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The work of nurse practitioners: a national work sampling study

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ABSTRACT

Aim. This paper is a report of a study of variations in the pattern of nurse practitioner work in a range of service fields and geographical locations, across direct patient care, indirect patient care and service-related activities.

Background. The nurse practitioner role has been implemented internationally as a service reform model to improve the access and timeliness of health care. There is a substantial body of research into the nurse practitioner role and service outcomes, but scant information on the pattern of nurse practitioner work and how this is influenced by different service models.

Methods. We used work sampling methods. Data were collected between July 2008 and January 2009. Observations were recorded from a random sample of 30 nurse practitioners at 10-minute intervals in 2-hour blocks randomly generated to cover two weeks of work time from a sampling frame of six weeks.

Results A total of 12,189 individual observations were conducted with nurse practitioners across Australia. Thirty individual activities were identified as describing nurse practitioner work, and these were distributed across three categories. Direct care accounted for 36.1% of how nurse practitioners spend their time, indirect care accounted for 32.2% and service-related activities made up 31.9%.

Conclusion. These findings provide useful baseline data for evaluation of nurse practitioner positions and the service effect of these positions. However, the study also raises questions about the best use of nurse practitioner time and the influences of barriers to and facilitators of this model of service innovation.

Key Words: Work sampling, Activity sampling, Nurse practitioner, Advanced practice nursing, Work observation.

What is already known about this topic

- Work sampling is a valuable methodology for investigating patterns of practice for individuals and groups in healthcare services and to gain understanding of how clinicians spend their time.

- Use of work sampling to understand nurse practitioner patterns of practice is limited in scope and size and there have been no studies that include a range of nurse practitioner service contexts.

- There is increasing interest internationally in gaining information on the workforce and work activity of nurse practitioners.

What this paper adds

- Thirty individual activities were identified as describing nurse practitioner work, and these were distributed across three categories.

- Direct care accounted for 36.1% of how nurse practitioners spend their time, indirect care accounted for 32.2% and service-related activities made up 31.9%.

- A work sampling instrument and research processes specific to studying nurse practitioner practice patterns.

Implication for practice and policy

- The amount of time nurse practitioners spend on administrative and co-ordinating activities reduces the time they spend in direct patient care.

- Nurse practitioners are educated and employed to deliver advanced clinical service, and information about time spent on activities not requiring these advanced skills will enable nursing and managers to improve utilisation of nurse practitioner services.

- Health service providers and government bodies need to consider the implications of structural and legislative barriers to nurse practitioners using their full scope of practice.

INTRODUCTION

The nurse practitioner role emerged as an innovative and logical response to the pressures of unmet health service need. Long-held service structures that are reliant on discipline silos are proving inadequate to meet the demands of contemporary healthcare consumer populations (Duckett 2005), and healthcare providers in most countries have been seeking innovation in health service delivery. Deregulation of medication prescribing in the United Kingdom, for example, has improved the reach and timeliness of health care (Courtenay *et al.* 2009, Robinson 2009). In Australia, Canada and elsewhere, variable health outcomes within populations and fragmented access to rural and remote services, particularly for indigenous communities, hampers best practice in health care (Roberts 1996, Nhan & Zuidema 2007). The nurse practitioner role is a service reform model to improve access and timeliness of care for these populations (Martin-Misener *et al.* 2004, Arbon *et al.* 2008, Nazareth *et al.* 2008).

Research into the role of nurse practitioners is well-established and the field is dominated by health service and policy research. This is an indication of the emergent nature of this level of health care; clinicians and providers alike are seeking evidence-based information about the effectiveness of nurse practitioner models in meeting gaps in specialist health care. Accordingly, the nurse practitioner role in a range of specialty fields has been evaluated through comparison with other healthcare professionals (Laurant *et al.* 2005), by satisfaction surveys of patients and other clinicians (Jennings *et al.* 2009), and through development and implementation of the role (Cummings *et al.* 2003, Gardner *et al.* 2005). This focus on examination of the service effect of nurse practitioners is welcomed by writers in the field as forming an important knowledge base for service planning, policy development and education standards (van Offenbeck & Knip 2004, Furlong & Smith 2005).

BACKGROUND

There is now increasing interest in health service research in investigating the workforce and work activity of nurse practitioners, and there is an emerging body of work reporting these studies (Rosenfeld *et al.* 2003, Hurlock-Chorostecki *et al.* 2008, Wallerstedt *et al.* 2009, van Soeren *et al.* 2009). This may well be related to the move in several countries towards standardization and regulation of the nurse practitioner role (Furlong & Smith 2005, Gardner *et al.* 2006, Stanley 2009, van Soeren *et al.* 2009). Furlong and Smith (2005), for example, caution that a policy framework and standards for education are necessary to fully realize the potential of the nurse practitioner role for improving healthcare delivery. In the United States of America, leading nursing professional organizations have achieved consensus on a regulatory model for advanced practice nursing roles, including nurse practitioner (Stanley 2009). Examination of the work activities of nurse practitioners can provide detailed information on their role in providing health service, clinical care and baseline data for analysis of scope of practice and barriers to practice. There is, therefore, benefit in gaining understanding and improved knowledge about the pattern of clinical practice of nurse practitioners and the aspect of practice that may influence associated patient outcomes across different models (Hoffman *et al.* 2003, Rosenfeld *et al.* 2003, Laurant *et al.* 2005).

To this end, we designed a work sampling study to clarify the roles, responsibilities and patterns of practice of Australian nurse practitioners by examining the work activities of nurse practitioner clinicians. This research is one component of a three-phase study, the <u>Aus</u>tralian Nurse <u>Prac</u>titioner Project (AUSPRAC), in which multiple methods were used to undertake a comprehensive analysis of the rollout and impact of the nurse practitioner role across Australia (Gardner *et al.* 2009).

Research into work activity is well-established in nursing and other healthcare professions, and work sampling is the methodology most often used in this field (Urden & Roode 1997, Pelletier & Duffield 2003). This research approach has been developed to give a clear picture of workflow and

work practices by providing information on the amount of time that individuals or groups of clinicians spend on particular activities (Pelletier & Duffield 2003). Whilst there have been a small number of work sampling studies undertaken with nurse practitioners, the published research is limited in scope and size and there are no studies that include the range of contexts and models related to the diverse scope of nurse practitioner work. For example, Hoffman *et al.* (2003) used work sampling data to compare the work activity of one acute care nurse practitioner with the work of physicians in training. This comparison of nurse practitioner performance or work activity with other clinical professionals or trainees has limited application to understanding nurse practitioner work patterns and service profile, and fails to address the complex inter professional and multiprofessional nature of health service delivery systems (van Offenbeck & Knip 2004). Another work sampling study that did focus on nurse practitioner practice patterns (Rosenfeld *et al.* 2003) focused only on one model - the acute care nurse practitioner - and had a self-reporting survey approach. The instrument validated by Rosenfeld *et al.* (2003) informed our tool development but was too narrow in scope and modality to be used as a generic nurse practitioner work sampling data collection instrument for our study.

THE STUDY

Aim

The aim of the study was to describe variations in the pattern of nurse practitioner work in a range of service fields and geographical locations, across direct patient care, indirect patient care and Service-related activities.

Design

In this descriptive study we used work sampling to examine nurse practitioner work activities. This method involves taking randomly-spaced observations of work activity that can be generalised into a picture of clinician work patterns (Urden & Roode 1997, Pelletier & Duffield 2003). Data are

collected with reference to an established set of work categories. Each category has a number of activities, and observed behaviour is classified according to these activities. Detailed information on the extensive preparatory work for this study, including development and pilot testing of the data collection instrument, is reported elsewhere .

Sample

During Phase 1 of the AUSPRAC study a national census of Australian nurse practitioners was conducted, and in this survey nurse practitioners were invited to submit an expression of interest (EOI) to participate in this work sampling component of the project. A total of 144 EOIs were received, and from this pool a random stratified sample was obtained. Stratification was weighted according to the number of nurse practitioners per state/territory and across metropolitan and non-metropolitan regions. This process ensured that data collection included, in relative proportions, all jurisdictions and geographical contexts of nurse practitioner service.

We had no comparative groups and hence the analyses conducted were explicitly descriptive, containing no inference in the form of comparisons or hypothesis testing. This decision reflected the use of a non-probabilistic sample of nurse practitioners for activity observation. The rationale for the sample size was not statistical, but rather the sample size was based on precedent (Pelletier & Duffield 2003) and the sampling strategy in selecting nurse practitioners was purposive to achieve heterogeneity. Our sampling, however, was consistent with Sittig's (1993) assertion that the number of observations required to give an absolute error in the frequency percentages of ±1% with 95% confidence is greater than 10,000 (Sittig 1993). After allowing for dropout, the sample of nurse practitioners who participated in the study was 30. The unit of analysis, and therefore the actual study sample, was the observations. Hence the sample size was adequate at 12,189 observations.

Data collection

Data collection for this study was conducted from July 2008 to January 2009. The instrument was adapted with permission from a validated tool for work sampling data collection (Pelletier & Duffield 2003). The Pelletier & Duffield tool had three categories in which to organise work activities, and these same categories and their definitions were used for this study. We also included a Personal category to account for non-work related activities during data collection. The categories were:

Direct care: All activities performed for and in the presence of the patient / family, including explanations given to the patient/family/caregiver about these activities.

Indirect care: Activities performed away from the patient but on a specific patient's behalf, including coordination of care, collaboration with other healthcare professionals and documentation.

Service: These activities were not patient-specific and included attending meetings, conducting teaching/in-service, research and audit and administration.

Personal: Activities not related to the above categories included meals, breaks, adjusting personal schedules, personal phone calls and socialising with co-workers.

Within these categories were a total of 30 specific and observable work activities clustered to reflect the category of work. It is important that the work categories and activities are relevant to the role and scope of practice of the clinicians being observed. Accordingly, the activities in this study were amended from the Pelletier & Duffield tool to reflect the Australian Nurse Practitioner Competency Standards (ANMC 2006) and the broad range of activities that nurse practitioners may undertake in their clinical practice (Rosenfeld *et al.* 2003).

Face and content validity of the instrument was established through several measures. A panel of clinical experts, a nurse practitioner and a researcher experienced in work sampling methods was assembled to review the instrument for content validity. Only items that reached 100% consensual

validation by the panel were retained. Finally, the instrument was tested for face validity in a work sampling data collection trial with nurse practitioners over three sites. This trial was conducted over a six-hour period, and all observed nurse practitioner activities were accounted for in the instrument. The instrument was designed to accommodate different settings and contexts where Australian nurse practitioners work as identified in a national census (Gardner *et al.* 2009), and this included rural and remote, community and acute care. Each activity had a numerical code and a clear, evidence-based definition. The data collection instrument is illustrated as Table 1 in Appendix.

The data collection times and schedule for each clinician, and therefore each site, was randomly generated to cover a time-frame of two full working weeks from a potential six-week period. Data were collected at 10-minute intervals, in two-hour blocks, producing a total of 480 observations, or a total of 80 hours of data for those in the sample who had complete data sets. Those with incomplete data sets (15%) had a reduced number of observations due to occasional and unanticipated absence from the workplace. One data collector (or job-share equivalent) was needed to observe one individual nurse practitioner for the duration of the data collection period. This one-to-one approach required that individual data collectors were employed at all sites across Australia. Although logistically difficult, this method of work sampling data collection was selected from the various approaches reported in the literature (Pelletier & Duffield 2003, Ampt *et al.* 2007) as being most suited to the sample in this study, and avoided problems of bias and reliability related to other methods (Ampt *et al.* 2007).

A specifically-designed training programme was used for all data collectors, and included practice in observation and activity recording using an interactive computer-assisted instruction program based on videorecording of a nurse practitioner at work. Data collectors from all sites around Australia completed this training before commencing data collection. A research officer

experienced in work sampling methods oversaw the training programme, and help desk and

coaching strategies were available via teleconference for all data collectors. A mastery learning

approach was used, and all data collectors were tested against a gold standard; inter-rater reliability

was set at 95% accuracy, and this level was achieved or surpassed by all data collectors.

Ethical considerations

This study was approved by the human research ethics committees at all of the participating

universities and hospitals where the research was undertaken; the latter resulted in applications to

23 health facility human research ethics committees and research governance bodies. All nurse

practitioners selected for participation were sent an information package with a return addressed

envelope. The participants were those who signed and returned the consent form.

Data analysis

Data were prepared initially by identifying cases with missing data and screening for and correcting

errors and irregularities. Work sampling is an observational technique that produces counts

representing the number of times that an individual has been observed performing each of a range

of activities. Data were analysed using the Statistical Package for the Social Sciences, Version

16.0.1 (SPSS Inc., Chicago, Il, USA). Descriptive statistics were used to measure time spent on the

activities within each of three categories: Direct care, Indirect care and Service-related. The

Personal category was used only to account for non-work activities during data collection, and these

data were not used in analysis. Ranks, proportions and ratios were calculated to give information

about the pattern of nurse practitioner work within and across the work categories for each model.

RESULTS

Thirty nurse practitioners were observed across six Australian states, producing a total of 12,189

individual observations. After excluding personal time observations from the analysis, 11,032

observations remained in the data set. A wide range of nurse practitioner models was represented by the sample. The emergency nurse practitioner was the largest model represented at 23.2%. This is reflective of the proportion of emergency nurse practitioner models in the overall nurse practitioner population (28.6%). Data were also collected to describe the work schedule of nurse practitioner participants, and included office hours, shiftwork with night duty, and shiftwork without night duty. These and other contextual characteristics are described in Table 2.

Table 2: Demographics of Nurse Practitioner (NP) Participants

Region	N	Percentage
Metropolitan	22	73.3%
Non-metropolitan	8	26.7%
TOTAL	30	100.0%

NP Work Schedule	N	Percentage
Office Hours	21	70.0%
Shift Work (no night duty)	7	23.3%
Shift Work (with night Duty)	2	6.7%
TOTAL	30	100.0%

| NP Model	N	Percentage
Emergency	8	26.7%
Women's Health	3	10.0%
Cardiac	3	10.0%
Remote Area Nursing	2	6.7%
Paediatric Emergency	2	6.7%
Neonatal	2	6.7%
Mental Health	2	6.7%
Sexual Health	1	3.3%
Rural	1	3.3%
Renal	1	3.3%
Palliative Care	1	3.3%
Paediatric Intensive Care	1	3.3%
Haematology	1	3.3%
Aged Care	1	3.3%
Adolescent Health	1	3.3%
TOTAL	30	100.0%

The pattern of nurse practitioner work activity

The proportion of time spent within each of the three work categories is reported in Figure 2. The distribution of time across the 30 work activities within these categories shows small differences in

the proportion of time spent in each category. The major activities in the Direct care category include performing procedures (6.1%) and taking patient histories (5.9%). Overall, the 13 activities that comprised the Direct care category accounted for 36.1% of how nurse practitioners spend their time. Activities such as telemedicine, prescribing and administering medication were the lowest time allocation work activities in this category. Only two participants were using telemedicine to any extent, and both were working in services at the community/hospital interface.

Figure 1: Nurse practitioner work activities (n=11,032 observations)

(PD: Professional Development)
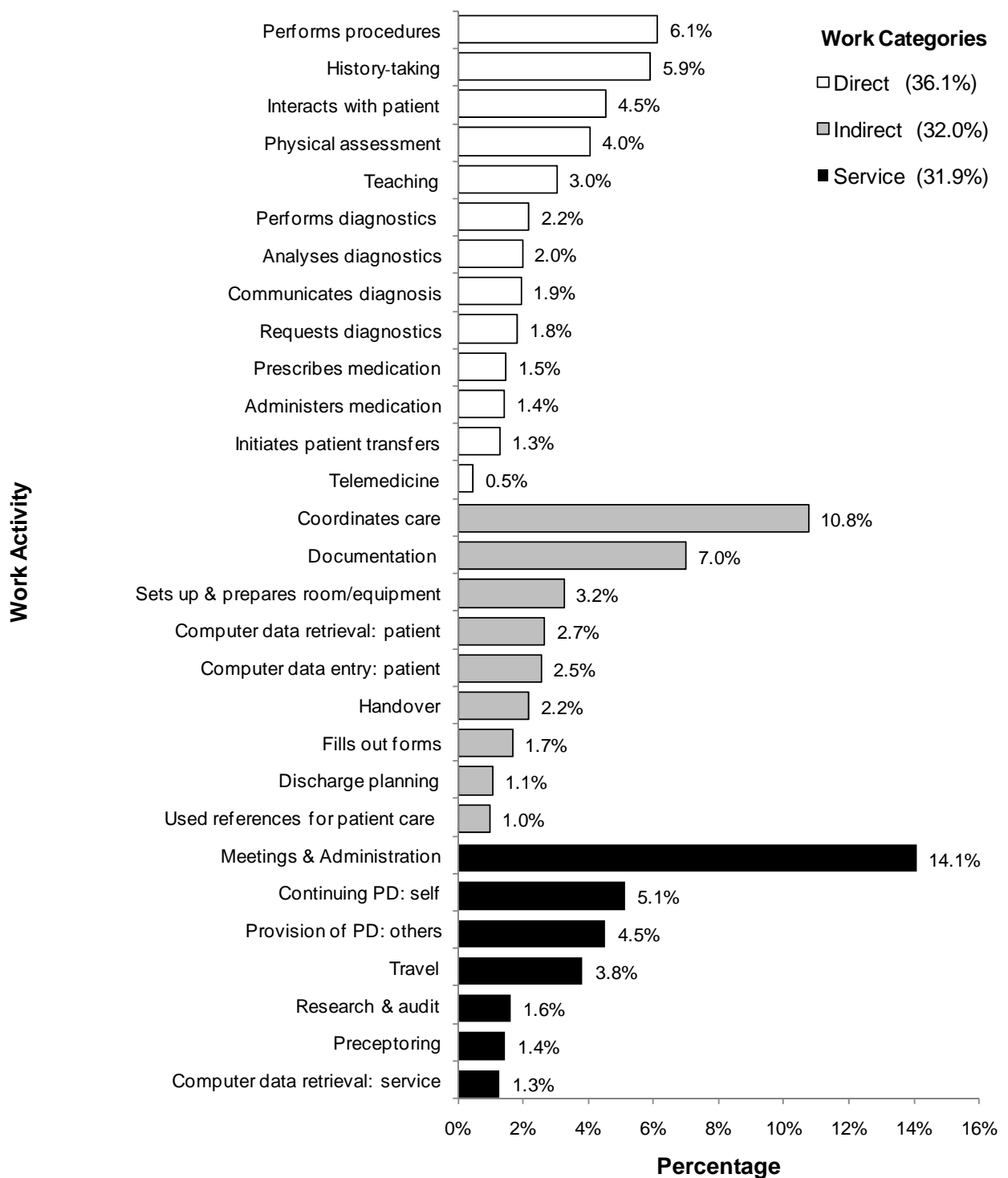
There were nine activities in the Indirect care category, and these accounted for 32.2% of nurse practitioners' working time. Co-ordination of patient care was the highest work activity in this category (10.8%). This work included documenting, reviewing, evaluating or communicating patient care, referrals and delegation. Documentation was also a high-ranked activity in this category, representing 7.0% of work time. This included any documentation in patient progress notes or other charts recording patient-provider interactions. The lowest activities recorded under the Indirect care category were discharge planning (1.1%) and using references for patient care (1.0%). The highest recorded work activity overall was meetings and administration, at 14.1%, in the Service-related category, which had seven activities in total. Of note is the fact that in the Service-related category was professional development of self (5.1%) and others (4.5 %) and research and audit activities (1.5%).

Top ten nurse practitioner activities

When the individual activities were ranked, the top ten were mostly spread across the Direct care (n=4) and Service-related (n=4) categories, with two from Indirect care. In the top ten activities, five represented almost 45% of all nurse practitioner work activities, and these were meetings and administration (14.1%), coordination of care (10.8%), documentation (7.0%), performing procedures (6.1%) and history-taking (5.9%) (see Figure 2).

Figure 2: Top ten Nurse Practitioner activities (n=11,032 observations)
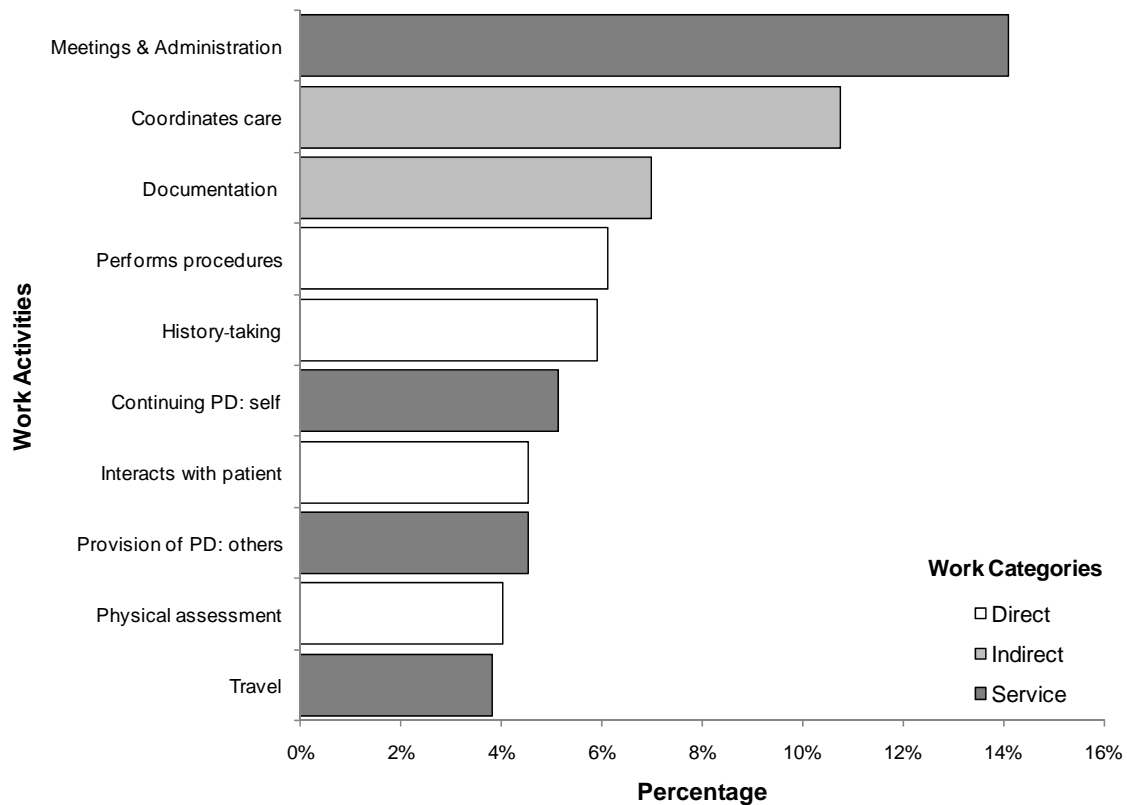
Whilst collectively the nurse practitioners spent 14.1% of their time in meetings, at the level of individual clinicians, 50% spent less than 8.9% in meetings, with a range of 2.7% to 43.5%. Those who spent less time in meetings tended to be those working in acute and emergency care settings.

DISCUSSION

Study limitations

The work sampling methodology used in this research is a well-accepted and cost-effective approach to investigating the work patterns of nurse practitioners and provides important information for health service and workforce planning. There are, however , some limitations to this research approach that need to be considered when reviewing our findings. Work sampling examines patterns of practice but does not measure other dimensions of work activities, such as

length of time in specific activities or the quality of work. Furthermore, there is risk of incorrect classifications in some activities. We used over 30 observers, and training of these observers to a standard ensuring inter-rater reliability was expensive; this may reduce the potential for replication studies.

The study instrument

Notwithstanding these limitations, this study yielded contemporary data on the work patterns of nurse practitioners. Whilst the study context was Australian, these findings provide important information for nurse practitioners, health service researchers, service planners and regulatory bodies in other countries. We developed the work sampling instrument and processes used in this study, and they apply specifically to the nurse practitioner role and scope of practice. Other generic work sampling researchers have used similar tools, with the main difference being that the work activities in this study were drawn from research-derived nurse practitioner practice competencies (Gardner *et al.* 2006).

Nurse practitioner work activities

A major finding of this study was that this representative sample of Australian nurse practitioners spent almost equal amounts of time across Direct care, Indirect care and Service-related areas of practice. These findings challenge nurse practitioners' own perceptions of how they spend their work time. In the survey findings from Phase 1 of the AUSPRAC study (Gardner *et al.* 2009), nurse practitioners estimated that 61.5 % of their time was spent in direct patient care activities; this is compared with 36% from the observational data in this study. Supporting the nurse practitioners' perceptions of their work patterns, the few reported studies into nurse practitioner work similarly report a focus on direct care. Hoffman *et al.* (2003) used trained observers to record and compare work activities of nurse practitioners and trainee physicians in an intensive care unit, and found that nurse practitioners spent almost half their time in management of patients; this equated with the

amount of time trainee physicians also spent on direct patient care. Rosenfeld *et al.* (2003) conducted work sampling using a self-reporting method of data collection with acute care nurse practitioners, and also reported that they were mostly involved in direct patient care activities. They further reported that the top ten nurse practitioner activities included equal numbers of direct and indirect care activities. These findings differ from our results, which show that the top ten activities were mostly spread across Direct care and Service-related activities. However, caution is recommended when comparing perceptions and measures of nurse practitioner work patterns across work categories. There is no standard definition of these work categories, and each of these studies involved different work sampling instruments and assumptions. It may well be time to experiment with replication studies using a specific nurse practitioner work sampling instrument and processes such as described in this study.

It is noteworthy that only 1.6% of nurse practitioners' time was spent engaged in research or evidence-seeking activity. Research is an integral part of advanced practice/nurse practitioner education and practice internationally (Gardner *et al*. 2007, Ruel & Motyka 2009), and is explicit in the Australian nurse practitioner competency standards (ANMC 2006). As clinical nurse leaders in an emergent service field, nurse practitioners need to engage in research and ensure an evidence base for their extended practice. Also of note is the time spent engaged in meetings, administration and coordination of care. However, there is clear indication in the literature that the burden of documentation and administration is a feature of the contemporary health service environment (Korst *et al.* 2003, Hendrich *et al.* 2009) and one that reportedly has an impact on efficiency in most clinical roles across disciplines.

Our results indicate that, contrary to nurse practitioners' own perceptions (Gardner *et al*. 2009) and the defined focus of the nurse practitioner role (ANMC 2006), the clinicians in this study spent more time on Service-related activities and coordination of care than on direct clinical care. There

are several ways to interpret these results. However, considering that limited work has been conducted on theory development around nurse practitioner service, it may be useful to discuss this important aspect of the findings through a conceptual focus on a nursing model of service. Rosenfeld *et al.* (2003) suggests that nurse practitioners are *blending* the extended practice activities with standard nursing functions. This interpretation is consistent with other researchers' (Gardner *et al.* 2006) claims that the practice of nurse practitioners is conducted in a nursing as opposed to a medical model of care, and that these clinicians seamlessly mix or blend the broad range of actions related to patient management, including extended and standard practice activities. An alternative interpretation relates to the extent to which the nurse practitioner can practise to the full scope of their role. The pattern of the Australian nurse practitioner role as reported in this study is inconsistent with the focus of the nurse practitioner role internationally, which is reported as primarily a clinical service role with individual patients or communities (Furlong & Smith 2005, Gardner *et al.* 2007). In Australia and elsewhere, there remain significant barriers to nurse practitioners practising according to the dimensions and scope of their role (Hurlock-Chorostecki *et al.* 2008; van Soeren *et al.* 2009), particularly in relation to prescribing (Kaasalainen *et al.* 2007; Main *et al.* 2007, Gardner *et al.* 2009). Consistent with the nursing model, these clinicians, when faced with inability to use their extended practice skills, may be likely to pick up the administrative and coordinating work that is relevant to the previous roles of a nurse consultant or nurse specialist. Exploration of this interpretation is beyond the scope of work sampling methodology, but may be explicated in another component of this multi-phase research project, where case study methodology is in progress.

CONCLUSION

Our findings provide useful baseline data for the evaluation of nurse practitioner positions and the service effect of these. However, the study also raises questions about the best use of nurse practitioner time and the influences of barriers to and facilitators of this model of service

innovation. It is clear from these findings and other research that further research is needed to develop a theoretical model of the nurse practitioner role and to study organisational and service influences on this role.

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Table 1: Work sampling data collection instrument   <u>**APPENDIX**</u>

Participant Code: _ _ _ _

Work Sampling Instrument

Date:		Date:		Date:		Date:		Date:		Date:	
Day:		Day:		Day:		Day:		Day:		Day:	
Time Period: *		Time Period:		Time Period:		Time Period:		Time Period:		Time Period:	
Time	**Activity Code**	**Time**	**Activity Code**	**Time**	**Activity Code**	**Time**	**Activity Code**	**Time**	**Activity Code**	**Time**	**Activity Code**
0		0		0		0		0		0	
10		10		10		10		10		10	
20		20		20		20		20		20	
30		30		30		30		30		30	
40		40		40		40		40		40	
50		50		50		50		50		50	
60		60		60		60		60		60	
70		70		70		70		70		70	
80		80		80		80		80		80	
90		90		90		90		90		90	
100		100		100		100		100		100	
110		110		110		110		110		110	

* Time period: enter data collection period here. For example, 0900 – 1100hours.

Nurse Practitioner Activities

Direct Care	Indirect Care	Service-related	Personal
1. Physical assessment	14. Handover	23. Travel*	30. Personal
2. History taking	15. Fills out standardised forms	24. Computer data retrieval: service	
3. Communicates diagnosis	16. Documents in progress notes & charts	25. Research & audit	
4. Requests diagnostic investigations/procedures	17. Computer data entry: patient	26. Meetings & Administration	
5. Performs diagnostic investigations/procedures	18. Computer data retrieval: patient	27. Preceptoring	
6. Analyses/interprets diagnostic investigations	19. Coordinates care	28. Continuing professional development: self	
7. Performs/manages therapeutic procedures	20. Discharge planning	29. Provision of professional development: others	
8. Prescribes medication	21. Used references for patient care (text/electronic)		
9. Administers medication	22. Sets up & prepares room/equipment		
10. Interacts with patient/family/caregiver			
11. Teaching			
12. Initiates patient transfers/discharge			
13. Telemedicine			

*Time spent on travel: ☐ minutes