

Measuring the impact of a team model of nursing practice using work sampling

Kim Walker, Judith Donoghue and Suzanne Mitten-Lewis

Abstract

The increasing number of inexperienced graduates, as well as other levels of nurse such as the enrolled nurse and assistant-in-nursing, requires health service and nursing managers in the acute care sector to rethink the long-preferred "patient allocation" model of care provision. As well, the escalating shortage of registered nurses and subsequent low morale among those remaining in the workforce require hospitals to re-examine skills mix and staffing ratios. This paper presents the results of two work-sampling studies conducted in a major metropolitan private hospital, the first of which was to provide a rationale for changing from the patient allocation model to a team model of care. The second study aimed to evaluate and provide data on the impact of the change. Staff were heavily involved in both studies as well as the change process. The findings highlight how effective the new model has been in redistributing certain aspects of care to make better use of each nurse level's knowledge and skills.

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HEALTH SERVICE PLANNERS are responding to staff shortages and strained finances by redesigning nursing workforces.¹ Driven by such factors as the increased age and numbers of chronically ill patients,² increased acuity and complexity of hospitalised patients,^{3,4} the continuous introduction of new technologies,⁵ shortened length of stay and increased community burden with no compensatory transfer of resources,⁶ health care facilities have been implementing alternative practice models. These models attempt to sustain quality patient care, assure patient safety and satisfaction and maintain budgetary efficiency.^{7,8} The current shortage of registered nurses (RNs)^{1,9} has compounded the problem, making the redesign of nursing work an imperative.

What is known about the topic?

Nursing has long advocated the "patient allocation" model of care for a professional workforce with "team nursing" generally seen as a model from the past that is not appropriate for contemporary times. However, with the protracted crisis of recruitment and retention of registered nurses (RNs), the patient allocation model has become unsustainable in many hospitals, suggesting a need to return to team nursing.

What does this paper add?

Work sampling methodology identified changes in the pattern of nurses' work following changes to skill mix and staffing ratios. Our findings provide strong empirical evidence that team nursing can enhance the provision of care.

What are the implications for practitioners?

While the transfer of nursing education to the tertiary sector enhanced the professionalisation of nursing and made possible the idea of an all RN workforce, larger social and political forces have conspired to limit this possibility. As the long-term forecast for nursing is an increasing shortage of RNs the profession has to find ways to provide high quality and safe care to its constituencies that best use the skills of an RN while deploying less educated and skilled nurses to support and complement the work of this now precious resource.

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At a major private hospital in Sydney, Australia, an escalating number of RN vacancies that could not be filled increased the remaining staff's workload, with a subsequent decline in nurses' morale. To gather evidence on nurses' work activities and determine how and by whom work was performed, a work-sampling study was conducted in 2000 across the acute care wards and the operating services of the hospital. The results indicated that much of RNs' time was spent in activities that did not require RN capability.¹⁰ This study provided evidence to support the introduction of a different model of care.

In 2002, a team-oriented model called "partners-in-care" replaced an RN patient allocation model on two wards that had participated in the initial study. Enrolled nurses (ENs) and assistants-in-nursing (AINs) were introduced to a previously all-RN workforce. In this model the nursing unit manager determines the rostered ratio of clinical nurse specialists (CNSs), RNs, ENs and AINs in accordance with patient numbers and acuity. Generally, the partners-in-care model operates on a ratio of two RNs and one AIN or one RN, EN and AIN to care for 10 to 13 patients, depending on patients' acuity and staff skill level. It was envisaged that this redistribution of nursing work would allow RNs to engage more fully in activities requiring their professional knowledge and skills. Effective communication among the different levels of nurses is an essential component of the team-oriented model.

Six months after the partners in care model was introduced it was evaluated by repeating the work-sampling study to identify change in the organisation of the work. This article presents some of the salient findings of the 2000 and 2002 work-sampling studies for one of the medical-surgical wards where the model of care was changed. Between the two sampling periods, the casemix index (the indicator of patient acuity) was reduced from 1.72 to 1.28 by admitting patients requiring complex joint replacements to a different unit. As well, bed capacity was reduced by six beds; therefore fewer nurses were required to provide the same amount and level of care. Given these changes, the two sets of data have

been compared to highlight the impact of the team-oriented model.

Comparison aimed to identify:

- Differences in the percentage of time spent in the four work categories (direct care, indirect care, unit-related activities and personal) by each staff classification between 2000 and 2002;
- Changes in the hourly patterns of daily direct care activities performed by each classification of nursing staff (patient hygiene, mobilising patients, medication and patient nutrition) between 2000 and 2002;
- Changes in the percentage of communication activities of the different classifications of nurses between 2000 and 2002.

Methods

Work-sampling methodology originated in industrial engineering. Nursing researchers have employed it for over 50 years and reported results frequently over this period.¹¹⁻²² Essentially, work-sampling is a non-experimental approach designed to help "analys[e] the distribution of staff work activities in relation to how nursing staff spend their time and in relationship to the types of activities they perform"¹⁹ (p. 34). Work-sampling methodology is based on probability theory, which purports that "observations taken at repeated random intervals will have the same distribution [as continuous observations]. Thus, actual observations can be translated into percentages of time spent in actual activities"¹⁹ (p. 36). Large numbers of observations are necessary to ensure a sufficiently robust sample from which to generalise the findings. Useful reviews of the history, utility and efficacy of work-sampling can be found in Pelletier and Duffield²¹ and Duffield and Wise.²²

The 2000 and 2002 studies employed a work-sampling instrument originally described by Urden and Roode,¹⁹ adapted for the Australian context.²³ Twenty-five activities are grouped in four major categories: direct (10 activities) and indirect (9 activities) care, unit-related (5 activities) and personal (1 activity). Direct care com-

I Five communication activities of the indirect care category and specifications

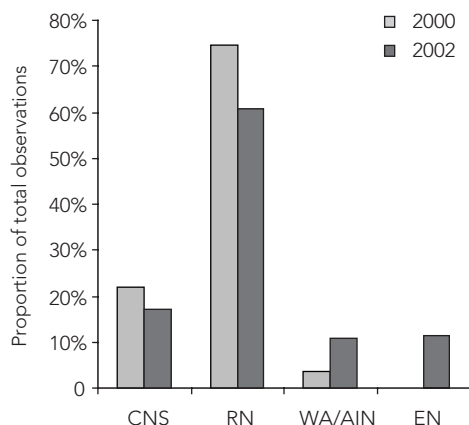
Activities	Specifications
Communication of patient information	Verbal interaction with other departments related to coordination of patient care. Providing instructions, information or direction to support staff regarding or ancillary non-professional staff in aspects of patient care (excluding doctors or other professionals). Referencing written materials. Provision of bed management information.
Patients' progress reports	Involves any documentation on progress notes or other charts, excluding admission. Does not include charting on observation charts at the bedside. Documentation in text/computer or completion of set forms to generate discharge summaries or instructions for patient, general practitioner or other health professional.
Verbal reports and handover	Giving or receiving an updated description of patient status for the purpose of shift-to-shift continuity, unit-to-unit transfer, and break or lunch coverage (live or taped).
Coordination of care: planning	Documenting, reviewing or evaluating forms associated with the nursing process and reflecting the scope of nursing practice. Includes making associations between interdisciplinary data and nursing judgment. Includes documentation in text/computer or completing hospital forms to develop or change a patient's care plan. Does not include observation forms.
Coordination of care: rounds	Rounds, communication with doctors and allied health professionals or other nurses in regard to care, including phone calls, referrals, and planning for admission or discharge. Includes debriefing after critical incidents.

prises activities performed in the presence of the patient and/or family such as hygiene, nursing procedures, medicine administration and patient–family interaction. Nursing activities performed away from proximity to the patient/family but undertaken specifically for a patient are categorised as indirect care. The preparation of injectable medications, planning care with other clinicians, coordinating referrals for other services and retrieving computerised patient test results are examples of indirect care. Unit-related activities include general maintenance of the nursing unit such as administrative meetings, environmental cleaning and restocking supplies. Personal activities are nurses' meal breaks, toilet breaks, adjusting personal schedules, personal phone calls and socialising with co-workers.^{10,14} The instrument has established reliability and validity.^{10,23}

Detailed specifications of tasks for each activity are required to ensure different data collectors are rating their observations consistently. Tests of inter-rater reliability in previously cited studies have shown high levels of internal consistency for this

instrument. Box 1 identifies five of the nine activities of indirect care concerned with communication as examples of the degree of specification.

2 Changes to staff skill mix: proportion of total observations by nurse classification



CNS = clinical nurse specialist. RN = registered nurse. WA = ward assistant. AIN = assistant in nursing. EN = enrolled nurse.

3 Categories of work as percentages of staff totals in a 07:00–16:00 shift

Position	Year	Direct	Indirect	Unit	Personal
CNS	2000	22.1%	44.5%	13.8%	19.7%
	2002	26.3%	48.0%	6.9%	18.8%
RN	2000	28.0%	47.8%	6.2%	18.0%
	2002	30.6%	44.6%	4.9%	19.9%
WA/AIN	2000	3.9%	47.3%	29.2%	19.6%
	2002	13.2%	41.9%	16.6%	28.3%
EN	2000				
	2002	32.1%	41.6%	5.1%	21.2%
Total	2000	25.7%	47.0%	8.8%	18.5%
	2002	27.9%	44.5%	6.7%	20.9%

CNS=clinical nurse specialist. RN=registered nurse. WA=ward assistant. AIN=assistant in nursing. EN=enrolled nurse.

The observations of these five activities were aggregated for the purposes of analysis, to form a global communication category. The same aggregation has been undertaken for data from the first study to enable any significant differences in indirect care between the patient allocation and team-oriented models to be identified.

Procedure

Nurse observers trained in the method were employed throughout data collection for both studies. A high level of inter-rater reliability (>90%) was established in both sampling periods before commencing the research.²¹ These data collectors observed the activities of each consenting nurse on the ward (every nurse rostered with the exception of the manager, who would be identifiable) every 10 minutes (called a set) for each of the 2-hour sampling periods. Thus, 12 sets of observations were collected for each sampling period. Only the actual activity being performed at the time of the observational “swoop” was recorded on the instrument, not the time spent performing it (after Urden and Roode 1997).¹⁹ The 2-hour periods were randomly selected over the 12 hours between 07:00 and

19:00 from Monday to Friday. Representation of all periods required data collection over 6 consecutive weeks. Although fewer observations were recorded in 2002 (6891) than in 2000 (7694), the total number of observations is sufficient to ensure valid comparisons.

Box 2 shows the proportional changes in staffing, with fewer CNSs and RNs in 2002, a shift from ward assistants (WAs) to AINs and the addition of ENs to the team.

Results are presented as proportions of the total number of observations for each staff type. Fisher's exact chi square test with the Bonferroni correction was used to compare proportions between 2000 and 2002. This test was considered appropriate because each activity is observed within a set that occurs once in the data.

Results

Differences in the percentage of time spent in the four work categories for 2000 and 2002 were identified for all staff classifications (Box 3). RNs show fairly similar proportions in three categories for both studies, with an increased percentage of personal time in 2002. CNSs and WAs/AINs showed a marked drop in unit-related activities in 2002, while the RN proportion reduced less

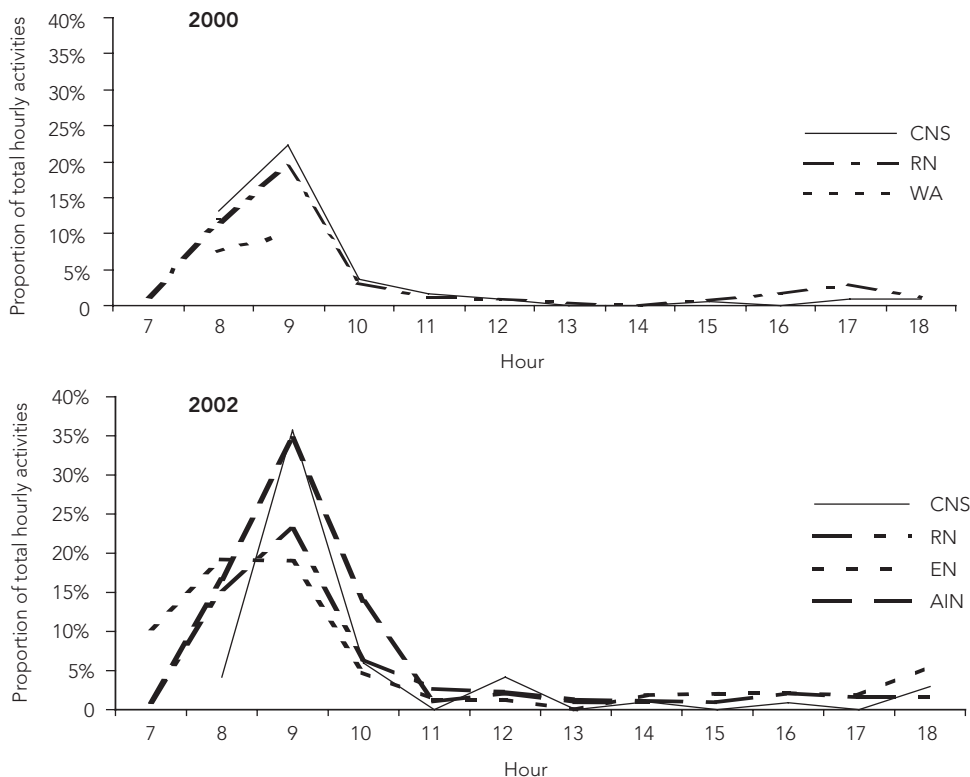
4 Specific direct care activities as percentage of nurses' total activities

Activity	Year	Position			
		CNS	RN	WA/AIN	EN
Patient hygiene	2000	3.1%	3.3%	2.5%	na
	2002	3.9%	4.7%*	7.7%*	5.4%
Medication/IV administration	2000	7.1%	10.6%	0	na
	2002	9.1%*	12.1%*	0	4.0%
Nutrition/elimination	2000	1.4%	1.4%	0	na
	2002	1.4%	1.7%	2.3%*	1.6%
Patient mobilising	2000	1.1%	1.0%	0	na
	2002	1.8%†	1.7%*	1.3%*	2.5%

* $P < 0.001$. † $P < 0.005$. CNS = clinical nurse specialist.

RN = registered nurse. WA = ward assistant. AIN = assistant in nursing. EN = enrolled nurse. na = not applicable.

5 Hourly observations of patient hygiene activity for staff classifications from 07:00 to 19:00



CNS = clinical nurse specialist. RN = registered nurse. WA = ward assistant. AIN = assistant in nursing. EN = enrolled nurse.

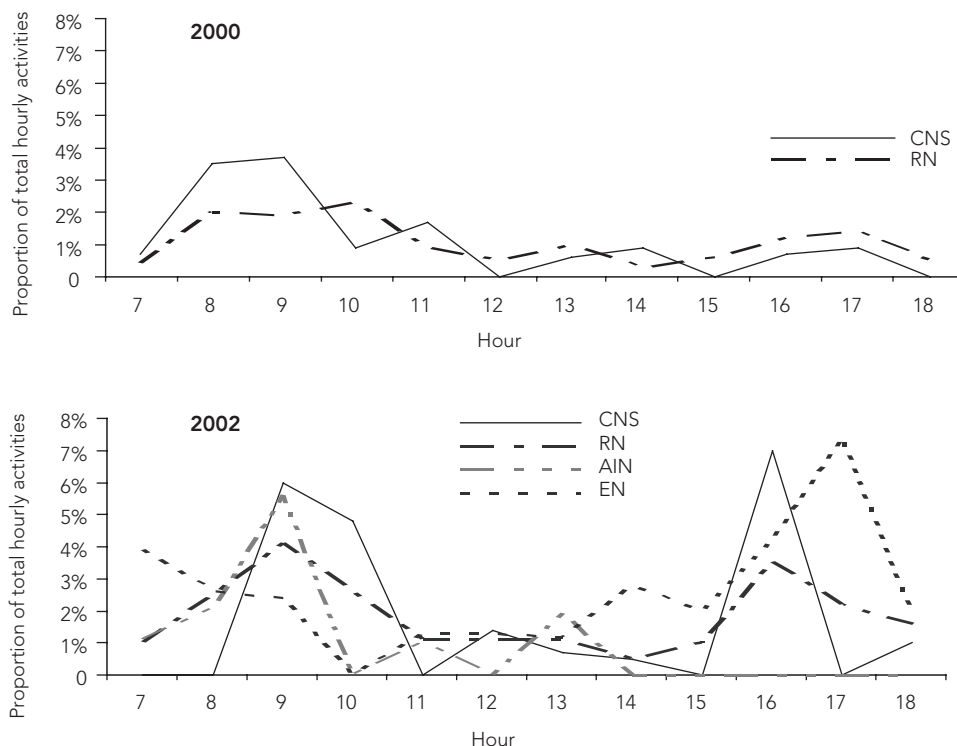
dramatically. The proportions in each category for the WA/AIN classification are different in 2002, reflecting the change in classification from WAs in 2000 to AINs in 2002. When the partners-in-care model was introduced, about 30% of WAs' work was in environmental cleaning. These activities were subsequently reallocated to cleaning staff.

Changes in the patterns of daily direct care activities performed by nursing staff (namely patient hygiene, medication, patient nutrition/elimination and mobilising patients) were reviewed to answer the second aim. These four activities were selected to represent the important "hands-on" direct care that is performed in all acute care units. Box 4 illustrates an increase in observations of these activities after the partners-in-care model was introduced. Box 4 highlights

the contributions of the ENs and AINs to patients' hygiene needs. ENs devoted a substantial proportion of their time to three activities. CNSs and RNs significantly increased the proportion of their time spent administering medicines. The proportion of direct care for these four activities increased for all classifications in 2002.

The work patterns across the 12 hours for the four direct care items show variations between 2000 and 2002. Hygiene — defined as activities that promote or restore patient cleanliness such as bathing, oral care, hair washing, shaving, Sitz bath, showering, occupied-bed linen change, care of the dead body, surgical shave/prep — demonstrates some pattern change (Box 5). In 2000, there was a peak in the early morning with a small contribution from the WAs and another,

6 Hourly observations of mobilising patients from 07:00 to 19:00



CNS = clinical nurse specialist. RN = registered nurse. WA = ward assistant. AIN = assistant in nursing. EN = enrolled nurse.

much smaller peak in the very late afternoon with little activity in between these times. In 2002, there was a greater peak of activity in the early morning (with the AINs and ENs contributing a substantial proportion of their time) followed by smaller peaks around the lunch period and mid and late afternoon.

Patient mobility comprises interventions that promote therapeutic movement of the patient, for example, assisting with ambulation, turning and positioning, leg exercises, and cough and deep breathing exercises. Box 6 illustrates the variations in the peaks and troughs of hourly activity with the two models. The contribution of the ENs and the AINs in 2002 enabled the substantial increases. The changed CNS pattern is more difficult to understand, but may be related to the casemix changes. The line graphs for nutrition/

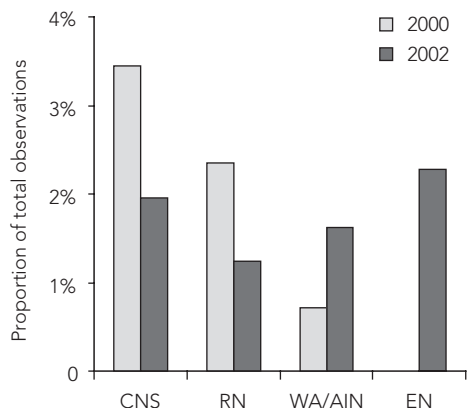
elimination activity and administering patients' medicines (not provided) indicate some pattern changes also. Nutritional activities increased and were more focused around the three meal peri-

7 Communication activities (aggregate of 5 items) as a percentage of total staff activities

Staff	2000	2002
CNS	31.1%	*34.7%
RN	31.0%	29.7%
WA/AIN	2.1%	2.7%
EN	na	28.7%

* $P < 0.05$. CNS = clinical nurse specialist. RN = registered nurse. WA = ward assistant. AIN = assistant in nursing. EN = enrolled nurse. na = not applicable.

8 Clerical activities by nurse classification



CNS = clinical nurse specialist. RN = registered nurse. WA = ward assistant. AIN = assistant in nursing. EN = enrolled nurse.

ods, indicating that patients were given increased assistance with their meals and the provision of fluids. The line graphs for medication preparation and administration by CNSs and RNs (not provided) indicate they were spending more time administering medicines, with substantial increases around 07:00, 10:00–11:00 and 14:00–15:00. The reason for this pattern change requires further investigation.

The third aim was to identify changes in the percentage of indirect communication activities with the introduction of a team-oriented model. The observations (Box 7) showed an increase in CNSs' activity that was related to the organisation of patient care with the ENs and AINs. The pattern for care planning completely changed for both CNSs and RNs. The CNSs remained the dominant communicators, while the RNs' activity decreased notably. Planning in 2000 went in peaks and troughs across the 12 hours. In 2002, there was a much lower level of activity in the morning that gradually increased across the day reaching a peak at 15:00.

Clerical work decreased for RNs and CNSs and increased for AINs and ENs (Box 8).

Discussion

The shortage of RNs at the study hospital necessitated the introduction of other nursing classifications to ensure patients received quality health care. In the results presented in this article, ENs and AINs were added to the skill mix in 2002, and the previous model of patient allocation was changed to a team-oriented approach. While there was a small reduction in the total numbers of CNSs and RNs, the introduction of the AINs and ENs offset this. The work activities previously undertaken by the RN and WA workforce were continued with the new skill mix, except for cleaning activities that were reallocated as non-nursing work.

The shifts in activity for the four classifications are shown in Box 3. The overall small increase in direct care (1.1%) in 2002 was less than might have been expected given the large contribution of the ENs and AINs to this category in 2002. Even allowing for differences in context, a total of 27% direct care could be regarded as insufficient. The levels of indirect care remained relatively consistent and were 40% or more for each staff classification. Although the total percentage of indirect care activities decreased by 2.1% in 2002, the activities in this category used a large proportion of staff time.

It is important to note that the distinction between direct and indirect care activities was somewhat arbitrary. For example, activities such as medication preparation and administration really constitute a continuum of care in that medication preparation (indirect care) cannot be separated from medication administration (direct care) in real terms. Consequently, medication preparation is every bit as much direct care as is the actual administration. Indeed, the high proportion of indirect care activities represented in both sampling periods highlights how significant the indirect care is in nursing work and adds force to the notion that much that is important in nursing work is relatively invisible. As Lawler has well established, so much of nursing work is literally "behind the screens".²⁴

Unit-related activities decreased for all classifications. This result has been attributed to the reallocation of environmental cleaning to cleaning staff, the introduction of ENs and the

replacement of WAs with AINs, and shifting clerical duties to ENs and AINs. Essentially, the skill-mix change provided more staff who were capable of undertaking activities in all categories of care.

However, personal activities increased by 3.5% overall, and the WA/AIN group had the most marked increase of 8.7%. This result indicates that an excessive amount of time is spent in the personal category by all staff, but especially by the WA/AINs. Minyard et al also reported that less educated levels of staff spent a greater proportion of their time in personal activities.²⁵ It can be inferred that the WA/AINs require more direction and supervision in order to work more efficiently. It also suggests that this group does not have enough work to do. Indeed, the RNs were concerned that the AINs in particular not be permitted to undertake any direct clinical work (eg, taking observations and documenting them in the progress notes) as this might compromise quality and safety of care, which could suggest under-utilisation of this group. As the model has matured and the AINs have become more familiar with the acute care setting, the RNs may well review this caveat in the future, thus enabling greater productivity.

The changes in categories of work can be better understood by comparing specific activities within the categories. The four direct care category activities (Box 4) show significant increases in hygiene activity for RNs and AINs in 2002. Likewise, the amount of time the RNs, CNSs and ENs spent in the preparation and administration of medicines increased — in the case of RNs, significantly. During the 2 years between the studies the ward had changed; patients' average of length of stay had decreased for all diagnostic groups and there was an increase in the number of admissions. It is likely that the increase in time spent giving medications/IVs was due to these altered dynamics. However, it is worth noting that reported medication errors did not increase from 2000 to 2002, indicating that the nurses were spending time to ensure safe administration of medicines. This is likely also to represent

the fact that in 2002 there were slightly fewer RNs and CNSs available to carry out this activity, thus increasing the time needed by those who were available. The increase in the time nurses are spending on these activities is considered beneficial to patients. However, it was the patterns of activities across the day for each classification of nurse that provided the most revealing information.

Change in the pattern of hygiene activity, for example (Box 5), continued to reflect the traditional organisation of this work as concentrated in the morning. While the inclusion of ENs and AINs in the skill mix resulted in an overall increase in patient hygiene activities with new peaks around lunchtime and dinner, the traditional organisation of work remained very similar. It might be expected that with the new skill mix the ENs and AINs could sustain hygiene activity across the day and the CNSs and RNs would decrease their contribution to this activity. The increase in their time undertaking this activity suggests that the integration of ENs and AINs into the team requires further development and evaluation. Unit-based discussions, involving all classifications of nurses, about the organisation of the work could result in a more productive team outcome. Worker involvement in the process of successful workplace change has been substantiated in the literature.²⁶⁻²⁸ The team model of care requires the different levels of nurses to collaborate more effectively in the use of their time for the greater benefit to patients.

The pattern of mobilising patients changed markedly with the introduction of the new model of care (Box 6). The significant peaks from 15:00–17:00 reflected the increase in CNS activity as well as the contribution of ENs. This is an important activity that aids in preventing hypostatic pneumonias and thromboses.

Communication activities also increased across all groups. The quality of communication has been demonstrated to have a direct influence on nurses' ability to detect early warning signs in patients' conditions and intervene appropriately in a timely fashion.²⁹ A variegated skills mix

necessitates an increase in communication due to the fact that different levels of knowledge between nurse classifications reduce the ability of RNs, in particular, to be able to assume that their colleagues always know and understand what they mean.³⁰

While Needleman et al have documented the importance of the RN to the provision of safe patient care and demonstrated a strong correlation between skill mix and patient outcomes,³¹ the team model increased the total nursing hours per patient day. This means that there are now more nurses per patient than before, but because the new categories of staff are not as well remunerated their introduction has been relatively cost-neutral. Indeed, cost was never a significant factor when the decision to change the model of care was made. Rather, the hospital's over-riding concern was to maintain the quality and safety of care and support the RN as pragmatically and safely as possible. As well, in the private sector, where there are fewer medical practitioners, nurses' capacity to provide relevant and timely information to the Visiting Medical Officers is crucial. Adding AINs and ENs to the staff mix increased the levels of observation and interventions provided to patients, thus considerably enhancing nursing's overall contribution to the well-being and satisfaction of the patient. This has been amply demonstrated in patient satisfaction surveys which frequently make special and very favourable mention of the new categories of staff and the effectiveness of the team model of care.

Conclusion

While such team models of care are not without their disadvantages, in these challenging times where the limited supply of skilled and experienced RNs is likely to remain an issue for workforce planning, models such as partners-in-care provide significant palliation. Indeed, it may well be that they become the preferred model for the future to address the reduction in the numbers of RNs available and the increase in demand for high quality acute inpatient care.

Competing interests

Judith Donoghue and Suzanne Mitten-Lewis received payment from St. Vincent's Private Hospital, Sydney, for creating a database and analysing the raw work sampling data for this study.

References

- 1 Duffield C, O'Brien-Pallas L. The causes and consequences of nursing shortages: a helicopter view of the research. *Aust Health Rev* 2003; 26(1): 186-93. Available at: http://www.aushealthreview.com.au/publications/articles/issues/ahr_26_1_200303/ahr_26_1_186-193.asp (accessed Oct 2006).
- 2 Jakob SM, Rothen HU. Intensive care 1980-1995: change in patient characteristics, nursing workload and outcome. *Intensive Care Med* 1997; 23: 1165-70.
- 3 O'Brien-Pallas L, Thomson D, Alksnis C, Bruce S. The economic impact of nurse staffing decisions: time to turn down another road? *Hosp Q* 2001; 4(3): 42-50.
- 4 Diers D, Potter J. Understanding the unmanageable nursing unit with casemix data. A case study. *J Nurs Adm* 1997; 27: 27-32.
- 5 Pelletier D, Duffield C, Adams A, et al. The impact of the technological care environment on the nursing role. *Int J Technol Assess Health Care* 1996; 12: 358-66.
- 6 Menadue J. Report of the NSW Health Council. Sydney: Better Health Centre, 2000. Available at: http://www.health.nsw.gov.au/policy/gap/files/Health_Council_Report.pdf (accessed Oct 2006).
- 7 Christensen P, Bender LH. Models of nursing care in a changing environment: current challenges and future directions. *Orthop Nurs* 1994; 13: 64-70.
- 8 O'Brien-Pallas L, Duffield C, Tomblin-Murphy G, et al. Nursing workforce planning: mapping the policy trail. (The Global Nursing Review Initiative Issue Paper 2). Geneva: International Council of Nurses, 2005. Available at: <http://www.icn.ch/global/> (accessed Oct 2006).
- 9 Cowin L, Jacobsson D. The nursing shortage: part way down the slippery slope. *Collegian* 2003; 10(3): 31-5.
- 10 Duffield C, Forbes J, Franks H, et al. A work-sampling study to determine the proportion of time nurses spend in undertaking nursing activities [unpublished report]. St Vincent's Private Hospital, Sydney. Centre for Health Services Management, University of Technology, Sydney, 2001.
- 11 Abdellah FG, Levine E. Work-sampling applied to the study of nursing personnel. *Nurs Res* 1954; 3: 11-16.
- 12 Hagerty BK, Chang RS, Spengler CD. Work sampling: analyzing nursing staff productivity. *J Nurs Adm* 1985; 15: 9-14.

- 13 Misener TR, Frelin AJ, Twist PA. Sampling nursing time pinpoints staffing needs. *Nurs Health Care* 1987; 8: 233-7.
- 14 Prescott PA, Phillips CY, Ryan JW, Thompson KO. Changing how nurses spend their time. *Image J Nurs Sch* 1991; 23: 23-8.
- 15 Quist BD. Work sampling nursing units. *Nurs Manage* 1992; 23: 50-1.
- 16 McNiven P, O'Brien-Pallas LL, Hodnett E. Work sampling revisited: a technique for understanding nursing work. *Can J Nurs Adm* 1993; 6: 20-3.
- 17 Scherubel JC, Minnick AF. Implementation of work sampling methodology. *Nurs Res* 1994; 43: 120-3.
- 18 Cardona P, Tappen RM, Terrill M, et al. Nursing staff time allocation in long-term care: a work sampling study. *J Nurs Adm* 1997; 27: 28-36.
- 19 Urden LD, Roode JI. Work-sampling. A decision-making tool for determining resource and work design. *J Nurs Adm* 1997; 27: 34-41.
- 20 Upenieks VV. Work sampling. Assessing nursing efficiency. *Nurs Manage* 1998; 29: 27-9.
- 21 Pelletier D, Duffield C. Work sampling: valuable methodology to define nursing practice patterns. *Nurs Health Sci* 2003; 5: 31-8.
- 22 Duffield C, Wise W. Tell me what we do. Using work sampling to find the answer. *Aust J Adv Nurs* 2003; 20: 19-23.
- 23 Wood LM. Research project on work sampling [unpublished report]. Manly: Mona Vale Hospitals, 1999.
- 24 Lawler J. Behind the screens: nursing, somology and the problem of the body. Melbourne: Churchill Livingstone, 1991.
- 25 Minyard K, Wall J, Turner R. RNs may cost less than you think. *J Nurs Adm* 1986; 16: 28-34.
- 26 Baileff A. Integrated nursing teams in primary care. *Nurs Stand* 2000; 14: 41-4.
- 27 Richards L. Qualitative teamwork: making it work. *Qual Health Res* 1999; 9: 7-10.
- 28 Crotty G. Focus. Change in health care organizations: an overview. *Tenn Nurse* 1996; 59: 15-16.
- 29 Anthony MK, Preuss G. Models of care: the influence of nurse communication on patient safety. *Nurs Econ* 2002; 20: 209-215.
- 30 Walker K. Project possibility: a model of care and the politics of change. *Contemp Nurse* 2002; 14: 86-94.
- 31 Needleman J, Buerhaus P, Mattke S, et al. Nurse-staffing levels and the quality of care in hospitals. *N Engl J Med* 2002; 346: 1715-22.

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