	16
4. Surveys, interviews and focus groups to collect data from nurse practitioners	19
5. Surveys and interviews to identify the views of others regarding nurse practitioners	7
6. Studies using work sampling and chart audit to investigate the work of nurse practitioners	2
Total	**68**

The papers for groups 1-5 are summarised in Table 9, Table 10, Table 11, Table 12 and Table 13. The categorisation of the literature to include in each table has been done according to 'best fit'. For example, there is a paper about a patient satisfaction survey in the table summarising studies of nurse practitioners in emergency departments (rather than in the table 'perceptions of others about nurse practitioners') because the survey was conducted in one emergency department with the aim of evaluating the nurse practitioners in that department.

Research into the role of nurse practitioners has primarily involved those working in emergency departments, although much of this research has been undertaken in a limited number of settings, particular the Northern and Alfred hospitals in Melbourne and inner-city hospitals in Sydney (Table 9 and Table 10). Some of the emergency department studies are quite limited in scope, with a particular focus on waiting times and length of time spent by patients in the emergency department. Other models that have been explored in more than one study include mental health and aged care. Other than that, most other research/ evaluation has involved one-off studies for quite specialised services e.g. emergency eye clinic, colorectal screening clinic.

Table 9 Studies involving transitional nurse practitioners or nurse practitioner candidates

Model / authors	Location	Study date	MMAT category and quality score	About the study
Transitional NP in ED (Lutze et al., 2011)	Two emergency departments in Sydney	2007 to 2009	QUAN descriptive 100%	The study involved one transitional NP in each department. Mentorship and supervision was provided by emergency physicians. The transitional NPs used standing orders for prescribing medications and ordering diagnostic tests. Patient management plans were discussed with a senior emergency medical officer or an authorised NP (available in only one of the departments) prior to patient discharge. Patient demographic, triage, patient flow and diagnostic data were collected from the clinical information system in both EDs for a 3-month period in two consecutive years.
Transitional NP in ED (Fry et al., 2011, Fry and Rogers, 2009)	St George Hospital, Sydney	2006 / 2007	QUAN non random 75%	Three full-time equivalent transitional NPs provided cover for 15 hours per day. Supervision and support was provided by medical staff. The transitional NPs could not prescribe. One paper reports the results of a documentation audit, survey of work performance by ED physicians and review of transitional NP investigations and referrals (Fry and Rogers, 2009). The other paper reports on a prospective study of patient throughput and incident monitoring data (Fry et al., 2011).
NP candidate in ED (Considine et al., 2006a, Considine et al., 2006b)	Northern Hospital, Melbourne	July 2004 to March 2005	Paper 1 QUAN descriptive 100% Paper 2 QUAN non random 100%	The study involved one full-time NP candidate who had to discuss each patient with an emergency physician, obtain counter signatures for medications and verify the results of medical imaging and pathology. Paper 1 reports a prospective analysis of patients managed by the NP candidate, using a professional journal and register of patients (Considine et al., 2006a). Paper 2 reports a retrospective study comparing waiting times, treatment times and ED length of stay for two groups of patients with hand/wrist injuries or needing removal of Plaster of Paris – those treated by the NP candidate and those receiving usual care (Considine et al., 2006b).
NP candidate in ED (Jennings et al., 2008, Lee and Jennings, 2006)	Alfred Hospital, Melbourne	2004 and 2005	Paper 1 QUAN descriptive 50% Paper 2 QUAN non random 100%	The project involved two NP candidates and was commenced two months after they took up their role. Paper 1 reports a prospective study comparing characteristics of patients who did not wait for treatment and those treated by NPs (Lee and Jennings, 2006). Paper 2 reports a retrospective analysis of waiting times and lengths of stay for two groups of patients in triage categories 3, 4 and 5 – those treated by the NP candidates and those receiving 'traditional' medical care (Jennings et al., 2008).
NP-like services in residential aged care (Joanna Briggs Institute, 2007)	New South Wales, South Australia, Australian Capital Territory, Western Australia	August 2005 to June 2007	Mixed methods 25%	This project involved seven NP candidates at six sites. During the course of the evaluation some candidates completed the requirements for registration as an NP and were recognised by their State licensing bodies. However, this did not impact significantly on the evaluation. The findings were considered 'tentative and equivocal and should be treated with caution' (p. 88). Evaluation was based on a modified version of the Minimum Data Set created for the nurse practitioner trials in NSW and Victoria. Data collection included focus groups, surveys and tools for assessing health status, wellbeing and resident satisfaction. Data was collected from a comparison group. Cost effectiveness was also evaluated.

Model / authors	Location	Study date	MMAT category and quality score	About the study
Mental health NP candidate in ED (Papoulis, 2011)	Whyalla, South Australia	2011	QUAN non random 25%	Retrospective clinical audit of adult mental health presentations treated by general practitioners (20 presentations) and the NP candidate (15 presentations).
Gerontological NP candidate (Lee, 2009)	Residential aged care facility in Victoria	2002	Mixed methods 25%	This project involved an NP candidate undertaking 'NP-like' practices. The NP candidate made recommendations for care, which were then discussed with the general practitioner who decided whether to act on those recommendations. The study formed the basis of a PhD thesis, using a mixed-methods approach that included assessing the functional and social status of residents, hospital admissions and resident satisfaction before and after the intervention, together with focus groups involving staff and residents. Results for functional and social status were compared to a small control group.
Community aged care NP candidate (Allen and Fabri, 2005)	Victoria	2003	QUAL 75%	The nurse was a nurse practitioner candidate working within the role boundaries of a registered nurse. The study involved semi-structured interviews with 15 clients and carers, and a convenience sample of 10 health care professionals from the aged care team.
Aged Care NP Pilot Project (Arbon et al., 2009, Bail et al., 2009)	Australian Capital Territory	2004 to 2005	Mixed methods 75%	The project evaluated the potential of an aged care NP model, involving student NPs in their final year of preparation for the role. The authors acknowledge that they were not evaluating the NP role, but rather evaluating the potential of the role. Data collection included interviews, focus groups, surveys (staff and patients) and journal entries of the student NPs.
Renal dialysis NP candidate (Stanley, 2005a, Stanley, 2005b)	Melbourne	2002 to 2004	QUAL 75%	Small study involving interviews with two NP candidates, and the keeping of a personal reflective journal by one of the nurses.

Table 10 Studies of nurse practitioners in emergency departments

Authors	Location	Study date	MMAT category and quality score	About the study
Li et al. (2012); Li et al. (2013)	Two large teaching hospitals in Sydney	July 2010 to Jan 2011	QUAL 75%	Semi-structured interviews with five NPs, four senior doctors (staff specialists and ED directors) and five senior nurses. Analysis using grounded theory. One paper investigated the use of information and communication technology by NPs (Li et al., 2012), the other paper examined the impact of the role, as perceived by those interviewed (Li et al., 2013).
Lee et al. (2014)	Alfred Hospital, Melbourne	Nov 2011 to June 2012	QUAN non random 100%	Prospective study which identified the sensitivity and specificity of X-ray interpretation by six NPs and 10 emergency physicians. One consultant radiologist served as the 'gold standard' for interpretation.
Jennings et al. (2013)	Alfred Hospital, Melbourne	Jan to Dec 2011	QUAN descriptive 100%	Retrospective review of all patients seen by NPs in a fast track service, including waiting time and length of stay in the ED.
Dinh et al. (2012); Dinh et al. (2013)	Canterbury Hospital, Sydney	April 2010 to April 2011	QUAN random 50%	Convenience sample of adult patients triaged to the fast track unit were randomised to initial assessment and treatment by a doctor or emergency nurse practitioner. The fast track unit employed one NP.
Considine et al. (2010)	Northern Hospital, Melbourne	January to December 2008	QUAN non random 75%	Retrospective audit of waiting times per triage category and length of stay in ED for non-admitted patients treated in the fast track area, by designation of treating health professional.
Wilson and Shifaza (2008)	Royal Adelaide Hospital	2006 or 2007	QUAN descriptive 25%	Data collection involved a retrospective medical record audit and self-administered patient survey exploring patients' views about the NP service. Studied NP care of minor injuries in an adult emergency department.
Jennings et al. (2009)	Alfred Hospital, Melbourne	2008	QUAN non random 25%	Self-administered patient satisfaction survey, given to patients usually treated in the fast track area of the ED. Compared results for patients treated by NPs and ED medical staff.

Table 11 Studies of nurse practitioners in other settings

Model / authors	Location	Study date	MMAT category and quality score	About the study
NP-led model for diabetes in pregnancy (Murfet et al., 2014)	Tasmania	January 2010 to December 2011	QUAN non-random	The NP coordinated a clinic involving an obstetrician, diabetes educator, dietician and antenatal nurse. The role of the NP is not described, other than stating that the clinic was led by the NP. Data from an audit undertaken after establishment of the clinic was compared with historical data (2003 to 2006). The audit included items for screening, referrals, monitoring of diabetes, treatments for diabetes, maternal complications and neonatal outcomes.
NP-led dementia outreach service (Borbasi et al., 2011)	Residential aged care facilities in Queensland	2009 to 2010	Mixed methods 25%	The focus of the evaluation was on the work of the clinical nurse, endorsed enrolled nurse, assistant-in-nursing and social worker on the team led by the NP, rather than the NP. Data collection included interviews, focus groups and surveys of staff in 20 residential aged care facilities (7 in the intervention group, 13 in the control group). An earlier paper provides further information about the model (Borbasi et al., 2010).
Various models (Gardner et al., 2014)	Queensland	Not reported	Mixed methods 50%	Evaluation of 11 NP services, including primary care, community-based chronic disease clinics and hospital acute care settings. The roles are not described. Data collection consisted of interviews with 11 NPs and 13 patients, a survey of stakeholders and medical record audits.
Mental health practitioner outpatient service (Wand et al., 2011a, Wand et al., 2011b, Wand et al., 2011c, Wand et al., 2012)	Royal Prince Alfred Hospital, Sydney	2008 to 2010	Mixed methods 75%	Mental health NP working in ED and also providing an outpatient clinic linked to the ED service. The papers report the results of a realistic evaluation employing a mixed-methods approach including interviews with 23 patients and 20 staff, and collecting data on the processes and outcomes of care, including self-report measures of non-specific psychological distress and individuals' perception of their competence to deal effectively with stressful situations.
Walk-in Centre (Desborough et al., 2013, Parker et al., 2011, Parker et al., 2012)	Canberra Hospital	May 2010 to May 2011	Mixed methods 50%	Evaluation of the Walk-in Centre included surveys of patient and nurse satisfaction and interviews with 12 nurses and 17 stakeholders. The Walk-in Centre was staffed by NPs and other advanced practice nurses. The NP role was not fully implemented.
Community pharmacies (McMillan and Emmerton, 2013)	Western Australia	Aug/Sept 2011	QUAL 75%	NPs working as primary care providers in a chain of pharmacies. The study involved 28 semi-structured interviews with pharmacists, NPs and pharmacy assistants.
Emergency eye clinic (Kirkwood et al., 2005)	Flinders Medical Centre, South Australia	Not reported	QUAN descriptive 100%	NP providing an emergency eye clinic half a day per week. The study involved prospective analysis of consecutive new patients attending the clinic, comparing diagnosis and treatment by NP and ophthalmologist.
Chemotherapy (Cox et al., 2013)	Sydney	2011	QUAN descriptive 100%	Study described as an 'initial evaluation'. The study collected data on unscheduled occasions of service to a chemotherapy unit, seen by the NP.
Women's health (Elmer and Stirling, 2013)	Women's Health Centre, Tasmania	January to June 2013	Mixed methods 25%	The role of the NP had been established for almost two years when the evaluation was undertaken. The evaluation adopted a realistic approach with data collection including interviews with key stakeholders, interviews with six clients, client satisfaction survey (n=30), stakeholder satisfaction survey (n=11) and descriptive data from the existing client database.
Colorectal cancer screening clinic (Morcom et al., 2004)	Repatriation General Hospital, South Australia	Not reported	QUAN descriptive 100%	The scope of practice of the NP included bowel cancer screening, health education and promotion, and performing flexible sigmoidoscopies. Evaluation consisted of an audit of client outcomes after the first 100 clients seen by the NP, including depth of insertion of the instrument, client discomfort scores, pathological findings, and client satisfaction.
Acute pain management service (Schoenwald, 2011)	Ipswich Hospital, Queensland	2009 / 2010	QUAN descriptive 100%	The NP worked within an anaesthesiology-based pain service to review all clients undergoing major surgery or trauma and provide a pain management to women for caesarean section. The study included review of data on prescribing, service utilisation, incidents, clinical complaints and use of non-pharmacological interventions.

Note: A study of an oncology nurse practitioner in a rural setting has not been included in Table 11 because it is only available as a poster abstract (Girgis et al., 2013).

Table 12 Data collection from nurse practitioners using surveys, interviews or focus groups

Authors	Location	Study date	MMAT category and quality score	About the study
MacLellan et al. (2014)	Australia	Not reported	QUAL 25%	Ten NPs were interviewed regarding their transition to the role. At study commencement, they were either endorsed as an NP (with or without a position) or appointed to an NP position and waiting to be endorsed. At least three interviews were conducted with each NP, over a period of 12 months.
Lowe et al. (2013)	Australia	2012	QUAN descriptive 25%	Survey of convenience sample of NPs, nurse managers and nurse policymakers regarding integration of NP roles in the health system. Response rate of 38% (n=172).
Buckley et al. (2013); Cashin et al. (2014)	Australia	2010	QUAN descriptive 75%	Survey of members of the Australian College of Nurse Practitioners about their prescribing practices. The 209 respondents represented approximately 42% of endorsed NPs in Australia at the time. One paper reports on prescribing practices (Buckley et al., 2013)></EndNote>; the other paper reports on confidence of NPs prescribing medications (Cashin et al., 2014).
Desborough (2012)	ACT	2010	QUAL 50%	Seven NPs were interviewed and five participated in a focus group to identify processes and relationships being used by NPs to construct and implement their roles.
Middleton et al. (2011)	Australia	2009	QUAN descriptive 100%	Second national census, repeating the survey done in 2007. 293 NPs responded (76.3%), of which 71.5% were employed as an NP.
Gardner et al. (2009)	Australia	2007	QUAN descriptive 100%	First national census. Survey of authorised NPs regarding their role and scope of practice. Sent to all 234 authorised Australian NPs, with an 85% response rate, of which 72% were employed as an NP.
Newman et al. (2009); Cashin et al. (2009); Dunn et al. (2010); Buckley et al. (2014)	Australia	2007	QUAN descriptive 50%	Survey of members of the Australian Nurse Practitioner Association about prescribing practices. The papers report preferences for continuing education (Newman et al., 2009); prescribing practices (Dunn et al., 2010); and provision of patient education (Cashin et al., 2009). The most recent paper reports the sources used by NPs to obtain information about quality use of medications, comparing the results with the 2010 survey (Buckley et al., 2014).
Cleeton et al. (2011)	Australia	Not reported	QUAL 50%	Interviews with four NPs (two fully endorsed and two candidates), undertaken as one component of a PhD thesis investigating legal issues relevant to the role and functions of NPs.
Harvey (2010)	Australia	Not reported	QUAL 75%	PhD thesis which included interviews with eight NPs, only one of whom was employed as an NP at the time. Critical discourse analysis was used to examine policy documents regarding NP authorisation.
Keating et al. (2010)	Victoria	2008	QUAN descriptive 100%	Survey of people involved in NP projects in EDs, including NPs, NP candidates, project officers and nurse unit managers, to explore perceived barriers to progression and sustainability of the NP role.
Carryer et al. (2007); Gardner et al. (2008)	Australia & New Zealand	Not reported	QUAL 75%	Interviews involving 15 NPs, undertaken as part of a larger study to describe the role of NPs and develop NP competencies.
Adrian and Chiarella (2008)	South Australia	2008	Mixed methods 25%	Survey of authorised NPs, NP candidates and nurses intending to become an NP, with a 54% response rate (n=34). Interviews and focus groups also conducted.
Chiarella et al. (2007)	New South Wales	2007	QUAN descriptive 75%	Survey sent to clinical nurse consultants / midwifery consultants and nurse practitioners / midwifery practitioners, of which 33 (43%) nurse practitioner/ midwifery practitioners responded.
Wilson et al. (2005)	New South Wales	Not reported	QUAL 75%	Interviews with nine NPs about their experiences working with general practitioners and allied health professionals.

Table 13 Perceptions of others about nurse practitioners

Authors	Location	Study date	MMAT category and quality score	About the study
Allnut et al. (2010)	WA and NSW	Not reported	QUAN descriptive 100%	NPs in both states recruited 129 clients to participate in a survey to evaluate understanding of the NP role, satisfaction with education received, quality of care and NP knowledge and skill.
Wortans et al. (2006)	Victoria	2003-2004	QUAL 25%	This study interviewed seven patients seen as part of a demonstration project to test the feasibility of implementing an NP role in psychiatric/mental health nursing. The study involved a NP candidate whose extended role activities were conducted under the direct supervision of a medical practitioner.
Jones et al. (2013)	Australia	2009	QUAN descriptive 75%	Survey distributed to all members of the Australasian College of Emergency Medicine, with a minimum 25% response rate (the exact response rate is not known).
Della and Zhou (2009)	New South Wales	2009	QUAL 25%	Evaluation of NPs in NSW which included semi- structured interviews, telephone interviews, focus groups and a review of published documents. Data on number of participants were not reported.
Weiland et al. (2010)	Australia	2008 or 2009	QUAL 50%	Semi-structured phone interviews with stratified sample of 95 doctors from 35 EDs in each State/Territory to investigate their perception of NPs. Four of the questions were concerned with NPs, including one open-ended question (the responses to which are the focus of the paper).
Lee et al. (2007)	Alfred Hospital, Melbourne	2004	QUAN descriptive 50%	Survey of 76 medical and nursing staff to explore staff knowledge of the NP role, using the survey developed by Martin and Considine (2005). The ED employed two NP candidates at the time of the survey. Survey conducted 3 months after NP candidates commenced.
Martin and Considine (2005)	Northern Hospital, Victoria.	July 2004, March 2005	QUAN descriptive 75%	Survey of ED staff to examine the attitudes and knowledge of medical and nursing staff before and after implementation of the NP role. The pre-test response rates for nursing and medical staff were 79% and 56% respectively; the equivalent post-test response rates were 57% and 47%. The ED employed a single NP candidate at the time of the surveys.

Various methodologies have been used, with a particular emphasis on interviews, surveys and documentation audits. Most studies have focused on one aspect of the nurse practitioner role (e.g. relationships with colleagues, patient satisfaction, impact on waiting times) rather than undertaking a comprehensive evaluation of the role. Quantitative studies with a descriptive approach represent the largest group of studies and have the best quality scores. There is plenty of scope to increase the number and quality of mixed methods studies (Table 14). The most frequently occurring issues to arise from assessing studies using the MMAT were lack of details or justification for selection of participants (quantitative and qualitative studies), low response rates and lack of consideration of how findings are influenced by the researchers (qualitative studies).

There is a notable absence of theory in the research undertaken to date, either to inform the research or to develop theory as a result of the research. Two researchers employed a particular theoretical approach to underpin their doctoral theses (Cleeton, 2011, Harvey, 2010) and two evaluations have used the theoretical perspective of realistic evaluation to develop theory based on configurations of context-mechanism-outcomes (Elmer and Stirling, 2013, Wand et al., 2011a). Two studies used grounded theory as a method of data analysis

Table 14 Summary of MMAT quality scores

Study type	No. of MMAT quality scores	Average quality score
Quantitative descriptive	20	80%
Quantitative non-randomised studies	8	75%
Qualitative	13	58%
Quantitative randomised studies	1	50%
Mixed methods	9	42%
Total	**51**	**66%**

(Desborough, 2012, Li et al., 2013), but both presented their findings in the form of 'themes' rather than a theory.

There is an almost complete absence of drawing on the wider literature from fields such as organisational change, implementation science, diffusion of innovations and knowledge translation to either inform the research methods or assist with interpreting the findings. References cited in the Australian nurse practitioner literature come largely from sources that are either about nurse practitioners or the particular clinical field that is the subject of the paper e.g. aged care, emergency medicine. This seems like a lost opportunity to learn from a vast literature in these other fields.

Many of the studies of particular models, either involving 'NP-like' services or authorised nurse practitioners, have involved the nurse practitioners themselves. In many instances, there is only one nurse practitioner or transitional/candidate nurse practitioner i.e. the nurse practitioners are evaluating their own performance. It is difficult to know how many times this occurs because this detail is rarely reported but it appears to involve about two-thirds of the studies. There is nothing inherently wrong with this and it is an important part of any profession developing its knowledge base. However, it does raise the potential for introducing bias into the analysis and interpretation of results. There is the potential to use this growing body of nurse practitioners with highly developed research skills to formally evaluate the practice of their peers rather than focusing solely on their own practice.

SECTION SIX

Where do nurse practitioners work and who do they treat?

Table 15 provides a summary from three sources about the clinical specialties in which nurse practitioners work. Each source has its limitations (data from each national census is based on those who responded to the survey; data from the NSW Health Nurse Practitioner database is difficult to keep up-to-date) but there is considerable similarity across the three sources, particularly with regard to the main clinical areas in which nurse practitioners are to be found, with emergency department typically accounting for about a quarter of all nurse practitioners. The data from the two national censuses are for nurses who were employed as nurse practitioners at the time of the surveys.

Of the respondents to the 2009 national survey, 64% were employed in metropolitan areas, a decrease from 81% in the 2007 survey.

In terms of the published literature, the most common places for nurse practitioners to work are:

- Fast-track areas or minor injuries clinics in emergency departments (Considine et al., 2010, Dinh et al., 2012, Jennings et al., 2013, Lutze et al., 2011).
- Clinics e.g. for ophthalmology (Kirkwood et al., 2005), colorectal cancer screening (Morcom et al., 2004), mental health (Wand et al., 2012) and medical oncology (Cox et al., 2013).
- In community settings such as community pharmacies (McMillan and Emmerton, 2013), a women's health centre (Elmer and Stirling, 2013) and aged care (Allen and Fabri, 2005).

Table 15 Nurse practitioner clinical fields

	1st national census (2007)		2nd national census (2009)		NSW Health NP database (Oct 2013)	
	No	%	No.	%	No.	%
Emergency	39	26.9	63	30.3	53	27.3
Mental health	12	8.3	12	5.8	11	5.7
Paediatrics	10	6.9	11	5.3	20	10.3
Continence/women's health	10	6.9	12	5.8	9	4.6
Oncology	9	6.3	9	4.3	9	4.6
Diabetes	7	4.8	5	2.4	9	4.6
Generalist/remote	7	4.8	11	5.3	10	5.2
Renal	6	4.1	13	6.3	9	4.6
Wound management	6	4.1	7	3.4	4	2.1
Community/primary health	5	3.4	12	5.8	5	2.6
Neonatal	5	3.4	5	2.4	11	5.7
Aged care/rehabilitation	5	3.4	11	5.3	12	6.2
Cardiac	3	2.1	9	4.3	5	2.6
ICU liaison	3	2.1	2	1.0	2	1.0
Pain management	3	2.1	4	2.0	2	1.0
Hepatology	3	2.1	2	1.0	1	0.5
Other	12	8.3	20	9.6	11	11.3
	145	**100**	**208**	**100**	**194**	**100**

Sources: 1st national census (Gardner et al., 2009); 2nd national census (Middleton et al., 2011).

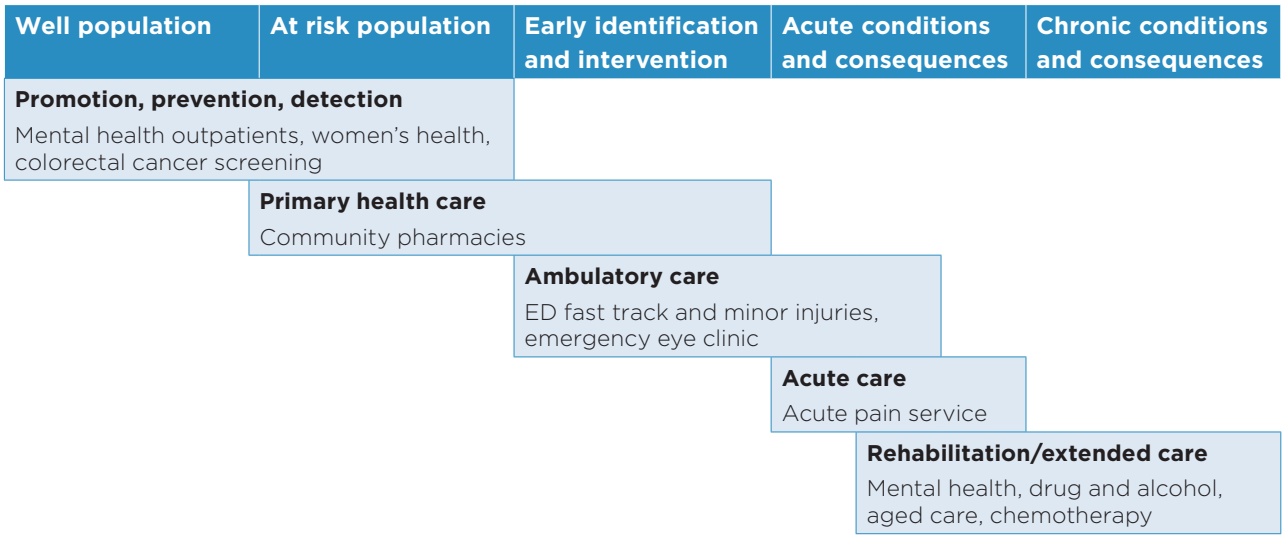
In terms of the types of people seen by nurse practitioners, a useful way of thinking about this is in terms of five population groups: the well population, people who are at risk, people who require early identification and intervention, people with acute conditions and consequences, people living with chronic consequences and conditions (Woodley, 2001).

This can be matched with the types of services which each of these population groups require – promotion, prevention and detection; primary care; ambulatory care; acute care; rehabilitation and extended care – which can then be used as a framework for the various nurse practitioner models identified in the Australian literature (Figure 1).

There are very few studies of nurse practitioners working in hospital-based services other than emergency departments. There are no reported studies for nurse practitioners working in sub-acute areas such as palliative care and rehabilitation.

There is a significant gap in the literature in terms of studies investigating nurse practitioners in rural and remote locations. The most remote location found in the literature for a study involving a nurse practitioner was Whyalla in South Australia which is classified as 'outer regional' (rural, rather than remote).

Figure 1 Nurse practitioners and the population groups they see



SECTION SEVEN

What do nurse practitioners do (activities)?

7.1 What they report they do and what they are observed doing

The most comprehensive study of how nurse practitioners spend their time is the Australian Nurse Practitioner Study (AUSPRAC) which used a work sampling methodology to collect data on the work patterns of nurse practitioners (Gardner et al., 2010a). The study defined three main types of activities:

- Direct-care activities (e.g. physical assessment, prescribing medications).
- Indirect care activities (e.g. conducting handovers, documenting patient care, coordinating care, discharge planning).
- Service-related activities (e.g. travel, meetings and administration, professional development) and personal activities.
- Personal activities (activities not related to patient care, service or professional development (Gardner et al., 2009).

Excluding personal activities, nurse practitioners spent 36.1% of their time on direct-care activities, 32.0% of their time on indirect care and 31.9% of their time on service-related activities (Gardner et al., 2010a). Data from the AUSPRAC study and three other studies which have collected self-reported data from nurse practitioners are summarised in Table 16.

Details of the three surveys referred to in Table 16 can be found in Table 12.

The authors of the AUSPRAC study observed that the finding about direct care accounting for just over one-third of their time (excluding personal care) is at variance to the self-reported data from

Table 16 Allocation of time by nurse practitioners

	1st national census (Gardner et al., 2009)	2nd national census (Middleton et al., 2011)	Survey in NSW (Chiarella et al., 2007)*	AUSPRAC study (Gardner et al., 2010a)
Year	**2007**	**2009**	**2007**	**2008/2009**
Method of data collection	Self-report (survey)	Self-report (survey)	Self-report (survey)	Observation
No. of nurse practitioners	145	205	25	30
Measure	**Mean % of time**	**Median % of time**	**% hours / month**	**% of time**
Direct care	61.5	67.5	55.7	36.1**
Indirect care			11.7	32.0
Patient education	9.6	5.0	6.5	3.0
Education of colleagues	10.1	9.0	7.7	4.5
Administration	13.7	10.0	6.7	14.1
Research	3.5	1.5	3.7	1.6
Other	1.6	0	8.0	11.7
Total	**100**	**-**	**100**	**100**

Notes:

* Data in the NSW survey (Chiarella et al., 2007) have been aggregated as follows:
Direct care: time spent on clinics and direct clinical interventions with patients/clients.
Indirect care: time spent on discussion with multidisciplinary team or nurse/midwives regarding patient care.
Administration: time spent making appointments, filing and finding notes and attending meetings.
Other: time spent writing or developing guidelines, developing policy, and continuing professional development.

** Direct care as reported in the study included 3.0% of time spent on patient education (referred to as 'teaching' in the paper)

nurse practitioners in the first national census who estimated that 61.5% of their time is spent on direct care. The authors also noted that the results differ from overseas studies which have reported that the role of nurse practitioners is primarily one of clinical service delivery and surmise that there may be barriers preventing nurse practitioners from undertaking extended practices (Gardner et al., 2010a). What is not canvassed in the paper is whether there is a degree of confusion or difference regarding indirect time. For example, indirect care in the work sampling study includes categories for coordination of care, discharge planning and preparation time for direct care, all of which might be considered as 'direct care' when responding to a survey. A survey of nurse practitioners in South Australia used the terms 'clinical care' and 'consultancy' to distinguish time spent caring for patients from time spent on other activities. Most respondents to the survey spent more than 50% of their time on clinical care or consultancy (Adrian and Chiarella, 2008).

Categorising time, by whichever method, makes no allowances for multi-tasking (e.g. sitting in a management meeting planning the care of a patient). Despite all these caveats, it seems reasonable to conclude based on the data in Table 16 that patient care (whether considered to be 'direct' or 'indirect') takes up about two-thirds of a nurse practitioner's time, not allowing for 'personal time' (i.e. time at work not spent 'working').

Further details from the AUSPRAC study regarding direct-care activities are summarised in Table 17, with most time spent performing or managing therapeutic procedures (6.1%) and history taking (5.9%).

The data in the table are presented in such a way as to assist in distinguishing between the work of registered nurses and nurse practitioners. Given that some registered nurses, particularly in specialised areas, undertake direct-care activities of a very complex or technically difficult nature, there is likely to be varying views about which activities fit within each column in the table. For example, with the activity 'interacts with patient/ family/carer', the nature of the interaction will be influenced by many factors, including the role the registered nurse or nurse practitioner is performing. That does not alter the fact that the activity is integral to both roles. Presenting the activities in this way is more a schematic representation of the activities than anything else and should not be taken too literally.

It is interesting to note that activities which are uniquely the role of nurse practitioners make up so little of their time, which perhaps helps to explain some of the confusion about the role. Much more of their time is spent undertaking activities that overlap with the role of other registered nurses to varying degrees. It should be noted that the activities summarised in Table 17 are designed for observing practice, and thus take no account of the advanced clinical reasoning which is a feature of nurse practitioners.

Table 17 Direct care activities – percentage of time spent by nurse practitioners

Activities intrinsic to the role of registered nurses and nurse practitioners	Advanced practice (undertaken in greater depth or complexity by a nurse practitioner)	Extended practice (integral to the role of nurse practitioners)
Communicates diagnosis (to others involved in the care of the patient) (1.9%)	Physical assessment (4.0%)	Requests diagnostic investigations/procedures (1.8%)
Administers medication (1.4%)	History taking (5.9%)	Prescribes medication (1.5%)
Interacts with patient/family/ carer (4.5%)	Performs diagnostic investigations e.g. ECG, biopsy, phlebotomy (2.2%)	
Teaching (of patient/family/ caregiver) (3.0%)	Analyses/interprets diagnostic investigations (2.0%) Performs/manages therapeutic interventions (e.g. coaching/ counselling patients, delegating tasks to others (6.1%) Initiates transfers/discharge (1.3%) Telemedicine (0.5%)	

Note: The percentages in the table are the percentage of time spent by nurse practitioners undertaking each activity, according to a national study involving 30 nurse practitioners undertaken between July 2008 and January 2009 (Gardner et al., 2010a).

In a small sub-study involving retrospective chart audits of 96 patients cared for by 11 nurse practitioners, extensive use of pathology requests by nurse practitioners was identified and all nurse practitioners referred patients to other health professionals and agencies. Almost 94% of patients received a therapeutic intervention from a nurse practitioner, with the most common interventions being counselling and education, both of which were provided by all nurse practitioners. Just under 45% of patients received medication from a nurse practitioner, with all but one nurse practitioner prescribing medications (Gardner et al., 2010b).

7.2 Nursing or medical model

In a study which interviewed clinicians from the emergency departments of two Sydney hospitals, the nurse practitioners and senior nurses reported (in discussing the role of nurse practitioners):

> a holistic aspect which defined their practice and which they believed distinguished their role from that of a physician. Holistic care was understood to be an expansion of the clinical focus beyond the disease to the whole person; consideration of the physical as well as the psychosocial needs of a patient.
> (Li et al., 2012, p. 4)

A patient satisfaction survey conducted in a Melbourne emergency department identified that certain aspects of patient care (having enough time to discuss things, provision of instructions for follow-up care) were viewed more favourably by those whose care had been managed by nurse practitioners compared to those managed by doctors (Jennings et al., 2009).

A case study of a mental health practitioner working in an emergency department referred to how 'nurses have access to a level of intimacy and informality with patients, not common among other health professionals' and drew a distinction between the focus on treating diseases (medical profession) and an emphasis on health promotion (nursing profession) (Wand et al., 2011b, p. 398).

This perspective on the role of nurse practitioners is reflected in feedback from patients/clients referring to 'the caring manner of the nurse' performing procedures (Morcom et al., 2004), appreciating the comprehensive nature of health assessments (Allen and Fabri, 2005), feeling 'comfortable and at ease' with a nurse practitioner (Elmer and Stirling, 2013) and being able to 'relate more easily' with a nurse practitioner than with a doctor (Wortans et al., 2006).

These instances aside, there is little in the way of research evidence from Australian studies to support there being a distinctly nursing approach to patient care that distinguishes the care provided by nurse practitioners from the care provided by other health professionals, primarily doctors. This is reflected in the outcomes which have been studied, which have tended to focus on generic outcomes such as access to services, timeliness of services, length of time being treated and disposition post treatment, rather than outcomes that might be considered particularly sensitive to nursing interventions.

7.3 Patient assessment

According to the AUSPRAC study, nurse practitioners spend 4.0% of their time on physical assessment, 5.9% of their time on history taking and 2.0% of their time analysing and interpreting diagnostic investigations (Gardner et al., 2010a). Key aspects of what has been referred to the 'dynamic practice' of nurse practitioners are 'comprehensive assessment based on skills in advanced physical assessment, analysis of the person in context and advanced knowledge in human sciences' (Carryer et al., 2007, p. 1822).

Evidence of the ability of nurse practitioners to provide comprehensive patient assessment or enhance existing systems of patient assessment is largely confined to studies in aged care (Allen and Fabri, 2005, Arbon et al., 2009, Joanna Briggs Institute, 2007, Lee, 2009). This is not meant to imply that comprehensive patient assessment is not taking place elsewhere – it has simply not figured highly in the Australian research undertaken to date.

The quality of patient assessment can be inferred from other findings, all in emergency departments:

- No significant difference in the numbers of X-rays ordered by a nurse practitioner candidate and an emergency physician (Considine et al., 2006a).
- The ability of nurse practitioners to interpret medical imaging is on a par with emergency physicians (Lee et al., 2014).

- Review of investigations and referrals by a transitional nurse practitioner identified no missed fractures or inappropriate investigations (Fry and Rogers, 2009).

An interesting aspect of these findings is that they all involve comparison of nurse practitioners and doctors, when one of the underlying premises of having nurse practitioners is that the nature of their patient assessments will be qualitatively different to doctors.

7.4 Health education, prevention and health promotion

The issues of health education, prevention and health promotion feature more prominently in studies of nurse practitioners providing services to the well and 'at risk' populations (Figure 1):

- Preventive health was the predominant type of service provided by a women's health nurse practitioner, with clients of the service indicating that their health literacy had increased as a result of using the service and that the nurse practitioner had helped them to become aware of health issues they had previously not known about (Elmer and Stirling, 2013).
- In a study of nurse practitioners working in community pharmacies, the issue of health promotion was recognised more for the potential for it to be part of the nurse practitioner role, rather than actually being part of the role (McMillan and Emmerton, 2013)
- The colorectal screening service includes discussion of the results of procedures and provision of education and information brochures (Morcom et al., 2004).
- The focus on health promotion and health education in a mental health outpatient service, including the provision of printed information to assist with symptom management (Wand et al., 2012).

One exception can be found in the results of a study into a community aged care nurse practitioner service which indicated that the nurse practitioner taught clients and their carers on a wide range of topics (Allen and Fabri, 2005).

Nurse practitioners responding to a national survey reported high levels of confidence about providing education to patients about their medications, although this may be at odds with actual practice as not all respondents in the same survey reported that they provide patients with comprehensive information about medications (Cashin et al., 2009).

7.5 Prescribing

Two surveys in Australia have focused on the prescribing practices of nurse practitioners (Table 18).

Table 18 Prescribing practices of nurse practitioners

	1st survey (Dunn et al., 2010)	2nd survey (Buckley et al., 2013)
Date of survey	**2007**	**2010**
Participants	Members of the Australian Nurse Practitioner Association .	Endorsed nurse practitioners who were members of the Australian College of Nurse Practitioners
Respondents as a % of total authorised nurse practitioners	27%	Approximately 42%
Number of respondents (authorised nurse practitioners)	68	209
Practice does not involve prescribing	28%	23%
Prescribing occurs in >75% of my practice	9%	Not reported
Usually prescribe at least once per day	n=29 (43% of total)*	n=99 (47% of total)*
% of nurse practitioners reporting prescribing as part of usual care	Not reported	Paediatric/neonatal care (100%), emergency care (98.5%), primary care/general practice (75%).

* In the published papers, these percentages are expressed as the percentage of those that prescribe as part of their practice rather than (as reported here) the percentage of the total number of respondents.

The first survey by Dunn et al. (2010) targeted nurse practitioners and nurse practitioner candidates. Only the results for nurse practitioners are reported here.

The most frequently reported medications prescribed by nurse practitioners in the second survey were anti-infective agents (29.4%), analgesics (16.1%), psychotropic drugs (7.1%) and drugs affecting the cardiovascular system (6.4%), and musculoskeletal system (5.6%). The authors concluded that the medications prescribed by nurse practitioners are comparable to the medications most frequently prescribed by all prescribers (Buckley et al., 2013). The results of both surveys should be treated with some caution given the relatively low number of nurse practitioners responding to the survey as a percentage of total nurse practitioners in Australia, particularly for the first survey.

One study, involving a nurse practitioner candidate, found that the most common medications ordered by nurse practitioners in emergency departments were oral analgesics, immunisations, intravenous antibiotics and local anaesthetics. About half of the patients managed by the nurse practitioner candidate were discharged home with advice about using over-the-counter analgesics (Considine et al., 2006a). The main analgesic prescribed by a nurse practitioner in a pain management service was oral oxycodone (Schoenwald, 2011).

The major impediment to nurse practitioners prescribing is lack of a PBS prescriber number. For those working without prescriber numbers, prescribing is limited to medications which can be dispensed from a hospital pharmacy (Chiarella et al., 2007).

7.6 Ordering diagnostics

One Australian study, at the Alfred Hospital in Melbourne, has investigated the interpretation and ordering of medical imaging by nurse practitioners. The study was conducted prospectively and identified the sensitivity and specificity of X-ray interpretation of isolated limb injuries (shoulders to fingers, hip to toes) by six nurse practitioners and 10 emergency physicians. One consultant radiologist served as the 'gold standard' for interpretation. The weighted Kappa statistic (accepted as the standard measure of agreement for clinical assessment) was 0.83, which constitutes an excellent level of agreement between the two groups, with the two groups demonstrating similar levels of sensitivity and specificity (Lee et al., 2014). An earlier study indicated no difference in the pattern of ordering X-rays by a nurse practitioner candidate and emergency physicians (Considine et al., 2006a).

Most nurse practitioners report that medical imaging is relevant to their practice (Gardner et al., 2009, Middleton et al., 2011), although in a NSW survey only about half reported ordering medical imaging (Chiarella et al., 2007). The importance of medical imaging to their practice varies according to the model of the service they are providing (Gardner et al., 2010b),

7.7 Referrals

In a recent study, nurse practitioners working in emergency departments expressed the view that they have greater insight than doctors into the role of other health professionals, which results in them engaging allied health staff in patient care more frequently as part of an holistic approach to care delivery (Li et al., 2012).

In two national surveys, nurse practitioners reported high levels of referrals to allied health (>97% of nurse practitioners), general practitioners (> 83%) and specialists within their own health service (> 86%) (Gardner et al., 2009, Middleton et al., 2011). In a sub-study to assess extended practice involving 11 nurse practitioners, the rate of referrals varied between 0.2 referrals per patient and 1.6 referrals per patient, according to the nurse practitioner model, with referrals to medical specialists varying markedly between different nurse practitioners and 40% of patients being referred to allied health or other health professionals (Gardner et al., 2010b). The most common referrals by nurse practitioners working in emergency departments are to general practitioners (Considine et al., 2006a, Jennings et al., 2013).

7.8 Admitting and discharging patients

In the first national census of nurse practitioners (in 2007), 16 nurse practitioners (11.0%) were able to admit people to hospital and 42 (29.4%) were able to discharge people from hospital (Gardner et al., 2009). In the second national census (in 2009), the ability to admit and discharge had increased, with 37 (18.4%) reporting that they had admitting

rights and 64 (32.2%) reporting the ability to discharge (Middleton et al., 2011).

What this means in practice is difficult to gauge as none of the Australian research makes any reference to how often nurse practitioners admit people to hospital and what happens when they do. The only references in the literature to the practice of discharging patients is mention of the fact that nurse practitioners have the authority to discharge patients from emergency departments (Considine et al., 2010, Lee and Jennings, 2006).

There is no data on how often patients are discharged from hospitals and emergency departments based solely on the authority of a nurse practitioner and no qualitative data describing how this happens. A recent study investigated length of stay in the emergency department of a group of patients whose care was managed by nurse practitioners (Jennings et al., 2013). It can be inferred that decisions about sending those people home would have been made by the nurse practitioners, particularly as the study focused on a cohort of patients managed independently by the nurse practitioners, but there is no specific reference to which clinicians made the decision to send the patients home.

7.9 Manage an episode of care

As Carryer et al. pointed out (as part of what they referred to as professional efficacy):

> The addition of diagnostic ability, the ability to request pathology tests and X-rays and prescribing were viewed as a convenience for patients to improve timely health service previously compromised by remoteness or workforce shortages. However, more importantly, they demonstrated that the ability to provide care that is more comprehensive assisted with reducing fragmentation. (2007, p. 1822)

Put another way, they state that 'the very nature of the NP role allows that the nurse is responsible for the complete episode of care' (p. 1822).

Unfortunately, there is little evidence in the Australian literature to support this potentially very important aspect of the nurse practitioner role. This is not to say that the introduction of nurse practitioners to the health system has not increased the capability of nurses to manage complete episodes of care and reduce fragmentation, but rather that this has not been the focus of the research that has been conducted. Examples in the literature of managing an episode of care or reducing fragmentation are limited to the following:

- The majority of patients managed by a nurse practitioner candidate in an emergency department were completely managed by that nurse, with only four patients (out of 476) handed over to medical staff because the patients were outside their scope of practice (Considine et al., 2006a).
- The nurse practitioner in a women's health centre was able to meet the needs of 80% of clients without the need to refer them to another service (based on the responses of clients responding to a survey) (Elmer and Stirling, 2013)
- An outpatient service for mental health clients (based in an emergency department) which assisted with reducing fragmentation between emergency department presentation and follow-up care (Wand et al., 2011a).
- For 70% of patients seen in a chemotherapy unit, the nurse practitioner did not need to seek medical advice (Cox et al., 2013).

In a recently published study, doctors, nurses and allied health professionals were asked whether they thought the introduction of a nurse practitioner had reduced duplication of services and reduced the number of health care professionals a patient must interact with. The results were inconclusive (Gardner et al., 2014).

Bail et al. (2009), in a study involving a student nurse practitioner, describe how a nurse practitioner acting across acute, community and residential aged care settings in a 'transboundary' capacity can improve the coordination of care (Bail et al., 2009). Also addressing the issue of coordination in aged care, the report by the Joanna Briggs Institute into 'NP-like' services in aged care concluded that:

> The findings suggest that if an appropriately prepared nurse, with prescribing and diagnostic investigation rights, is allocated a caseload of residents in aged care facilities this may be effective in complementing the role already played by general practitioners in … providing enhanced communication, coordination and monitoring of care for other health care providers, the client and/or their carers. (2007, p. 73)

The words 'integration', 'coordination and 'fragmentation' are rarely mentioned in the Australian nurse practitioner literature, and when they do make an appearance it is almost always in the introduction to a paper or report, rather than in the results section or discussion of the results. This component of the work of nurse practitioners warrants further research.

7.10 Leadership

One of the orientating statements in the new national nurse practitioner standards for practice is that a nurse practitioner 'advocates for, participates in, or leads systems that support safe care, partnership and professional growth' (Nursing and Midwifery Board of Australia, 2013). Earlier research to develop core competencies for nurse practitioners in Australia and New Zealand identified clinical leadership as one of the three core competencies. Nurse practitioners who participated in that research referred to various aspects of clinical leadership – leading practice, being responsible for leading a service and taking responsibility for the practice of others (Carryer et al., 2007).

There are references in the Australian literature to the 'expectations' that nurse practitioners will provide clinical leadership (Wand et al., 2011b), the 'potential' for nurse practitioners to provide clinical leadership (Arbon et al., 2009) and nurse practitioners themselves have identified that they do provide clinical leadership (Li et al., 2012). However, in general, the role of nurse practitioners as clinical leaders has not been investigated, an observation that has been made before by Carryer et al. (2007).

SECTION EIGHT

Patient outcomes achieved by Australian nurse practitioners

Studies investigating the outcomes achieved by nurse practitioner roles that are fully operational (see Section 5 for a definition of 'fully operational') are limited. As recently as 2012, Wand et al. wrote:

> Despite the limitations of this evaluation, to the best of our knowledge, this is the first study reporting the outcomes from the services provided by an established NP in Australia, and the first detailed evaluation of an established MHNP role anywhere (Wand et al., 2012, p. 158).

The comprehensive nature of the evaluation by Wand et al. is rare. There has been a more recent evaluation, which adopted the same theoretical approach (realistic evaluation) as the evaluation by Wand et al. although not on the same scale, of a women's health nurse practitioner in Tasmania (Elmer and Stirling, 2013). Studies which include consideration of outcomes by authorised nurse practitioners (rather than candidate or transitional nurse practitioners) are summarised in Table 19 and Table 20. It should be noted that all the emergency department studies investigated nurse practitioners treating minor injuries or working in fast track units.

The studies in Table 19 demonstrate a focus on process measures such as waiting times and time spent in the emergency department, with patient outcomes largely confined to patient satisfaction, with the notable exception of the study which sought to measure health status. The results generally support the positive impact of nurse practitioners in emergency departments.

Table 19 Outcomes achieved by authorised nurse practitioners in emergency departments

Outcome measures	Outcomes achieved
Waiting times	The median waiting time to be seen by an NP was 14 minutes (Jennings et al., 2013). Compliance with recommended triage waiting time was highest for NPs and lowest for junior medical officers (Considine et al., 2010).
Length of stay in ED	Length of stay for patients sent home was 122 minutes and for other patients was 271 minutes (unclear whether mean or median) (Jennings et al., 2013). Patients managed by NPs or NP candidates had the shortest ED length of stay and patients managed by junior and locum medical officers had the longest ED length of stay (Considine et al., 2010).
Adverse events	9% of patients initially seen by NPs had unplanned representations or missed fractures, compared to 6% of patients initially seen by doctors. According to the study authors, the average of 8% between the two groups 'appears high'(Dinh et al., 2012).
Health status	There were no significant differences in health status at 2-week follow up in two groups of patients, one initially seen by NPs, the other by doctors (Dinh et al., 2012).
Patient satisfaction	Total satisfaction scores were significantly higher in the group of patients seen by NPs, compared to the group seen by doctors (Dinh et al., 2012). Patients who received care from NPs reported greater patient satisfaction than patients who received care from doctors (Jennings et al., 2009). Patient satisfaction results were similar to studies reported in the UK which also reported patient satisfaction with NPs (Wilson and Shifaza, 2008)

Table 20 Patient outcomes achieved by authorised nurse practitioners (other than in emergency departments)

Model	Outcome measures	Outcomes achieved
NP-led model for diabetes in pregnancy (Murfet et al., 2014)	Maternal complications Neonatal outcomes	No statistically significant reduction in maternal complications. Concluded that the NP-led model 'may play an important role in improving neonatal outcomes' (p 1159).
NP-led dementia outreach service (Borbasi et al., 2011)	Outcomes not directly measured but staff of residential aged care facilities were asked whether residents' quality of life improved.	Inconclusive results regarding residents' quality of life (as assessed by staff) between intervention group and control group.
Various hospital and community-based models (Gardner et al., 2014)	Patient satisfaction Safety (assessed by medical record audit and peer review)	Patients feel safe and confident being treated by NPs. NPs practiced in accordance with competency standards.
Mental health outpatient clinic (Wand et al., 2012)	Patient-rated psychological distress Patient-rated self-efficacy Patient satisfaction	Statistically significant reduction in psychological distress after attending the clinic, with some improvement in the mean score for the self-efficacy scale. In general, patients were very positive about aspects of the service, particularly availability, accessibility and therapeutic features.
Walk-in Centre (Parker et al., 2011)	Patient satisfaction Impact on presentations to nearby ED	Not relevant as the evaluation identified that the nurse practitioner role had not been implemented (despite the employment of nurse practitioners).
Community pharmacies (McMillan and Emmerton, 2013)	Outcomes not measured	Not applicable.
Emergency eye clinic (Kirkwood et al., 2005)	Adverse reactions to medications Additional clinical appointments	There were no adverse reactions and no additional clinical appointments were required.
Chemotherapy unit (Cox et al., 2013)	Second review required in 7 days Admitted to hospital within 7 days	18% of patients seen by the NP required a second review within seven days and subsequent admission to hospital (although there is no comparator to judge whether this percentage is high or low).
Women's health (Elmer and Stirling, 2013)	Health literacy Client satisfaction	Clients expressed high levels of satisfaction and referred to ways in which the NP had increased their health literacy.
Colorectal cancer screening clinic (Morcom et al., 2004)	Depth of insertion of the instrument (flexible sigmoidoscope) Client discomfort scores Pathology findings Client satisfaction	Depth of insertion of the instrument, pathological findings, and patient satisfaction with the procedure compared favourably with results reported from Australia, the USA and the UK. There was a high level of patient satisfaction.
Acute pain service for post-operative and obstetric patients (Schoenwald, 2011)	Timeliness of assessment Complaints Incidents Non-pharmacological interventions for pain management	Patients received prompt intervention (although 'prompt' was not defined), there was only one complaint or clinical incident and what appears to be diverse range of non-pharmacological interventions were used.

As with the emergency department research, the studies in Table 20 indicate a propensity to investigate patient satisfaction. The results generally support the positive impact of nurse practitioners. As was noted in Section 4.3, it is difficult to attribute outcomes to nurse practitioners and in two of the studies in Table 20 this becomes even more difficult when the focus of the study is not so much on the nurse practitioner, but a service being led by the nurse practitioner.

Outcomes achieved by the introduction of 'NP-like' services are similar to those reported above:

- Waiting times or length of stay in emergency departments are either unchanged (Considine et al., 2006b), or improved (Fry and Rogers, 2009, Jennings et al., 2008).
- Clients report satisfaction with the care provided by nurse practitioners (Allnut et al., 2010, Arbon et al., 2009, Wortans et al., 2006).
- An absence of adverse events, complaints or clinical incidents (Fry et al., 2011, Fry and Rogers, 2009).

In aged care, the results have been quite varied, with a report of similar outcomes (health status, quality of life) to those achieved by general practitioners (Joanna Briggs Institute, 2007), a report of improvements in function and social status (Lee, 2009) and a report (based on client interviews) of improvements such as symptom relief and enhanced socialisation and improved access to services (Allen and Fabri, 2005).

No Australian studies were identified which had conducted an economic evaluation of nurse practitioner services, which is a major gap in the literature.

SECTION NINE

Factors influencing successful implementation of nurse practitioners

9.1 Introduction

The introduction of nurse practitioners potentially represents a significant change, from the perspective of the nurse practitioner themselves, the people they work with, the clients they treat and the organisations they work for. The literature demonstrates the value of examining change at different levels such as the individual practitioner, the team, the organisation and the broader context (Ferlie and Shortell, 2001, Grol and Wensing, 2004, Williams et al., 2009). The implementation science literature indicates that implementation is influenced by the individuals involved, the context within which implementation takes place and the process by which implementation is accomplished (Damschroder et al., 2009, Durlak and DuPre, 2008). This knowledge was used to design a coding structure to investigate factors that influence the implementation of nurse practitioners, with five categories of codes:

- Characteristics of nurse practitioners.
- The role of nurse practitioners.
- The process of implementation.
- The context within which nurse practitioners work, including governance arrangements; support from managers, doctors and fellow nurses; and collaboration with the people they work with.
- The broader context of health and aged care, including systems of funding and legislation.

The concept of levels can be found in a conceptual framework developed in Canada which is structured in term of the health care system, the organisation, the team, the nurse practitioner and the patient (Kilpatrick et al., 2013). Another team from Canada adopted a 'whole systems change' approach to examine the 50-year history of nurse practitioners in that country which included multiple levels: the 'micro level' of practitioners, patients, communities and organisations; the regional or provincial level; and the federal or global levels (Edwards et al., 2011). The coding structure also has some similarities to the model proposed by Sidani and Irvine (1999) who developed a conceptual framework for evaluating the role of nurse practitioners which has three components: structure (patient, nurse practitioner and organisational variables), process (the roles that nurse practitioners assume to deliver care) and outcomes. Full details of the coding structure are provided in Appendix C.

The following sections summarise the main factors influencing the implementation of nurse practitioners in Australia. It is worth repeating the point made earlier in Section 5 about the general lack of a broader 'organisational change' perspective to much of the Australian research about nurse practitioners i.e. there is a paucity of in-depth analysis of the process of change.

9.2 The role of nurse practitioner

Based on the responses to a survey of nurse practitioners, nurse managers and nurse policy makers regarding integration of nurse practitioner roles in the health system, Lowe et al. (2013) found that although all three groups perceived that nurse practitioner roles were regarded positively, they also thought that there was a lack of understanding of the roles. They make the point that confusion about the role of nurse practitioners can impede 'progression of the roles and affects the potential contribution that NPs can make to service delivery' (Lowe et al., 2013, p. 32).

Weiland et al. (2010) conducted interviews with 95 doctors from 35 EDs from across the country to investigate their perception of nurse practitioners. Some of the doctors felt that the role was well-defined whereas others did not. The authors concluded that their results 'suggest mixed feelings toward the NP role with substantial resistance to NPs undertaking some of the work typically seen as being the domain of doctors' (p. 276).

Other studies have addressed the issue of role confusion in various ways and have indicated how this can negatively impact on implementation of the role:

- Based on a small study which focused on the issue of collaboration it was suggested that lack of understanding of the nurse practitioner role by doctors can inhibit medical-nursing collaboration (Wilson et al., 2005).
- One nurse practitioner candidate spoke about how she was 'neither a nurse nor a doctor' which made it difficult to develop her role (Stanley, 2005a).

The influence of a positive view of the nurse practitioner role can be found in the findings of a study to evaluate a mental health nursing practitioner service operating within an emergency department but also providing a separate outpatient service. It was postulated that the high regard in which the role was held by emergency department staff 'instils confidence in and support for the service' and that 'ED ownership of the MHNP outpatient service was critical to the implementation and ongoing success of the program' (Wand et al., 2011a, p. 205).

9.3 The characteristics of nurse practitioners

Various Australian studies have identified the important characteristics of being a nurse practitioner:

- Extensive and systematic clinical knowledge and skill (Carryer et al., 2007).
- Comprehensive skills in patient assessment (Carryer et al., 2007).
- The ability to deal with the unexpected (Gardner et al., 2008).
- The ability to initiate therapy, prescribe medication and to initiate investigative procedures (Carryer et al., 2007).
- Knowing how to learn (Gardner et al., 2008).
- Ability to work with others (teamwork and collaboration is central to practice) (Gardner et al., 2008).
- Provide clinical leadership, in terms of leading practice, being responsible for leading a service and taking responsibility for the practice of others (Carryer et al., 2007).
- High level of self-efficacy (Gardner et al., 2008).
- Ability to use nonlinear reasoning and develop creative solutions in clinical practice (Gardner et al., 2006).

What is not known is how these characteristics influence implementation of the nurse practitioner role. Intuitively, it would seem reasonable to assume that the presence of these characteristics would facilitate implementation, and absence of these characteristics would serve as a barrier to implementation, but research needs to be undertaken to test that assumption.

9.4 The role of patients

There is little in the Australian literature about how patients influence the implementation of nurse practitioners. Studies that have sought the views of patients have generally focused on patient satisfaction, rather than investigating patient understanding of the role of nurse practitioners. There appears to be little consumer awareness of the role of nurse practitioners (Allnut et al., 2010). Charlton et al. (2008) reviewed the literature on how the communication styles of nurse practitioners might influence patient outcomes (including seven studies) and found no studies which adequately addressed the issue. The interaction between patients and nurse practitioners, and how each might influence the other, is a potential area for future research.

9.5 The process of implementation

In the early days of introducing nurse practitioners there was lots of planning for implementation, particularly at a 'system' level with changes to legislation, education and regulation. More recently, the process of local implementation has received less attention in the published literature. Based on work done in South Australia it was concluded that 'full implementation of the role in most settings remains challenging' (Adrian and Chiarella, 2008, p. 31).

The first 12 months are considered to be a critical phase for implementation, a time when systems and relationships are established, and the role is defined (Desborough, 2012). Martin and Considine, as a result of their study in a Victorian emergency department, identified 'the importance of an inclusive and collaborative approach to implementation' (2005, p. 77). Another study found that 'a cumulative process of exploration, data collection, consultation and model refinement prior to implementation was pivotal to the success of the program' (Wand et al., 2011a, p. 205). A report in New South Wales found that initial support for

the introduction of a new role could be withdrawn when it came time to implement the role, due to lack of funding, resulting in distrust of the approval process. This emphasises the need to ensure that issues such as identified need for the position, funding and the scope of the role are determined before a nurse practitioner position is established (Della and Zhou, 2009).

9.6 The context within which nurse practitioners work

The key aspect of the local environment influencing implementation is the 'people side' of the system of care, including the degree of collaboration, particularly with medical staff, and the support of managers, doctors and other nurses. Nurse practitioners:

> … regarded teamwork in all its forms as best practice. Working in multidisciplinary teams was the best way to work, the most efficient for both staff and patient … The facility to work well with others was probably the most strongly supported aspect of capability in this study. (Gardner et al., 2008, p. 254)

The issue of collaboration does not appear to feature strongly in studies of nurse practitioners in emergency departments. In part, this is because the issue has not been studied to any great extent in emergency department settings. An interesting aspect of the nurse practitioner role in emergency departments is that, at least in the published literature, it is largely confined to fast track units and minor injuries clinics. Nurse practitioners in the small number of emergency departments in which studies have taken place have carved out a quite distinct role which may negate the need for too much emphasis on collaboration, at least as a subject worth studying.

The importance of collaboration has been raised most frequently in studies of 'NP-like' services in settings other than emergency departments, particularly aged care:

- Interviews with colleagues of a community aged care nurse practitioner candidate identified a high level of collaboration between the nurse practitioner and the community health team, which included nurses, doctors and allied health staff (Allen and Fabri, 2005).
- In another aged care study, this time involving student nurse practitioners, it was found that the student developed an important 'trans-boundary' role by improving relationships across acute, residential and community settings (Bail et al., 2009).

Desborough (2012), based on interviews and a focus group with nurse practitioners, identified the importance of nurse practitioners 'developing legitimacy and credibility' which depends on the ability to work collaboratively in an environment where knowledge and expertise are needed to influence others. All the participants in her study recognised the need for team support to implement and maintain the nurse practitioner role. Communication is seen as critical to good teamwork (Gardner et al., 2008), aided by nurse practitioners being accessible to other members of the team (Desborough, 2012).

Based on interviews with nurse practitioners regarding their working relationships with general practitioners and allied health professionals, Wilson et al. (2005) concluded that two characteristics of nurse practitioners were key to supporting collaboration: the length of time the nurse practitioner had spent working in the local area and the rapport they had established before becoming an authorised nurse practitioner. High levels of collaboration were associated with a long history of working in the local health service.

Relationships with medical practitioners are critical to nurse practitioner roles. In emergency fast track units this has reached the point where nurse practitioners and medical staff are interchangeable, with nurse practitioners and nurse practitioner candidates being part of the medical roster (Considine et al., 2010). Nurse practitioners have identified support and acceptance by medical staff as important to the development of their role (Chiarella et al., 2007, Cleeton, 2011). A survey of nurse practitioners, nurse managers and nurse policymakers found that:

> Medical support was an important theme identified in the current study; it is pertinent to all those trying to establish themselves in an NP role or managers wishing to establish the roles in their organisations. (Lowe et al., 2013, p. 33)

Collaborative relationships with senior medical staff can strengthen the position of nurse practitioners with regard to other health professionals (Desborough, 2012) and medical support is important for role integration (Lowe et al., 2013). As trust and rapport are developed between the nurse practitioner and medical staff, there is potential for the nurse practitioner scope of practice to broaden (Elmer and Stirling, 2013). A recent review of the literature on collaboration between nurse practitioners and medical practitioners concluded that 'collaboration develops step by step, that professional hurdles need to be overcome, and that positive experiences of working collaboratively may be the strongest force to promote and advance collaboration' (Schadewaldt et al., 2013, p. 9).

Doctors can perform an important role as mentors of nurse practitioners, particularly as there may be no suitably qualified nurses available to provide mentorship (Desborough, 2012) and there is some evidence that experience working with a nurse practitioner will result in doctors being more favourably disposed towards the role (Jones et al., 2013). Based on the experiences of newly-endorsed nurse practitioners, MacLellan et al. (2014) found that a characteristic of transitioning to the nurse practitioner role was growing acceptance by medical colleagues.

Another important source of support for nurse practitioners is from their managers. Just over half the nurse practitioners responding to a nation-wide survey (n=105) identified 'lack of organisational support', particularly from the nursing profession, as limiting their practice (Middleton et al., 2011). The negative influence of lack of managerial support has been identified in several studies (Chiarella et al., 2007, Harvey, 2010, Keating et al., 2010, Parker et al., 2011, Weiland et al., 2010). Others have identified the positive influence of managerial support (Adrian and Chiarella, 2008, Joanna Briggs Institute, 2007).

Other issues within the local context influencing the role of nurse practitioners are governance, funding (with lack of funding introducing uncertainty about the future of the role), and adequate resources and systems to support the role of the nurse practitioner.

Governance arrangements for nurse practitioners may be unclear, particularly if there are multiple reporting relationships e.g. managerially responsible to a nurse unit manager, with clinical supervision from a doctor (Della and Zhou, 2009). Directors of emergency departments expressed concern in a recent study about not being able to negotiate the responsibilities of nurse practitioners in their department who were responsible to the director of nursing (Li et al., 2013). Some of the participants in a survey of emergency department doctors indicated that lack of awareness of clinical governance structures was a barrier to the nurse practitioner role being accepted more broadly (Weiland et al., 2010).

The resources and systems required to support nurse practitioners include clerical support and library resources (Chiarella et al., 2007), access to clinical information and decision support systems (Li et al., 2012), and evidence-based resources at point of care (Newman et al., 2009).

With regard to the broader context within which nurse practitioners work, the main issue raised in the literature is the lack of access to the Medicare Benefits Schedule (MBS) and the Pharmaceutical Benefits Scheme (PBS) (Chiarella et al., 2007, Middleton et al., 2011). In the second national census of nurse practitioners, approximately 90% of respondents identified lack of access to the two schemes as 'limiting' or 'extremely limiting' to their practice (Middleton et al., 2011). All three of the extended practice domains of nurse practitioners – prescribing, ordering diagnostics, referrals (to specialist doctors) – are still constrained by legislation and access to the MBS and PBS. Legislation and financial reimbursement are major barriers to nurse practitioners setting up in private practice, both in Australia and other countries where private practice takes place (Currie et al., 2013).

In a recent study, nurse practitioners raised various aspects of isolation (being a solo practitioner, distance from other service and practitioners, access to education) but it is not clear to what extent these issues acted as a barrier to implementation (Lowe et al., 2013).

9.7 Comparison with Canada

The most comprehensive investigation of factors influencing implementation is from Canada, involving a review of over 500 papers (primarily Canadian) about clinical nurse specialists, primary healthcare nurse practitioners and acute care nurse practitioners. The work also included over 60 stakeholder interviews (DiCenso et al., 2010). Some of the results of that investigation are summarised in Table 21 and serve as a useful comparator for the synthesis of the Australian evidence.

Another important source of evidence regarding factors that influence implementation is a systematic review of qualitative research into barriers and facilitators for advanced and specialist roles in acute hospital settings. Of the 14 papers included in the review, nurse practitioners were the only participants in five of the studies and were also involved in one other study along with clinical nurse specialists and clinical nurse consultants.

Table 21 Barriers and facilitators in the Canadian health system

Level	Factor
What nurse practitioners do, including the nature of the role and understanding of the role	Scopes of practice that overlap with doctors can create tension and concerns related to liability. Where the NP role is clearly defined, there is less concern from doctors about NP scope of practice and liability. Restrictions on and variations in the scope of practice of NPs are barriers to implementation. Understanding of the APN role by the healthcare team facilitates role integration and lack of understanding is a barrier to integration. There should be a good fit between the requirements of the role and the person filling the role.
Consumers (patients, families, carers)	Inadequate public awareness of APN roles is a barrier to APN integration. Once informed about the role, the public is supportive.
The local context within which nurse practitioners work	Poor planning for implementation is a barrier to successful integration. Insufficient administrative support and competing time demands are frequently reported barriers to participating in education, research and leadership activities. Inadequate resources to support the APN role (e.g. support staff, technology, infrastructure) have been frequently reported. Stakeholder participation at the onset of role development is critical for ensuring commitment to and providing support for planned change. Lack of management support is a barrier to role implementation. Support from doctors and nursing leadership are important for role implementation. Networking support systems or communities of practice support the sharing and addressing of common issues and foster professional development. Inter-professional collaboration supports positive outcomes for patients, providers and the healthcare system. Resistance from doctors relate to concerns regarding liability, scope of practice issues, reimbursement mechanisms and NP independent practice. If the relationship with doctors is not good, it is a significant barrier to NP role implementation; if the relationship is good, it is a key facilitator of NP role implementation and integration.
Broader system of health care (e.g. regulation, funding, geographic isolation)	Identification of a service need or practice gap was a significant factor in determining the success of integration. A strategic communication plan about advanced practice roles is essential to achieving full integration, acceptability and support. NP education costs are high, which may limit the pool of candidates. Variability in legislated prescribing privileges across Canada interferes with implementation. Remote areas posed challenges for recruitment and practice support. Small, remote, communities can be receptive to advanced practice. Lack of sustainable funding and/or reimbursement models is a barrier.

One study included some participants from Australia. The review found that:

> The factors most widely regarded as important to the success of specialist and advanced nursing roles relate to relationships with other key personnel, and to role definitions and expectations. Other important factors relate to the practitioner's personal characteristics and previous experience, to education and preparation for the role, and to organizational culture and resources.
> (Lloyd Jones, 2005, pp. 206-207)

These factors are similar to the barriers and facilitators found in the Australian and Canadian literature, and demonstrate how the work of nurse practitioners can be influenced, both positively and negatively, by factors operating at various 'levels'.

SECTION TEN

Discussion

Health policy can be categorised into practice policy (the use of resources by practitioners), service policy (e.g. allocation of resources and patterns of service delivery) and governance policy. Although much of the evidence regarding nurse practitioners is couched in clinical terms, decisions about whether to employ nurse practitioners is largely an issue of service policy, for which the relationship between evidence and policy has generally been weak (Black, 2001).

Evidence is neither fixed nor certain, referred to as 'a contested domain' (Nutley et al., 2003), with a need for continual interpretation and reframing (Greenhalgh et al., 2004) and subject to 'debates and controversies of opposing viewpoints in search of ever more compelling arguments' (Wood et al., 1998, p. 1735). Synthesising evidence to inform policy is less about providing definitive answers and recommendations and more about using evidence to suggest what options are available and explore the consequences of those options (Ham, 2005). This perspective has influenced the approach taken with this literature review.

An important question is how a new service or program works i.e. what are the key ingredients that make a particular intervention work and how do those ingredients exert an effect (Craig, Dieppe et al. 2008). Unfortunately, the 'how' question is typically not well answered, which is the case with the Australian literature on nurse practitioners. This has given rise to the idea of realist review which re-frames the 'evidence' question to one of 'what is it about this programme that works for whom in what circumstances?' (Pawson, Greenhalgh et al. 2005).

There is a 40-year history of nurse practitioner research, primarily in the USA, the UK and Canada. That research has consistently shown that nurse practitioners produce outcomes that are either equivalent to or better than outcomes achieved by doctors. Although individual studies and individual reviews of the literature can always be criticised on the grounds of methodological quality, this is a remarkable result.

In arguing for greater conceptual clarity about the various terms used to describe evidence Luce et al. (2010) propose a framework based on three key questions: 'can it work?' (efficacy), 'does it work?' (effectiveness) and 'is it worth it?' (economic value). Given the variation in the role of nurse practitioners in different countries there is a need to be cautious about interpreting the evidence from overseas studies. However, the consistent results achieved overseas suggest that little is to be gained by continuing to try and answer the 'can it work?' question. The answer is 'yes, it can', but it is probably the wrong question to be asking at this point in the development of nurse practitioners in this country.

Two interesting aspects to studies seeking to address the issue of efficacy are that (1) the outcome measures used in the studies are measures of generic outcomes (e.g. waiting times for treatment), rather than outcomes which might be sensitive to nursing care; (2) the comparator against which nurse practitioners are judged invariably consists of some form of medical practitioner. This assumes that (a) medical practitioners can be considered as the 'gold standard' and (b) doctors and nurses do the same things in the same way, both of which are open to debate. It may be time to stop comparing doctors and nurses in this way, and focus instead on using 'evidence' as the comparator and identifying the unique contribution of nurse practitioners to patient care. As was indicated in Section 7.9, one avenue worth exploring is how nurse practitioners might improve coordination and reduce fragmentation.

Given the recent origins of nurse practitioners in this country, much of the Australian research has involved nurses who were not practising to the full extent of the role e.g. nurse practitioner candidates. An example is the paper by Allen and Fabri (2005) entitled 'An evaluation of a community aged care nurse practitioner service', in which the nurse practitioner candidate for the duration of the project worked within the role boundaries of a registered nurse. Together with the original pilot

studies funded to inform the adoption and early implementation of nurse practitioners, studies such as these have formed an important part of the development of nurse practitioners. However, it is probably time to stop investing resources in studies of these 'NP-like' services. Future research and evaluation efforts should focus on authorised nurse practitioners working in established positions, to try and work out how and why they work (or do not work).

The section of this report on factors that influence successful implementation was based on the findings from Australian studies. As was pointed out in Section 5, these studies have not drawn on the wider literature from fields such as organisational change and implementation science and hence it is not surprising that there was little in the way of evidence to support that section of the report. Many lists of factors that influence implementation have been produced, for example (from the innovations literature): decision-making devolved to teams on the ground; support, commitment and involvement of senior management; widespread involvement of staff at all levels; few job changes; availability of timely, high-quality, on-the-job training; effective communication and networking across organisational boundaries; dedicated funding; and timely and accurate feedback about the impact of implementation (Greenhalgh et al., 2004). As was indicated in Section 9.1, there is value in considering change as multi-layered – individual practitioner, team, organisation and broader context. Taking a broader approach to evaluating nurse practitioners, incorporating knowledge from the wider literature, has great potential to inform future research and provide greater understanding of how the various factors influence implementation in different circumstances.

With regard to the effectiveness question, it is well recognised that innovations need to be adapted to local circumstances. The 'fit' between an innovation and the context within which that innovation is implemented may be a more useful unit of analysis than just considering the attributes of the innovation itself (Greenhalgh et al., 2004). There is a paucity of Australian research on nurse practitioner models and focusing over the next few years on in-depth case studies of particular models in a particular context would be an appropriate strategy. Nurse practitioners, either in a generalist or specialist role, working in rural and remote locations would be a good place to start, given the absence of research in this area.

The 'is it worth it?' question is the most difficult to answer. There is a lack of evidence regarding the cost effectiveness of nurse practitioners, particularly within Australia but from overseas as well. Given the problem of attribution (identifying the contribution of nurse practitioners to particular outcomes in a complex, team-based, environment) this may be the wrong question as well. The issue may not be whether nurse practitioners are cost effective, but whether particular models of health service delivery (e.g. fast track) are cost effective. The issue then becomes one of deciding what role a nurse practitioner may, or may not, play in such models. In some situations (e.g. rural and remote communities), the choice may be between a nurse practitioner or no service.

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APPENDIX A

Government-sponsored pilot projects in Australia

Jurisdiction	Relevant dates	Nature of trials	Results
Australian Capital Territory (ACT Health, 2002, Gardner and Gardner, 2005)	10-month trial from March to December 2001	Trial of four models: sexual health, wound care, mental health liaison / consultation, and military. The last of these trials was not completed. Data collection was similar to the pilot projects in NSW and Victoria. The sexual health model was reported in more detail in a separate paper (O'Keefe and Gardner, 2003)	It was concluded that the NP services were efficacious, safe, valued by patients and well accepted by other health professionals.
New South Wales	1994 / 1995	10 pilot projects, nine of which were considered to involve primary care. Two projects involved randomised controlled trials. Two of the projects were subsequently reported in detail: *Management of wounds and blunt limb trauma in rural and remote locations* (Chang et al., 1999); *Nurse practitioners: an evaluation of the extended role of nurses at the Kirketon Road Centre in Sydney, Australia* (Hooke et al., 2001)	The evaluation concluded that the NP role was feasible and safe service, with strong adherence to protocols and clinical guidelines. Clinical review found the clinical decisions of the nurses to be reasonable.
Queensland (Queensland Health, 2003)	Implementation commenced February 2003; data collection February to August 2003	Trialled NP models in two settings – acute care (1 site); rural and remote (3 sites). Data collection included chart audit, interviews, survey and case study review to evaluate four domains: access, clinical effectiveness, safety, and cost.	The NP models facilitated access to services, including quicker access to medical specialists. There were no adverse events, high levels of patient satisfaction and supportive comments from fellow health professionals.
Victoria Phase 1 (Parker et al., 2000)	Data collection from late 1999 to early 2000	11 projects, involving three models: acute (specialist), community, community/acute interface (specialist). Data collection included a minimum data set, surveys and four case studies. The NPs were candidates, with few fulfilling all aspects of extended practice (e.g. ordering diagnostic tests and drugs, referrals). One of the projects, involving neonatal care, has been separately reported (Copnell et al., 2004)	Generally, there was a poor response rate for the surveys, hence findings were considered 'tentative and indicative'. The NP candidates were well accepted by colleagues and clients, with positive comments (by clients) about level of care, attention and expertise.
Victoria Phase 2 (Pearson et al., 2004)	Data collection from October 2001 to January 2002	Evaluation of 16 NP models. The NPs were new to the role and required a period of support and supervision. One of the Phase 2 projects, involving intensive care liaison nurses, has been separately reported (Green and Edmonds, 2004).	There was a high level of service provision, which was rated well by consumers and colleagues. All the models were found to be effective and appropriate, with no significant increases in costs.

Data collected in the NSW, Victorian and ACT trials were similar. In the ACT trial the following data collection was undertaken: patient demographics; clinical practice review; details of the therapies, diagnostics and referrals recommended by the nurse practitioners; data on patient outcomes, including re-presentations, adverse events and improvements in symptoms, functional status or self-management; nurse practitioner clinical service survey; consumer satisfaction; data from workshops and nurse practitioner clinical journals. At the time of the trial, nurse practitioners were not licenced to practice in the ACT, precluding some aspects of the extended role of NPs e.g. prescribing, making referrals, ordering diagnostics (ACT Health, 2002). South Australia chose to move directly to implementation of NPs, rather than trialling NPs in that state. The diversity of projects in the government-sponsored trials is illustrated by the summary in the table below.

Number of projects by clinical field in government-sponsored pilot projects					
Clinical field	**ACT**	**NSW**	**Queensland**	**Victoria (Phase 1)**	**Victoria (Phase 2)**
Adolescent health					2
Community					2
Custodial nursing					1
Diabetes					3
Emergency		1		1	
General practice		3			1
Haematology			1	1	
Homeless persons				1	1
ICU liaison					1
Mental health	1	1		1	
Midwifery		1			1
Neonatal				1	
Paediatrics				1	
Palliative care					1
Perioperative pre-admission				1	
Rural/remote area nursing		3	3	1	1
Sexual health	1	1			
Stomaltherapy / continence					1
Women's health				2	1
Wound management	1			1	
Total	**3**	**10**	**4**	**11**	**16**

APPENDIX B

Australian studies excluded from the literature review

Title and authorship	Where	When	Reason for exclusion
The introduction of a nurse practitioner model of care into an Australian outpatient setting (Scanlon, 2013)	Victoria	2011 to 2012	The paper is essentially a description of the NP service, rather than a study. Data are limited to aggregated data on waiting times for non-urgent patients to be seen in the outpatient clinic, comparing periods with and without an NP.
How acceptable are primary health care nurse practitioners to Australian consumers? (Parker et al., 2013)	Australia	Aug/Sept 2010	This study involved seven focus groups with 77 participants to explore their perceptions of NPs working in primary health care. However, very few of the participants had received care from an NP and many were not sure if they had or not.
A structure and process evaluation of an Australian hospital admission avoidance programme for aged care facility residents (Crilly et al., 2011)	Queensland	2006	Reports on a Hospital in the Nursing Home program. The registered nurse managing the program 'displayed functions consistent with advanced practice nursing roles' (p 331) but the nurse 'does not practice independently or autonomously in the planning and implementation of interventions' (p 332). The paper suggests developing the role to one of a nurse practitioner.
The successful implementation of nurse practitioner model of care for threatened or inevitable miscarriage (Webster-Bain, 2011)	Victoria	Not applicable	This paper outlines a description of the role rather than an evaluation of the role.
Developing the nurse practitioner role in a rural Australian Hospital: a Delphi Study of practice opportunities, barriers and enablers (Haines and Critchley, 2009)	Victoria	2006	This paper reports on a Delphi study to identify service gaps which might benefit from NPs and the barriers and enablers that might influence implementation of the role. There is no indication in the paper that any of the experts had direct knowledge of NPs.
Consumer evaluation of a mental health liaison nurse service in the emergency department (Wand and Schaecken, 2006)	Royal Prince Alfred Hospital, Sydney	Not reported	This paper has been cited in the literature as evidence of the benefits of a mental health NP working in the ED but there is nothing in the paper to indicate that the mental health liaison nurse was working as an NP at the time of the study.
Advanced nursing practice: the case of nurse practitioners in three Australian states (Offredy, 2000)	Victoria, SA, NSW	Not reported	The paper reports the results of interviews with four NPs, in the form of a case study about each NP which essentially consists of a description of their role. It is unclear as to whether any of the nurses were formally authorised NPs, particularly as the paper pre-dates the appointment of the first NP in Australia (in 2001).

APPENDIX C

Coding structure to facilitate analysis of the Australian studies

Category	Codes	
Characteristics of nurse practitioners	Acting with authority Knowledge and skills Leadership	Self-efficacy Sense of identity
What nurse practitioners do	Assessing patients Autonomy Availability Crossing boundaries Manage episode of care Nursing framework or model Ordering diagnostic investigations Other expanded or extended scope Patient-centre care	Practice in accordance with guidelines Prescribing or medication administration Prevention, education and health promotion Procedures and interventions Referrals Throughput Time on direct patient care
The local context	Awaiting approvals Clinical guidelines and protocols Continuing education Governance Needs or service gaps Organisational fit Resources Support systems Collaboration and relationships Management support Medical support, including links with medicine Nursing support	
	Setting	Clinics Community ED fast track Hospital
The context of the broader system of health and aged care	Endorsement process Funding, including MBS and PBS Rurality Legislation	
The process of implementation	No codes in these categories	
The patients they treat		
Help Hinder		
What nurse practitioners achieve	Access Admission to hospital Adverse events (or lack thereof) Cost effectiveness Discharge from hospital or ED Health status, including quality of life Length of stay (in hospital or ED) Patient satisfaction Procedure outcomes Quality of service Waiting times	

APPENDIX D

Details of literature searching

Literature searching included both Australian and International peer-reviewed academic literature, alongside 'grey literature' such as relevant government documents and web-based information. Searching was limited to the years 2000 to 2013 and included the following databases: Cochrane Database, Cinahl, Medline, Education Research Complete, ERIC, Health Source: Nursing / Academic edition, Informit Health, Psychology & Behavioural Sciences Collection, Summons, Google Scholar. An initial search of the Cochrane database yielded three relevant studies. A Summons search was then performed to help identify key search terms: 'nurse practitioner', 'role', 'definition' and 'Australia'. The first 80 results of this search were reviewed, which identified 12 relevant articles. After the first 80 the relevance of the articles diminished quite significantly.

Once a search across a database was performed, the list of documents was sorted by relevance so that the most relevant items appeared to the beginning of the results list. Searches were performed using a combination of search terms and the results are summarised in the table below. Initial searching was undertaken in October 2013. The searches were re-run in June 2014 to update the review prior to publication.

The APN Literature Database maintained by McMaster University was then searched, yielding 18 additional papers from Australia of potential relevance. A search was also conducted for the author Gardner, given the key role of the Australian researchers Anne Gardner and Glenn Gardner. Using Google Scholar, searching the citations of the seminal paper by Horrocks et al. (2002) yielded 10 additional papers of potential interest. The Trove database was searched for Australian theses.

Search terms	Database	Results	Downloaded from results
'nurse practitioners' AND Australia	EBSCO: Cinahl, Medline, Education Research Complete, ERIC, Health Source Nursing / Academic edition, Psychology & Behavioural Sciences Collection	1292	61
'nurse practitioners' AND Australia AND theory		31	9
'nurse practitioners' AND Australia AND model		152	33
'nurse practitioners' AND (literature OR systematic) AND review AND role		260	24
'nurse practitioner' AND role AND review	INFORMIT – Health	2	2
'nurse practitioners' AND role	INFORMIT – Health	39	12
'nurse practitioners'	Cochrane Database of Systematic Reviews	4	3
'nurse practitioner' AND role AND definition AND Australia	Summons	80	12
'nurse practitioner' AND Australia	APN Database	114	10
'nurse practitioner' AND review		318	8
'nurse practitioners' AND Gardner	Cinahl	56	4
Citations of Horrocks et al. (2002)	Google Scholar	815	10
'nurse practitioners'	Trove	100	5
			193

The following websites were searched for relevant reports, studies and literature reviews:

Australian College of Nurse Practitioners

Australian Government Department of Health and Ageing (as it was at the time)

Australian College of Nursing

Australian Nursing and Midwifery Federation

College of Emergency Nursing Australasia

Nursing and Midwifery Board of Australia

National Health and Medical Research Council

ACT Government Health Directorate

Department of Health, Northern Territory

New South Wales Ministry of Health

Queensland Health

Department of Health, Victoria

SA Health

Department of Health, Western Australia

Department of Health and Human Services, Tasmania

Queensland University of Technology

The University of Queensland

Sydney University

University of Newcastle

Deakin University

Flinders University

Curtin University

University of Western Sydney

University of Technology, Sydney

Monash University

Edith Cowan University

James Cook University

University of Adelaide

University of South Australia

Charles Sturt University

American Association of Nurse Practitioners

National Institutes of Health

NP Canada

Canadian Health Services Research Foundation

McMaster University

Royal College of Nursing

National Institute for Health and Care Excellence

University of York Centre for Reviews and Dissemination

APPENDIX E

Literature reviews excluded

Literature review	Reason for exclusion
Experience of being an advanced practice nurse within Australian acute care settings: a systematic review of qualitative evidence (Ramis et al., 2013)	The review included four papers, but no papers about NPs met the inclusion criteria, which the authors surmised might be a reflection of the relatively new status of NPs in Australia.
Advanced neonatal nurse practitioners in the workforce: A review of the evidence to date (Smith and Hall, 2011)	The paper is more of a review of various issues concerning advanced neonatal NPs, with references to the literature, rather than a literature review.
Exploring the perioperative nurse practitioner role (literature review) (Knapp, 2011)	Despite the title, this is not a literature review.
What is the impact of advanced primary care nursing roles on patients, nurses and their colleagues? A literature review (Bonsall and Cheater, 2008)	Described as a 'comprehensive overview' rather than a systematic review. Focused on advanced primary care nursing, particularly nurse-led first contact care. Only includes four studies involving NPs, and does not add materially to previous reviews of NPs in primary health care.
Do nurse practitioners provide equivalent care to doctors as a first point of contact for patients with undifferentiated medical problems (Bazian Ltd, 2005)`+?	This review 'independently assessed' the randomised controlled trials included in the systematic review by Horrocks et al. (2002) and undertook additional searching to update the earlier review. It does not materially add to the work of Horrocks et al. and has therefore been excluded.
Systematic review of recent innovations in service provision to improve access to primary care (Chapman et al., 2004)	Limited to studies in the UK and has a much broader scope than just NPs. The papers included in the review that are specific to NPs are included in other reviews of the literature.
Effectiveness of nurse prescribing: a review of the literature (Latter and Courtenay, 2004)	Focused on nurse prescribing in the UK in what is described as the 'early phase' of nurse prescribing in that country. There is no mention of nurse practitioners in the paper. More relevant reviews of the literature on nurse prescribing can be found in Section 7.5.
Advanced practice nursing outcomes: A review of selected empirical literature (Cunningham, 2004)	The review focuses on oncology advanced nursing practice and only two (of the 19) papers selected for the review involved NPs.

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