



Impact of the nurse practitioner role in cardiothoracic surgery

By Louise Jensen, RN, PhD, Professor, Faculty of Nursing, University of Alberta, Edmonton, AB and Kimberly Scherr, RN, MN, Advanced Nurse Practitioner, Cardiothoracic Surgery, University of Alberta Hospital, Edmonton, AB

Abstract

Changes in the health care system are necessitating new approaches to acute care delivery. The acute care nurse practitioner (NP) role was implemented in the cardiothoracic intensive care unit (CVICU) at the University of Alberta Hospital, Edmonton, Alberta. An evaluation of the structure, process, and outcomes of this new role are presented. A survey was conducted of all health care providers ($n = 90$) directly involved with the NP in the CVICU. The unique skills of the NP were perceived to have a beneficial impact on patients and families, nurses, physicians and other health care providers. Factors affecting the implementation of the NP role in CVICU are described.

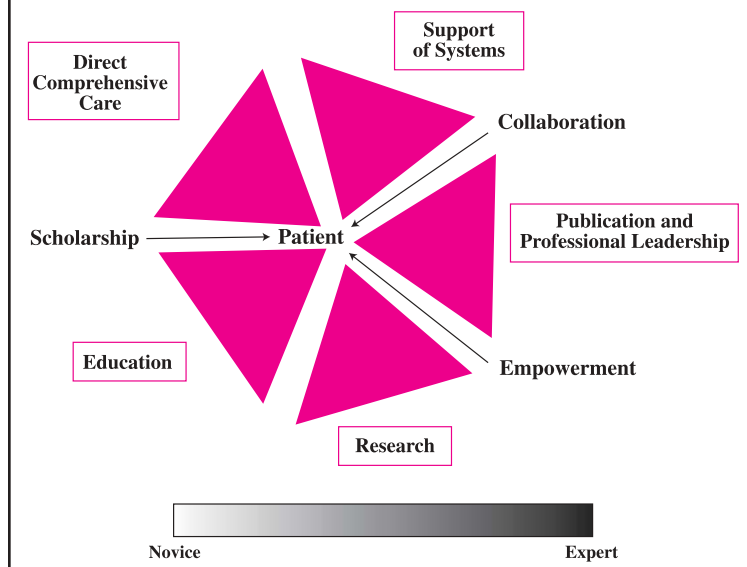
Within the current system of health care delivery, expanding biomedical knowledge, advancements in technology, and shortages of health care professionals have created an opportunity to improve processes by which health care is provided. Improvements in both primary and tertiary care have been attributed to the development of advanced nursing practice (Brown & Grimes, 1995; Buppert, 1995; Rudy et al., 1998). Innovation of advanced nursing practice roles, however, has posed multiple challenges (Bond, Wilkie, Simpson, Levin, & Whitney, 1996). Traditionally, advanced nursing practice in the acute care setting has been characterized by the clinical nurse specialist role, which was developed as an avenue for professional advancement.

Clinical nurse specialist roles involve provision of direct and indirect care, consultation with nursing staff, education of staff and patients, design and implementation of clinical research, and informal leadership. In contrast, knowledge and skills in assessment, clinical reasoning, differential diagnosis, requesting diagnostic tests and treatments, prescribing medications, and implementing patient management plans are central to the role of the acute care nurse practitioner (NP) (Mick & Ackerman, 2000). However, because it is a relatively new role, comprehensive assessment of the impact and value of advanced nursing practice is essential to

provide evidence that this role is critical to the health care team and an important component in the delivery of quality health care (Counsell & Gilbert, 1999; Kleinpell-Nowell & Weiner, 1999).

Advanced nursing practice is evolving. Nurse practitioners combine expert clinical practice with education, research, consultation, and leadership (Ackerman, Norsen, Martin, Wiedrich, & Kitzman, 1996). Nurse practitioners take health histories, perform physical examinations, order appropriate laboratory and other diagnostic tests, and prescribe medications and other treatments for health problems. In addition, NPs provide holistic care by focusing on health promotion, disease prevention, and by providing relevant health teaching. The Strong Model of Advanced Nursing Practice (Figure One), developed at Strong Memorial Hospital, University of Rochester Medical Center (Ackerman et al., 1996), outlines the domains of advanced nursing practice. The acute care NP role is relatively new and many health care providers are only now becoming familiar with the competencies and scope of practice (Urban, 1997; Watts, Hanson, Burke, Gallagher, & Foster, 1996). Groundwork for the acute care NP was established by neonatal NPs in the early 1970s, demonstrating that NPs could provide safe, efficient, and economical care (Spitzer et al., 1974). The purpose of this survey was to assess health care professionals' perceptions of the impact of a new acute care NP role in a cardiothoracic surgery intensive care unit. The perceived structure, process, and outcomes of this new role are presented.

Figure One: The Strong Model of Advanced Nursing Practice (Ackerman et al., 1996)



Nurse practitioner role implementation in cardiothoracic surgery

The acute care NP role was implemented in June, 1998 at the University of Alberta Hospital, Edmonton, Alberta. The need for an acute care NP in cardiothoracic surgery, specifically in the intensive care setting, arose due to a decrease in numbers of medical residents, decreased availability of staff physicians in the intensive care unit, and increased numbers of patients on the surgery waiting list coupled with the intention to increase the number of surgeries performed. As well, there was a desire for a registered nurse with graduate education to maintain a direct clinical role, facilitate movement of patients through the intensive care unit, provide consistency and continuity of patient care, provide pre-operative and post-operative follow-up to decrease complications and hospital re-admissions, and to provide essential patient care in a timely fashion. The NP in this position graduated from a new advanced nursing practice program at the Faculty of Nursing, University of Alberta, following 10 years of experience as a registered nurse, with nine years in the specialty of cardiac surgery and transplantation. The Master of Nursing Program in Advanced Nursing Practice at the University of Alberta consists of core nursing courses as well as core and specialty advanced nursing practice courses that include 600 clinical practice hours.

The NP is currently responsible for 19 pre- and post-operative cardiac surgical/transplant patients in the CVICU on a daily basis. The NP has a collaborative practice with seven surgeons and four intensivists. The NP works 10 hours a day, four days a week, no nights or weekends, with attending physicians, intensivists, residents, medical students, staff nurses, educators, administrators, clinical nurse specialists, clinical equipment specialists, transplant coordinators, physiotherapists, respiratory therapists, social workers, pastoral care workers, dietitians, pharmacists, speech pathologists, occupational therapists, unit clerks, orderlies, and secretaries. The NP has a joint reporting structure to the medical director of cardiothoracic surgery for clinical matters and the nursing director for professional and nursing-related issues.

Structure	Process	Outcomes
<ul style="list-style-type: none"> • Role components • Time spent in role components • Work setting and culture • Medical/nursing support • Regulations • Policies • Staffing patterns 	<ul style="list-style-type: none"> • Patient care delivery • Interpersonal communication • Referral patterns • Nurse/NP satisfaction • Collaboration • Access to care • Efficiency of care • Skills assessment 	<ul style="list-style-type: none"> • Quality of care • Resource utilization • Patient/family satisfaction • Physician satisfaction • Utilization of services • Patient education

Consultation most commonly occurs with staff nurses who have specific patient related concerns. However, often the NP provides information to other services regarding patients so their evaluation becomes easier and more expedient. The NP also acts as a liaison with other multidisciplinary team members to facilitate communication regarding patient mobilization, social issues, supports necessary for the family, and discharge planning. The NP participates in weekly administration meetings, professional practice meetings, and intensivists meetings.

The NP has five hours of protected time each week in which to perform activities related to research and scholarly activity. She is a co-investigator on several research projects and enrolls patients in studies, obtains informed consent, and collects and analyzes data. She also gives presentations on related nursing issues at the local, provincial, and national level. The NP holds an Associate Faculty of Nursing position and provides mentorship and consultation to advanced practice and undergraduate nursing students. She also provides knowledge and support to medical students and residents in order to facilitate their learning, and serves as a resource to other health professionals being introduced to cardiothoracic surgery.

Assessment of nurse practitioner role in cardiothoracic surgery

A survey was undertaken two years following implementation of the NP role in the CVICU. The objective was to assess the impact of the NP role in order to monitor the efficacy of the role, justify its implementation, and provide the necessary impetus for the recruitment of new NPs. The acute care NP's perceptions of her role were obtained. In addition, a survey was conducted of all health care providers ($n = 90$) directly involved with the NP in the CVICU.

Nurse practitioner perception of role responsibilities, competence and satisfaction

The acute care NP in CVICU completed a questionnaire consisting of items addressing education, professional experience, and scholarly achievements, role responsibilities, role self-efficacy, and role satisfaction based on the structure, process, and outcome variables of the role (Table One).

Nurse practitioner perceived role responsibilities

The NP perceived herself as an integral component of the nursing structure and involved in advancement of nursing at several levels: in facilitation of activities necessary in improving quality of patient care both from a nursing and

Responsibility	Time spent
Direct patient care	73.0%
Research/quality assurance	7.5%
Publication	7.5%
Administration	5.0%
Education	2.5%
Professional leadership	2.5%
Consultation	2.0%

medical perspective, and in taking the lead role in implementation of desired changes in the area. The NP described her role in the CVICU as being multifaceted. The NP identified her main responsibilities to include direct patient care, consultation, research, education, and leadership. The percentage of time spent in each domain of advanced practice is specified in Table Two, with the majority (73%) devoted to direct patient care. Within direct patient care (Table Three), she reported allocating the most time to patient rounds (30%) and patient assessments and problem identification (20%). The procedures most commonly performed are listed in Table Four. The most common reasons identified by the NP for receiving pages included extubation orders, sedation/analgesic orders, difficulties with post-operative bleeding, hemodynamic instability, arrhythmias, electrolyte imbalances with decreased urine output, and radiographs to be reviewed.

Nurse practitioner perceived role competence

On a scale from one (novice) to 10 (expert), the NP described herself as being most expert in performing direct patient care, professional leadership, and education; the least expert in case management, publishing, and consultation. When asked to rate her confidence from one (not at all) to seven (very confident), the NP was most confident in taking histories and performing physical examinations, documenting findings, and formulating and communicating a therapeutic plan; the least confident in choosing diagnostic tests and determining a non-cardiac medical diagnosis. This may in part be due to the curriculum of her graduate education program, for which she identified relevant content deficits in principles of wound management, infectious diseases and appropriate treatment, diabetes management, interpretation of abdominal radiographs, and diagnosis and treatment of acute gastrointestinal problems.

Nurse practitioner perceived role satisfaction. On a scale from one (very dissatisfied) to five (very satisfied), the NP

rated herself as being very satisfied with the role, nursing administration support, staff nurse collaboration, ability to implement the role, job performance, quality of patient care, responsibilities and accountability, and role competency. She was least satisfied with professional development opportunities, educational preparation, guidance and resources, mentorship, and administrative activities. She was dissatisfied with role reimbursement and existing professional regulations of the NP role. Overall, the NP perceived the benefits of her role to be improved clinical outcomes, facilitating patients through the health care system, conducting research to provide evidence-based practice, increased consistency and efficiency of care, patient/family education, follow-up of treatments, holistic care, and patient advocacy.

Other health care providers perceptions of the nurse practitioner role

To assess the impact of the acute care NP in cardiothoracic surgery by other health care providers, a survey questionnaire was developed based on a literature review of role structure, process, and outcome variables (Table One) which, in turn, were grouped according to the NP role dimensions of direct patient care, consultation, education, research, and professional leadership. Section I of the questionnaire consisted of six items related to role process and five items related to role outcomes. These items were rated on a five-point Likert scale from one indicating a change for the worse, to five, a change for the better; Section II consisted of 24 items on general attitudes towards the structure, process, and outcomes of the role, rated on a five-point Likert scale from one, strongly disagree, to five, strongly agree; and Section III contained respondent demographic items. To ensure anonymity of responses, the questionnaire with a letter of introduction and a self-addressed return envelope was distributed via workplace

Table Three: Cardiothoracic NP perceived role responsibilities: Direct patient care activities

Direct patient care activities	Time spent
Patient care round/documenting outcomes and progress	30%
Patient assessment/problem identification	20%
Performing therapeutic procedures/treatment	15%
Initiating patient transfers/discharges	15%
Initiating or changing orders in plan of care	10%
Conducting and documenting history and physical exam	5%
Communication of care plan to patient/family	2%
Seeking consultation	1%
Giving consultation	1%
Coordination of interdisciplinary plan of care	1%

Table Four: Cardiothoracic NP reported frequency of skill performance

Therapeutic procedures/treatments performed	Frequency
Chest tube removal	4 - 8 times/day
Transfer orders	3 - 8 times/day
CVVHDF orders	3 - 4 times/day
Pacemaker adjustments	2 - 8 times/day
Completing consultations/referrals	2 - 4 times/day
TPN orders	1 - 4 times/day
Cardioversion	2 - 6 times/week
Central line/dialysis catheter insertion/rewire	3 - 5 times/week
Chest tube insertion	2 - 4 times/week
Pacing wire removal	1 - 4 times/week
Femoral guide wire removal	1 - 3 times/week
Arterial line insertion/rewire	1 - times/week
PA catheter insertion	1 - 2 times/week
LABP removal	1 - times/week
LA line removal	0 - 1 times/week
Intubation	0 - 1 times/week

staff mailboxes. Consent to participate was return of the questionnaire.

The category of health care professional for the respondents is outlined in Table Five. Of the 90 questionnaires circulated, 34 were returned; this provided a response rate of 37.7%. Furthermore, of the total registered nurses eligible to respond (n = 47), only six (12.8%) returned the completed questionnaire, while 35.3% (n = 12) of the total respondents were physicians who worked with the NP. Respondents had

been in their positions for one to five years (n=16; 47.1%) or longer (n=12; 35.3%). The majority of respondents (n=22; 66.7%) perceived themselves as being knowledgeable and familiar with the NP role.

Other health care providers’ perceptions of the nurse practitioner’s impact on the process of care

Health care providers were asked to compare the delivery of patient care in the CVICU prior to the implementation of the NP role, and to rate to what degree the continuity of patient

Table Five: Health care provider category of respondents

Category	Total number	Respondents	Percent within category	Percent of total respondents
Full time RN	32	4	12.8	6.7
Part time RN	15	2		
Administrator/managers	4	3	75.0	3.3
CNS/CNE	4	2	50.0	2.2
Physicians		12	80.0	13.3
Surgeon	6			
Intensivist	4			
Resident	5			
Patient care coordinator	2	1	50.0	1.1
Transplant coordinator	1	1	100.0	1.1
Other		9	53.0	10.0
Respiratory therapist	11			
Physiotherapist	2			
Social worker/pastoral care	2			
Dietitian/pharmacist	2			
Total	90	34		37.7

Table Six: Health care provider perception of cardiothoracic NP’s impact upon process of care (N=34)

	Changed for worse		No change	Changed for better	
Process variables (n (%))	1	2	3	4	5
Continuity of patient care (n=30)			3 (10)	10 (33)	17 (57)
Coordination of patient care (n=29)			4 (14)	13 (45)	12 (41)
Collaboration among caregivers (n=31)		1 (3)	1 (3)	14 (45)	15 (48)
Relationships with patients (n=31)			11 (36)	18 (58)	2 (7)
Relationships with families (n=30)			10 (33)	15 (50)	5 (17)

Table Seven: Health care provider perception of cardiothoracic NP’s impact upon outcomes of care (N=34)

	Changed for worse		No change	Changed for better	
Outcome variables (n (%))	1	2	3	4	5
Achievement of patient outcomes (n=28)			5 (18)	12 (43)	11 (39)
Prevention of potential complications (n=29)			7 (24)	12 (41)	10 (35)
Application of evidence-based protocols (n=27)			11 (41)	10 (37)	6 (22)
Timely administration of treatments/procedures (n=29)			1 (3)	9 (31)	19 (66)
Efficient/appropriate use of resources (n=27)		1 (4)	9 (33)	9 (33)	8 (30)

care, clinical information and decision-making relationships among caregivers, patient-centred relationships, and relationships with families had changed. On a five-point scale from one (changed for the worse) to five (changed for the better), continuity of patient care (n=27; 90%) and collaboration among caregivers (n=29; 93%) were perceived by most respondents as having positively changed since the implementation of the NP role. Twenty-five respondents (86%) also rated coordination of patient care as having positively changed, as had relationships with patients (n=20; 65%) and families (n=20; 67%) (Table Six).

Other health care providers’ perceptions of the nurse practitioner’s impact on the outcomes of care

Outcomes of care related to the NP role that were assessed included achievement of patient outcomes, prevention of potential complications, application of evidence-based practice protocols, timely administration of treatments/procedures, and efficient use of resources. The outcome perceived by most (n=28; 97%) to have positively changed was the timely administration of treatments and procedures. As well, respondents rated achievement of patient outcomes (n=23; 82%), prevention of potential complications (n=22; 76%),

and efficient and appropriate use of resources (n=17; 63%) as having positively changed (Table Seven).

Other health care providers' perceptions of the nurse practitioner's performance

Respondents were asked to rate their perceptions of the NP's performance (one=strongly disagree to five=strongly agree) on several items (Table Eight). Respondents were confident with the NP as the first-line practitioner in the critical care setting (n=22; 66.7%). Most respondents also strongly agreed/agreed that the NP planned effectively for treatment goals (n=30; 90.9%) and strongly agreed/agreed that she was an expert resource for patient care (n=25; 75.7%). Furthermore, 87.9% (n=29) of the respondents strongly agreed/ agreed that the NP enhanced communication, thus continuity of care, and 77.4% (n=24) strongly agreed/agreed that she improved quality of care. Thirty-one respondents (93.9%) strongly agreed/agreed that the NP responded to changes in patient status, and 29 (90.7%) strongly agreed/agreed that she accomplished desired patient care goals. The majority perceived the NP to be an effective educator for other practitioners (n=23; 74.2%) and provided leadership in development of practice standards (n=25; 75.8%). Twenty-nine respondents (87.9%) rated the NP as being highly accepted by co-workers. A majority of respondents (n=26; 86.6%) identified that there was lack of understanding of the NP role related to scope and standards of practice. However, the NP's responsibilities were perceived by most as being realistic (n=30; 89.8%), as was her workload (n=24; 77.4%).

Transition of the cardiothoracic nurse practitioner from novice to expert

One major challenge identified by the NP was the change from "expert" nurse in cardiovascular surgery to "novice" nurse practitioner. This was heightened by the lack of NP mentors and an apprenticeship program. Limited recognition of other health care professionals of the role domains and a lack of a standard NP job description, may have contributed to role confusion. Because the NP role was in its infancy, with only a few positions across the country to use for comparison, the full extent of NP responsibilities was underestimated.

Along with the limited understanding of the role came the need to educate nurses and medical residents that the NP was not there to "do for them", but to empower them to advance their own practice. The NP was effective in supporting the staff when patient problems arose,

however, a further obstacle yet to be overcome is the limited intra-professional support for the role. To date, limited regulations governing advanced nursing practice have been developed by the professional nursing association, forcing the NP to function under "delegated medical authority". This phrase on its own serves as a limiting factor to autonomy and independence in nursing practice at all levels.

Thus, the NP role is both challenging and rewarding at the same time. Trusting relationships have developed with other health care providers. Yet, it has taken time for physicians from other medical services to accept the NP as the first-line caregiver. This has improved with the development of the NP role in other service areas within the institution. Because the NP role is new in the institution, networking with others in similar positions has been difficult. However, the consensus within the cardiothoracic surgery service was that clinical outcomes were perceived to have improved, with patients being facilitated through the system through increased efficiency and continuity of patient care. Patient and family education, follow-up of treatments, increased clinical research, and patient advocacy were further perceived benefits since the implementation of the acute care NP role.

Challenges remaining

Advanced nursing practice encompasses many different functions in many different roles. However, aspects of the role vary depending on the practice setting, specific patient population, and employer. In the short term, the NP, in conjunction with the health care team in the CVICU, stabilized patients and minimized complications through physical and psychosocial care measures; while in the long term, the NP restored optimum health potential for each patient or facilitated a dignified death. She was perceived to use advanced diagnostic reasoning and clinical

Table Eight: Health care providers perception of cardiothoracic NP's performance (N=34)

Survey item	Mode*	Mean*	SD
Confidence as a first-line practitioner	4	3.76	1.09
Plans treatment goals	5	4.40	0.87
Enhances/facilitates communication	4	3.94	0.99
Expert resource for patient care	5	4.09	1.01
Implements effective patient care	5	4.16	0.97
Improves quality of patient care	5	4.10	1.01
Responds to changes in patient status	5	4.36	0.90
Enhances continuity of patient care	5	4.30	0.95
Collaborates to achieve patient outcomes	5	4.37	0.94
Accomplishes desired patient goals	5	4.31	0.86
Consultant/role model for other professionals	5	3.97	1.12
Educates other practitioners	5	4.03	1.02
Provides leadership in setting practice standards	4	3.91	0.98
Accepted by other professionals	5	4.30	0.92
Autonomous in providing patient care	4	3.66	1.10
Supported by others	5	4.30	0.94

* 1 = Strongly disagree to 5 = Strongly agree

judgment in the provision of direct patient care. In addition, the NP was involved in quality assurance, staff education, research, and clinical and professional leadership in developing practice guidelines.

Several factors, similar to vanSoeren and Micevski (2001), were identified as having significant impact on the NP role in the CVICU. First was the presence of multiple, conflicting demands and role expectations. Nursing administrators expect that the NP engage in non-clinical components, while their medical counterparts expect her to engage solely in the clinical components. The NP attempted to perform all activities, but found that priorities must be established on a daily basis as there was not enough time to do them all. This interfered with maximal implementation of the role. Workload was related not only to the number of patients and the number of activities performed per day, but also to the NP's perception of not having adequate time to perform all clinical and non-clinical activities during scheduled working hours. Thus, the NP extended her working hours to accomplish non-clinical functions. The issue of inadequate compensation for role responsibilities and time commitment required to carry out all functions may lead to future job dissatisfaction.

Second, there was an unclear role definition, responsibilities, and boundaries that interfered with role implementation. Lack of clarity and formalization of the role led to variability in role implementation, role tension, and lack of support for the role.


Next, there was overwhelming receptivity and support for the role. Acceptance and support for the NP role had positive effects on role implementation and was considered integral to the development of collaborative relationships and ensuring success of the role. Trust in the NP's abilities, respect for her practice, and acknowledgement of her contribution promoted collaboration that, in turn, was essential for the success of the NP role.

Fourth, the NP's perceived competence in knowledge and skills required for the role influenced the role implementation. That is, if there was a perception of inadequate preparation, those components of the role were performed less.

Next, the NP experienced a lack of autonomy in practice. Limited independence in clinical decisions was frustrating to the NP, as physicians had the authority to overrule the NP's decisions, even if the latter were consistent with evidence-based protocols. Associated with limited autonomy was the lack of prescribing privileges that had a similar impact on role performance. Also, there was limited opportunity for professional development. The NP had to be rigorous in demanding the need to engage in education and research activities to expand her knowledge base and keep up to date and involved in knowledge development. Over time, the NP was recognized as having a role in research and hence, protocol and policy initiation.

Finally, at that time, there was a lack of professional regulation by the provincial governing body. Since then, legislation has been enacted dictating the competencies required for the role.

Conclusion

Despite some unresolved issues that have made the development and implementation of the acute care NP role in CVICU challenging, the presence of the role has had a positive impact in the area and in the advancement and recognition of nursing in the institution. The NP role was identified as being extremely rewarding, both personally and professionally. Ultimately, the acute care NP is a member of the health care team, working in collaboration with other health care professionals to improve quality of patient care. Further research is required to assess the impact of the NP role in relation to outcomes such as length of stay, complication rates, and morbidity and mortality. Though many hurdles remain, with ongoing support, the NP role will become a desired position within the institution and in the community for those who covet challenge and change, and who wish to transgress towards a new frontier in nursing. 

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