

**School of Nursing and Midwifery
Faculty of Health Sciences**

**The development of practice standards for graduates of
Australian critical care nurse education:
*The AuSDACE Study***

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**This thesis is presented for the Degree of
Doctor of Philosophy
Curtin University**

April 2014

DECLARATION

To the best of my knowledge and belief this thesis contains no material previously published by any other person except where due acknowledgement has been made.

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university.

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Date: 12 May 2014

ABSTRACT

Introduction: Critical care is one of the largest post-registration nursing specialties in the developed world. Internationally, workforce standards recommend that a proportion of nurses working in intensive care units should hold a critical care qualification. While this has been a driver behind nurses pursuing post-registration qualifications in this specialty, varying interpretations of a “critical care qualification” are used. There are no agreed practice standards to measure outcomes in relation to a specialty qualification and no attempts have been made to seek health service consumer input into the development of practice standards.

Aim: The aim of this study was to develop practice standards for graduates of Australian critical care nurse education and design a clinical assessment tool to measure graduate practice.

Methods: A mixed-methods design was used where critical care nursing stakeholders, patients and families informed a multi-phase process. First, a literature review explored and identified international differences in critical care nurse staffing, education and practice standards. Secondly, an analysis of graduate critical care nurse education programs nationally was undertaken that focused on graduate practice outcomes and clinical assessment methods based on course provider websites, course curricula and telephone interviews with course coordinators. The analytical process used to synthesise and interpret the qualitative data was based on the Framework Approach which consisted of five key stages: i) preliminary immersion of raw data; ii) conceptualisation of a thematic framework; iii) indexing; vi) charting; v) mapping and interpretation of data. In the third phase, the perspectives of patients and families on the role of critical care nurses and what they considered to be important for critical care nurses’ educational preparation was obtained. This qualitative phase used thematic analysis to explore the views of patients and families using individual interviews and focus groups. The fourth phase was an eDelphi study with a national panel of critical care nurses responding to three survey rounds. For round one 84 statements organised within six domains were developed from the earlier phases of the study. The panel categorised into four stakeholder groups responded to two rating scales; level of importance and level of practice. In the fifth phase, the previous cohort studies’ outcomes were arranged into a practical tool - the Standards of Practice and Evaluation of Critical-care-nursing Tool (SPECT) to

measure graduate practice. In this final research phase the SPECT was preliminary tested on its psychometric properties for face validity, content validity, reliability (internal consistency, test-retest and intra-rater agreement) and clinical feasibility.

Results: The study was presented through a series of six publications. The literature review identified that existing critical care nursing standards were similar internationally, although predominantly opinion rather than evidenced-based. No standards described the expected practice level for education program graduates. The lack of health consumer involvement further justified a reconsideration of the process for the development of graduate practice standards. The review of 22 Australian graduate critical care nurse education courses revealed considerable variation in course delivery and graduate practice outcomes. The expected outcome for most courses was safe practice with graduates not expected to practice at team leader or at the 'specialist' level. In the third phase, 17 patients and family members identified that both physical patient care and socio-emotional support of patients and families as being important factors for the critical care nurse role. Socio-emotional support components included communication, people skills, facilitating family presence and advocacy and these were reflected in participants' views about minimum practice standards for course graduates. It was also noted these were provided inconsistently in practice. The eDelphi study resulted in the practice standards developed from phases one through three being organised into three levels of graduate practice. In the final research step, the SPECT consisted of 86 standards (with elements) grouped in six domains; 65 standards where the graduate was expected to demonstrate an independent level of practice, 14 standards where the graduate was expected to demonstrate practice under supervision and 7 standards where the graduate was expected to have knowledge of/or the ability to describe. Testing of the SPECT revealed strong content validity index (CVI) domain range .772 - .887 and statement CVI range .66 -1.00. Reliability was good in terms of internal consistency Cronbach's alpha $>.864$, test-retest Spearman's Rank correlation range .772 - .887 and intra-rater kappa agreement were significant for 102/104 statements with at least moderate agreement for 94.2% of statements.

Conclusion: A rigorous and structured process was used to develop practice standards and a clinical assessment instrument in the critical care context. The SPECT reflects both the views of health service consumers and critical care nursing stakeholders. Testing revealed that it is reliable, face and content valid and appears to be a useful, authentic tool for assessing practice. The SPECT provides a clear

definition for the expected practice level for a graduate of a critical care education program. The AuSDACE Study informed the practice standards and associated SPECT that now provide the opportunity for achieving greater consistency for graduate practice outcomes and a uniform interpretation for professional health workforce standards for critical care nursing in Australia.

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ASSOCIATED AWARDS, PEER REVIEWED ABSTRACT PUBLICATIONS, CONFERENCE PRESENTATIONS AND NON PEER- REVIEWED PUBLICATIONS

Awards

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Gill, F. (2012, September). AuSDACE Study - Update. *Critical Times*, p.11.

Gill, F. (2012, December). Australian standards development and assessment in
Critical Care Nurse Education (AuSDACE) Study – Update no 4. *Critical Times*, p.4.

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STATEMENT OF CONTRIBUTION OF OTHERS

This thesis contains published work, all of which has been co-authored. The bibliographical details of the work, a description of the work, and an estimated percentage of contribution (%) of each author are listed below:

Paper 1: Gill, F. J. (75%) Leslie, G. D. (15%) Grech, C. (5%) & Latour, J. M. (5%)

Title: (2012). A review of critical care nursing staffing, education and practice standards. *Australian Critical Care*, 25(4), 224-237.

Fenella Gill conducted the literature review, data extraction, interpreted the data and drafted the manuscript. All other authors contributed to interpretation of the data and critically reviewed the manuscript.

Paper 2: Gill, F. J. (70%), Leslie, G. D. (20%), Grech, C. (5%), Latour, J. M. (5%).

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Paper 3: Gill, F. J. (75%), Leslie, G. D. (15%), Grech, C. (5%), Latour, J. M. (5%)

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Paper 4: Gill, F. J. (80%), Leslie, G. D. (10%), Grech, C. (5%), Latour, J. M. (5%)

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Fenella Gill collected, cleaned, coded, analysed and interpreted the data and drafted the manuscript. All other authors provided guidance for data analysis and critically reviewed the manuscript.

Paper 5: Gill F. J. (70%), Leslie G. D. (10%), Grech C. (5%), Boldy D. (5%), Latour J. M. (10%)

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Fenella Gill collected, cleaned, coded, analysed and interpreted the data and drafted the manuscript. Gavin Leslie, Jos Latour and Duncan Boldy provided guidance for data analysis. All co - authors critically reviewed the manuscript.

Paper 6: Gill F. J. (70%), Leslie G. D. (10%), Grech C. (5%), Boldy D. (10%) & Latour J. (5%)

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Fenella Gill collected, cleaned, coded, analysed and interpreted the data and drafted the manuscript. Gavin Leslie, Jos Latour and Duncan Boldy provided guidance for data analysis. All co - authors critically reviewed the manuscript.

We confirm permission has been obtained from all authors to include the manuscripts in this PhD thesis.



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Date 12 May 2014

Professor Gavin Leslie, Principal Supervisor, School of Nursing and Midwifery, Curtin University, co-author all six manuscripts.



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Professor Jos Latour, Associate Supervisor, co-author all six manuscripts.

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GLOSSARY OF TERMS

For the context of this study the following terms are defined:

Practice outcomes	The level and scope of clinical performance resulting from an education program.
Competence	The ability of the person to fulfil the nursing role effectively and/or expertly; it can also be considered as made up of a set of separate competencies (Australian College of Critical Care Nurses, 2002).
Competency	(Also known as competency standard) describes the attributes of a person resulting in effective and/or superior performance (Australian College of Critical Care Nurses, 2002).
Critical care environment	An area specifically staffed and equipped for the continuous care of critically ill patients (For the purpose of this study the critical care environment refers to adult intensive care, paediatric intensive care, coronary or cardiac care and high dependency areas (Australian College of Critical Care Nurses, 2002).
Critical care nursing	Is focused on the care of patients with life threatening illness (Elliott, Aitken, & Chaboyer, 2012).
Entry to practice level	The minimum standard of practice by which performance is assessed to obtain and retain a license to practice as a registered nurse (Adapted from: Australian Nursing & Midwifery Council, 2006).

Experiential learning	Clinical learning that is accomplished by being open to having one's expectations refined, challenged, or disconfirmed by the unfolding situation (Benner, Hooper Kyriakidis, & Stannard, 2011).
Graduate	A graduate is a person who has successfully completed an award course. Students have completed an undergraduate qualification such as a bachelor degree and are continuing their studies by completing an award such as a graduate certificate, graduate diploma, master or doctorate (Curtin University, 2011).
Post-registration specialisation	A process which 'deepens and refines' nursing practice, and which implies 'a level of knowledge and skill in a particular aspect of nursing which is greater than that acquired during the course of basic nursing education' (International Council of Nurses, 2002).
Specialist Critical Care Nurse	One who provides competent and holistic care for the critically ill patient through the integration of advanced level knowledge, skills and humanistic values (Australian College of Critical Care Nurses, 2002).

PART 1: SETTING THE SCENE

1.1 Introduction

The focus of critical care nursing is the care of patients with life threatening illness. It is estimated that worldwide there are over 500,000 critical care nurses representing one of the largest specialty areas of nursing (Elliott et al., 2012). The critical care nursing workforce plays an important role in the provision of healthcare with several studies showing that shortages of critical care nurses have a negative impact on patient outcomes (Dang, Johantgen, Pronovost, Jenckes, & Bass, 2002; Duffield et al.; Kane, Shamliyan, Mueller, Duval, & Wilt, 2007; Marcin, 2005; Needleman et al., 2011; Nichter, 2008; Numata et al., 2006; Thorens, Kaelin, Jolliet, & Chevrolet, 1995; Tourangeau, Giovannetti, Tu, & Wood, 2002; Van den Heede et al., 2009; West, Mays, Rafferty, Rowan, & Sanderson, 2009). There is also evidence that it is not just the number of critical care nurses that is important but the level of preparation experienced by the nurse as patient outcomes are improved when cared for by appropriately experienced and educated critical care nurses (Beckman, Carless, Durie, Gill, & Morrison, 1999; Hamilton, Redshaw, & Tarnow-Mordi, 2007; Morrison, Beckmann, Durie, Carless, & Gillies, 2001; Needleman et al., 2011; Rothschild, Bates, Franz, Soukup, & Kaushal, 2009).

The development of critical care nursing, specifically intensive care units (ICU) and coronary care units (CCU), began over half a century ago in the 1950s (Wiles & Daffurn, 2002). Very early it was recognised that well-educated and empowered nurses were key to the success of these neophyte facilities. It was claimed that in the first CCUs patient mortality was reduced because nurses were able to initiate therapy and provide resuscitation in the absence of doctors. Cost benefits and improved patient outcomes were recognised when closed unit policies (ie the control of patient admissions and discharges under the control of the intensive care specialists) were adopted (Brown & Sullivan, 1989; Knaus, Draper, Wagner, & Zimmerman, 1986). The critical care nursing skills required at that time were primarily to provide close and continuous observation prior to the availability of invasive monitoring or sophisticated bio-mechanical devices (Wiles & Daffurn, 2002).

The benefits to centralising special equipment, staff and facilities to care for critically ill patients to avoid or reduce complications became recognised in the 1960s and quickly developed into formal unit structures through the 1970s (Clarke et al., 2000). The evolution of critical care centred around the development of ventilators, cardiac monitors and other complex technology with nurses learning to operate the equipment and providing continuous care for patients in these settings. There was a strong emphasis on new developments for medical and nursing care that meant a new collaborative partnership. Staffing by specially trained nurses and doctors was considered a more important advancement in critical care than the development of technology (Burn, 1970; Knaus et al., 1986). Knaus et al. produced a series of seminal articles which formed the foundation of modern classification and outcome prediction in ICU based on data collected in the late 1970s and early 1980s. In their 1986 study evaluating patient outcomes in 13 tertiary ICUs they demonstrated that the use of technology was not a significant outcome factor. The best performing ICUs were characterized by excellent nurse-doctor communication and had the most comprehensive nursing education support (Knaus et al., 1986).

The high demand for education specific to critical care nursing was initially difficult to meet due to the absence of experienced nurses in the specialty. The majority of nurses at that time had received no prior training in the basics of respiratory, cardiac or intensive care and most learnt in an ad-hoc fashion from peers and medical staff. Protocols and procedure manuals, available from the mid 1970s, were also used as sources of knowledge and advice. Intensive care conferences for doctors and nurses began around the same time and were another important knowledge resource (Wiles & Daffurn, 2002). Few intensive care nursing textbooks were available and were often based on a medical model (Holloway, 1979). Programs of instruction of new staff began as lectures from medical staff (Wiles & Daffurn, 2002). Critical care nursing education began as ad-hoc training in the workplace where nurses and doctors learnt together. Post-registration critical care nursing courses developed from the 1960s in Australasia and the UK. These courses were developed for the local needs of hospitals and regions and differences in content and practice developed between hospitals, regions and countries (Baktoft, Drigo, & Hohl, 2003; Elliott et al., 2012). In Australia, the transition of post registration courses occurred during the 1990s when many hospital-based courses were discontinued, although some did continue, in pockets around the country. Universities with schools of nursing filled this education space through either

collaborating with hospitals or developing their own curricula to meet the demand for post-registration specialty education.

A review of Australian institutional websites in 2011 revealed that at least 18 universities offered graduate nursing courses in critical care with qualifications ranging from graduate certificates, graduate diplomas to master awards. Most university programs are currently offered in collaborative relationships with one or more hospitals. As some hospitals continued to provide critical care programs many universities provide credit transfer for these post-registration certificates towards a diploma or master qualification. There is a wide variation in clinical requirements across programs (Aitken, Currey, Marshall, & Elliott, 2006), with no consensus as to the expected clinical performance for graduates. It appears that any critical care nurse educational award can result in a graduate becoming a 'qualified' critical care nurse.

The demand for critical care nurse education and 'qualified' critical care nurses has further been driven by workforce standards in some countries that recommend staffing critical care units with a minimum proportion of nurses who hold post-registration specialty qualifications (Australian College of Critical Care Nurses, 2003; Australian Council on Healthcare Standards, 2011; College of Intensive Care Medicine of Australia and New Zealand, 2010; British Association of Critical Care Nurses, 2010; European federation of Critical Care Nursing associations, 2007) (see Table 1). These workforce standards have in turn been driven by the recognition that qualified staff are essential to optimise patient outcomes.

Table 1 *Minimum nurse staffing standards for intensive care units*

<p>A minimum of 1:1 nursing for ventilated and other similarly critically ill patients, and nursing staff available to greater than 1:1 ratio for patients requiring complex management.</p> <p>A nurse in charge of the unit with a post registration qualification in intensive care or in the clinical specialty of the unit.</p> <p>The majority of nursing staff with a post registration qualification in intensive care or in the specialty of the unit.</p> <p>All nursing staff in the unit responsible for direct patient care being registered nurses.</p>

Excerpt from the College of Intensive Care Medicine's Minimum Standards for Intensive Care Units (Australian Council on Healthcare Standards, 2011 p.31)

Aiming to establish some consistency across critical care nursing practice and post-registration education internationally, the Declaration of Madrid was endorsed by the World Federation of Critical Care Nurses (2005) who recommended that national critical care nursing organisations establish agreed standards for specialist critical care nursing to be used as a framework for both curriculum development and assessment of clinical practice. In Europe, the World Health Organisation developed a Europe critical care nursing curriculum (2003) and the European federation of Critical Care Nursing associations released a position statement on post-registration critical care nursing education (European federation of Critical Care Nursing associations, 2004). The Critical Care Section of the New Zealand Nursing Organisation also published a similar document (Critical Care Nurses' Section, 2010).

In Australia, the Australian College of Critical Care Nurses (ACCCN) published their own position statement on the provision of postgraduate critical care nursing education in 1999, revising the document in 2006 (Australian College of Critical Care Nurses). Specified were broad subject areas to be included in a program of study and it was recommended that the Competency Standards for Specialist Critical Care Nurses (Australian College of Critical Care Nurses, 2002) be used as a framework and as a basis for clinical assessment. The first edition of the competency standards was published in 1996 as a result of a national research project that included observation of specialist level practice of over 100 critical care nurses (Confederation of Australian Critical Care Nurses Inc). The national registered nurse entry-level practice competencies were used as a framework for the specialist critical care standards development. The competency based approach to the standards reflected the national movement at that time to establish competencies for entry level practice for registered nurses (Australian Nursing Council Inc, 1990). The ACCCN competency standards were revised in 2002 (Australian College of Critical Care Nurses). The development of the ACCCN competency standards was based on the premise that “competence is a broad, holistic concept that encompasses more than knowledge and skills” (Australian College of Critical Care Nurses, 2002, p. 30). The Competency Standards for Specialist Critical Care Nurses (Australian College of Critical Care Nurses, 2002) are a set of 20 standards grouped into six domains. They articulate a level of practice that would be attained following completion of a post-registration critical care education program plus approximately three to five years of critical care clinical experience. They do not adequately describe the practice of a course graduate who

is more likely to have as little as two years critical care experience. Table 2 illustrates the attributes of the specialist critical care nurse that were articulated during the competency standards development project.

Table 2 *Attributes of specialist level critical care nurses*

- | |
|--|
| <ul style="list-style-type: none"> • Manages the sickest patient to industry standards consistently • Respected by peers and others • Is a role model • Utilises a sound knowledge base in application and integration of knowledge to practice • Responds to a continually changing environment • Utilises research in practice • Supports less experienced staff • Displays an awareness of the needs of the whole unit • Is professionally active • Demonstrates effective communication skills • Demonstrates a high level of assessment skills • Interprets complex situations • Acts as a coordinator of care |
|--|

(Australian College of Critical Care Nurses, 2002)

The ACCCN competency standards were an early attempt to articulate the practice of the specialist level critical care nurse. The application of the competency standards to inform graduate education practice outcomes has required modification at a local level (Aitken, Currey, Marshall, & Elliott, 2006). In a similar way that education programs evolved around meeting local organizational workforce needs, there has also been no standardisation in the way the competency standards have been applied across the country.

Adding to the inconsistent use of the competency standards, there remains a popular view of competencies as a list of skills to be observed and “signed off” rather than the holistic interpretation of competency as describing the attributes of knowledge, skills, attitudes and values that collectively result in effective or superior performance. Terminology around competence and competency has also been used interchangeably (McMullan et al., 2003). Differences have been explained as competence being job related and describing behavior a person should demonstrate in his or her performance, where as competency is more person-orientated and refers to the underlying characteristics and qualities that lead to an effective or

superior performance (McMullan et al., 2003). However, these differences are not distinct and there has been a lack of agreement among educators and clinicians alike as to what is meant by competence and competency.

Patricia Benner (1984) is perhaps most well known in the literature around nursing competency and for identifying levels of nursing performance using Hubert and Stuart Dreyfus' five levels of adult skill acquisition: Novice to Expert (Dreyfus, 2004). Internationally Benner's framework has been used to articulate levels of critical care nursing performance (Aitken et al., 2006; Bench, Crowe, Day, Jones, & Wilebore, 2003; Gill, Leslie, & Southerland, 2006; Hanley & Higgins, 2005). Using Benner's framework the competent level is the midway point between novice (or beginning) and expert nursing performance. According to Benner (1984, p 27) the competent nurse:

“... sees his or her actions in terms of long-range goals or plans of which he or she is consciously aware. The competent nurse lacks the speed and flexibility of the proficient nurse but does have a feeling of mastery and the ability to cope with and manage the many contingencies of clinical nursing. The conscious, deliberate planning that is characteristic of this skill level helps achieve efficiency and organisation.”

Despite this apparent clear description of competent performance, difficulty in operationalising the concept of competent practice has been described (Meretoja, Eriksson, & Leino-Kilpi, 2002). In particular, interpretation of Benner's five levels of performance in the form of a rating scale has been reported as problematic for critical care student clinical assessment (Butler et al., 2011; Gill et al., 2006). It is Benner's competent level that appears to be a reasonable practice outcome from a graduate level education program. It is the proficient level of practice that matches most closely to the ACCCN specialist level Competency Standards.

Another area that has not been identified as contributing to standards of practice is the views of health consumers. Whilst the importance of nurse – patient and nurse – family relationships was identified by The Committee on the Quality of Health Care in America in its report aimed at improving the 21st century healthcare system (Committee on Quality Health Care in America Institute of Medicine, 2001) this was not necessarily a new concept. Reports from as early as the 1960s identified patients' and families' satisfaction with their care and their relationships with health

professionals (Korsch, Gozzi, & Francis, 1968; Molter, 1979). Subsequent to this in Australia, a new national program for safety and quality in healthcare (Australian Council on Healthcare Standards, 2012) has enshrined as one of its ten standards, the partnership with health care consumers. While health consumers have become an increasing focus for quality healthcare outcomes, critical care nurse education curricula have traditionally placed emphasis on clinical competence and technical expertise rather than developing relationships with and supporting critical care patients and their families. However, compelling reports with wide reaching impact such as the Mid-Staffordshire NHS Foundation Trust Public Inquiry (The Mid Staffordshire NHS Foundation Trust Public Inquiry, 2013) reinforce the importance of why health consumers and other key stakeholders need to be at the forefront of practice standard development.

In summary, critical care nurses have a positive impact on patient outcomes (Beckman et al., 1999; Hamilton et al., 2007; Morrison et al., 2001; Needleman et al., 2011; Rothschild et al., 2009). It is clearly recognised that optimum nurse staffing in critical care settings consists of an appropriate number of nurses with a proportion of those holding specialty graduate level qualifications. Critical care nurse education programs were initially developed locally to meet individual service requirements. In line with the professionalisation of nursing and tertiary preparation, there has been a transition of these programs to the university sector. In so doing there remains no uniform definition for the qualification or minimum practice standards for graduates. There remains a lack of consumer input to critical care education. As a consequence a research project was developed as a thesis by publication designed to develop Australian practice standards for graduates of critical care nurse education supported by an assessment instrument to measure practice outcomes. The Curtin University Human Research Ethics Committee approved the study (see Appendix 6.3)

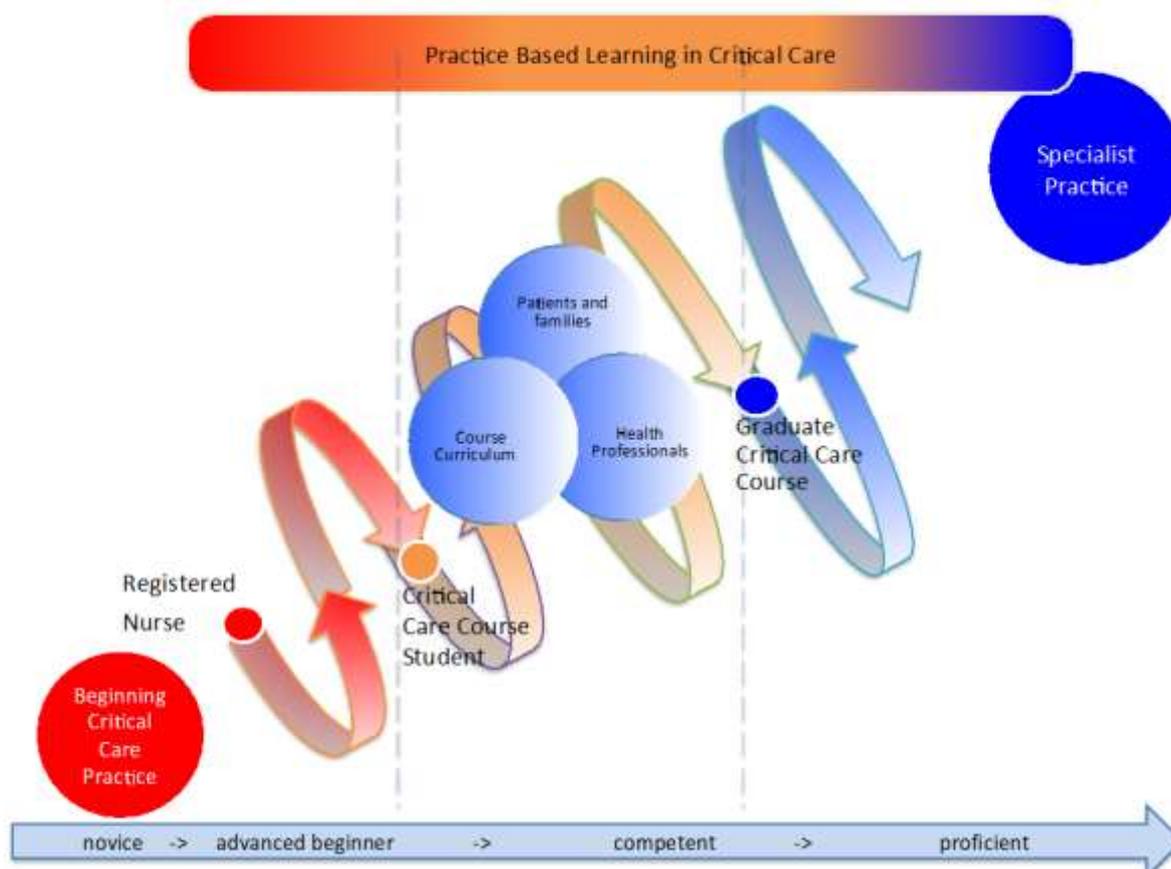
1.2 Framework

This conceptual framework explains the typical pathway taken by the beginning registered nurse to specialist in critical care nursing. In this framework the non-linear pathway includes a critical care course (graduate education program) component and factors that impact upon the learning journey. These are presented to explain the variability in critical care experience that may affect learning outcomes as a result of the course (Figure 1). This is considered to be the ideal and most direct

pathway to specialist level practice. It is possible for the nurse to progress from beginning practice to specialist level practice without undertaking a critical care course, but in this case the practice based learning journey will be much longer and uncertain, relying more heavily on individual self motivation and direction. The pathway is represented as a spiral to reflect the experiential learning gained from everyday practice and that competence development is not linear (Takase, 2012). In particular the progressive development of critical care practice can be conceptualised as a series of linked and ongoing clinical experiences (Levett-Jones et al., 2009).

Beginning practice

Critical care nursing practice is built on beginning registered nurse practice. Globally, registered nurse practice is normally regulated by national registration authorities (International Council of Nurses, 2013). In Australia the authority is the Nursing and Midwifery Board of Australia (no date) and the competencies for beginning or entry level practice for registered nurses were established in 1990 (Australian Nursing Council Inc) having now undergone a number of refinements and iterations. The entry level for nurses to work in critical care environments has traditionally followed the first or graduate year of practice. This can be aligned with Benner's model of performance development where the starting level for beginning practice in a specialist critical care environment for the registered nurse is typically at the novice level (Benner, 1984). In Figure 1, this starting point in critical care nursing practice is represented in red to the left of the page and has been mapped against Benner's (1984) progression from novice to competent and depicts proficient as the specialist level.

Figure 1 Conceptual framework critical care nurse learning pathway**Progression of learning**

For the registered nurse new to the critical care environment learning is continuous and occurs both formally and experientially. A structured orientation program is commonly delivered within the critical care environment via a combination of methods such as workshops, completion of workbooks, simulation, supervised practice and assessment of mandatory skills for safe practice. The duration of orientation programs vary across hospitals and critical care units but the orientation is usually followed by a period of supervised practice before the nurse progresses to working more independently albeit usually caring for stable and non-complex patients. At this stage the nurse can expect access to clinical support from more experienced nurses. After a period of weeks to several months, the registered nurse may begin a formal, graduate level, critical care nursing course. In Figure 1 this point is represented by the vertical dotted line on the left side of the page.

Learning is now scaffolded through participation in a structured program that includes theoretical and practical components built around a curriculum framework. Most often, the clinical practice development for the registered nurse, as a critical care course participant, is supported by both the course provider and continuing

employment in a clinical area. Clinical practice support may consist of varying amounts of clinical role modeling, support, mentoring, teaching and learning, performance feedback and practice assessment. Factors that impact on learning in the clinical environment includes a sufficiently varied and complex mix of patients, relationships with patients and their families, role models and mentors (health professionals) and organisational resources. In Figure 1, these environmental factors are represented by the three interconnected blue circles.

Interestingly this fits well with Benner's original novice to expert work (1984) as a theoretical underpinning and is consistent with what is a widely accepted framework for developing practice. Applying Benner's model, this combination of experiential and formal learning should enable the nurse to transition through the stages of "novice" critical care nurse, "advanced beginner" to "competent" by the end of a graduate critical care course. Benner's expert level is not represented in the figure as that level of performance is more advanced than the specialist or proficient level and some nurses may never achieve expert level performance, despite 10 or more years of experience (Benner, 1984).

Desired outcomes

There are a variety of desired outcomes from a graduate level critical care nursing education program (Aitken et al., 2006). These will depend on the perspective of the different stakeholders. For the nurse undertaking the critical care course there may have been a number of reasons for undertaking formal study. These include increasing clinical capabilities and improving quality of patient care, perceived employment opportunities, job security and financial benefits (Chaboyer, Dunn, Theobald, Aitken, & Perrott, 2001). From the perspective of the critical care nursing profession, educational outcomes are centred around advanced practice, patient comfort, safety, professional practice and ethical conduct (Marshall, Currey, Aitken, & Elliott, 2007). From the employing institution's perspective, the goal of staff undertaking a graduate critical care program is to produce a skilled and competent workforce to staff critical care areas. There is a continual need to supply qualified nurses to sufficient numbers to meet industry standards and cover staff turnover and redundancy (Australian College of Critical Care Nurses, 2003; Australian Council on Healthcare Standards, 2011; College of Intensive Care Medicine of Australia and New Zealand, 2010). For course providers, the outcomes include providing highly skilled specialised graduates for health services, meeting revenue targets linked to

student numbers and, in the case of some programs, providing a 'feeder' group of graduates into higher degree by research programs.

The national academic outcome standards are generic to higher education (Australian Qualifications Framework Council, 2013; Tertiary Education Quality and Standards Agency, 2011) and not specific to graduate nurse specialty education. While successful courses are often dependent on university – hospital partnerships their respective goals are not necessarily aligned. Health consumer (patient and family) expectations for graduate outcomes have not been identified.

The outcome of the graduate critical care education program is represented in Figure 1 by the vertical dotted line on the right of the diagram. The registered nurse has now graduated from being a critical care student to becoming a qualified and competent critical care nurse. With further experience and support the registered nurse will continue practice development through to the "proficient" (Benner, 1984) or specialist level (Australian College of Critical Care Nurses, 2002). This is represented on the right of the diagram in Figure 1.

Practice assessment

Depending on the different stakeholder perspective demonstration of a minimum level of clinical practice as an outcome measure of the graduate critical care nursing education program may or may not be important. There is currently no national standard or requirement. The ACCCN recommended that the competency standards (2002) be used to inform clinical assessment (2006). Despite the inherent problems of using specialist level standards to measure less advanced practice outcomes, these are currently the most commonly used standards adopted for the assessment of critical care students (Aitken et al., 2006). Ideally there is frequent assessment throughout the duration of the course with a minimum standard required to successfully graduate.

The framework illustrates the nurse's journey from beginning practice to specialist in critical care nursing through the existing education pathway many critical care nurses tread. What is missing from this framework is uniform minimum practice standards by which the performance of critical care graduates can be measured and stakeholders are cognizant of as exists for entry to practice registered nurses. Thus, stakeholder expectations of graduates from a critical care course are diverse across Australia and, as will be demonstrated later in this thesis, in some cases unrealistic.

1.3 Aim and research questions

It has been established that in critical care settings safe staffing consists of the appropriate number of nurses, with a proportion of those holding graduate level qualifications, in order to operate a critical care unit (Australian College of Critical Care Nurses, 2003; Australian Council on Healthcare Standards, 2011; College of Intensive Care Medicine of Australia and New Zealand, 2010). These workforce staffing standards drive the employment of registered nurses with critical care qualifications. There remains no agreed definition for the level of graduate “qualification” or practice standards implicit within the specialty practice.

In order to address these issues a research project was designed using a national approach involving consultation with the representative professional college, collaboration with critical care stakeholders in graduate nurse education (universities, colleges and hospitals), nurses in clinical practice (clinicians, managers and educators) as well as input from health consumers (patients and families).

The aim of the AuSDACE study was to develop practice standards and an assessment instrument.

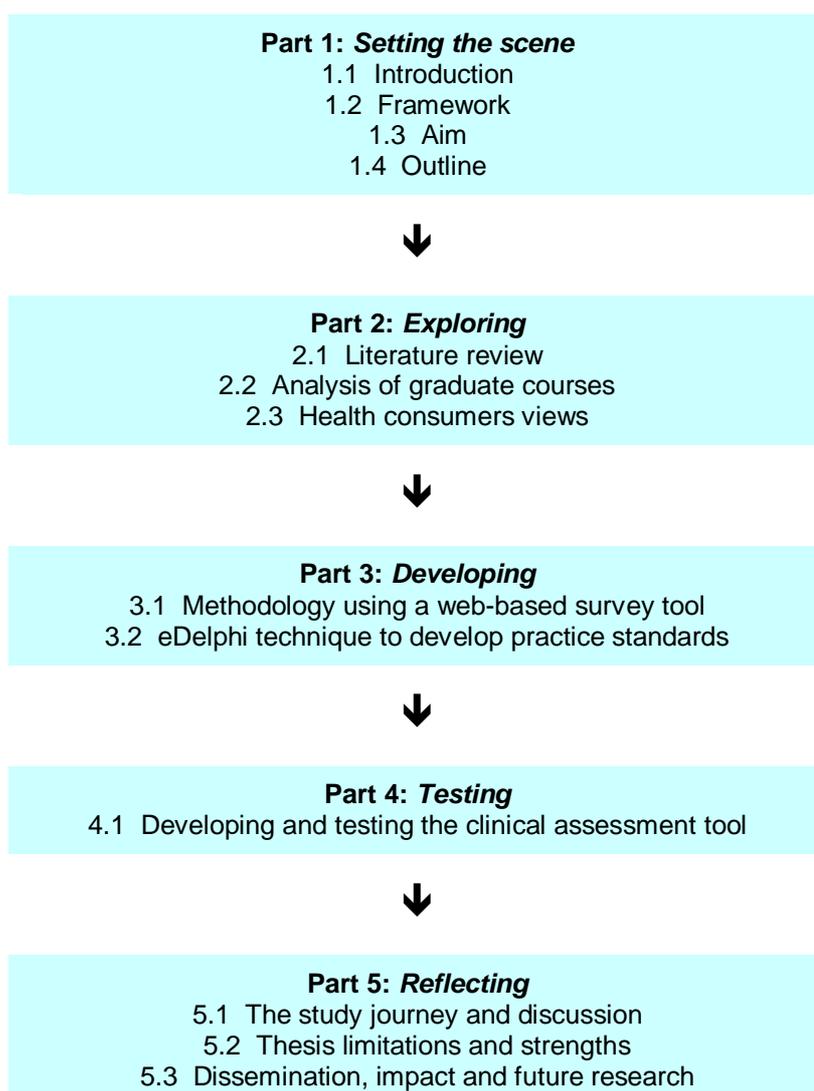
The study was guided by the following research questions:

1. What are the minimum practice standards for Australian critical care nurses on completion of a graduate level speciality qualification?
2. At what level of graduate educational qualification are critical care nurses prepared to meet the minimum practice standards?
3. What do health consumers consider to be important outcomes for Australian critical care education program graduates?
4. Can an instrument be developed to provide a valid and reliable assessment for Australian critical care nurse education graduate practice standards?

1.4 Outline of the thesis

The research questions merited a mixed methods research design to develop the standards and test the assessment instrument. The AuSDACE study was conducted in a sequential and structured way to obtain data from a wide range of sources and be informed by key stakeholders, including health consumers (patients and families). The thesis is comprised of five parts (Figure 2).

Figure 2 Thesis structure to develop the clinical assessment tool



Part 1: **Setting the scene** introduced the study in context, established the research framework, presented the study questions and the thesis outline. Part 2: **Exploring** was labelled in this way as it comprises the articles describing and reporting the data gathering processes undertaken to inform the development of the draft practice standards. The review of the literature (2.1) explored and identified international

differences and similarities in critical care nurse staffing, education and practice standards to inform the development of draft practice standards.

A national review of graduate critical care nurse education programs (2.2) then focused on Australian graduate practice outcomes and clinical assessment methods. Data sources included course provider websites, telephone interviews with course coordinators, documentation that consisted of curricula, course and unit outlines, and clinical practice assessment tools. The deductive analytical process used to synthesise and interpret the data was based upon the Framework Approach (Pope, Ziebland, & Mays, 2000; Ritchie & Lewis, 2003; Ritchie & Spencer, 1994; Smith & Firth, 2011). Practice standards and outcomes that were core across programs were identified. To obtain health consumers input, 2.3 was a qualitative study where critical care patients and families experiences with critical care nurses were explored. Focus groups and individual interviews were conducted to obtain a national health consumers' perspective. Participants' views were identified about the role of critical care nurses and what they considered to be important for critical care nurses' specialist educational preparation. Thematic analysis was used as the methodological framework. In this way Part 2: **Exploring** provided the data to inform the subsequent parts of the thesis structure.

Part 3: **Developing** consisted of two articles (3.1, 3.2) reporting the development of graduate practice standards. The research methodological considerations for using a web-based survey tool to conduct a Delphi technique were reported in article 3.1. The eDelphi data collection, analysis and resulting practice standards were presented in article 3.2. This research was designed to obtain the views of a national panel of critical care nurses. The panel was selected so that the spectrum of stakeholder opinion could be determined, also ensuring an appropriate and diverse distribution across Australia. The eDelphi provided high quality data collection, ease and speed of survey administration, direct communication with the geographically dispersed panel and rapid collation of feedback allowing data collection to be completed in an efficient time frame.

Based on the exploring and developing work presented in Parts 2 and 3, Part 4 **Testing** contains one article (4.1) that reported the testing of the assessment instrument for critical care education graduate practice. The standards were arranged into a practical tool titled: Standard of Practice and Evaluation of Critical-care-nursing Tool (SPECT). Identifying whether the SPECT was a reliable and valid

instrument as well as an authentic assessment tool in practice, was the essential final step for the study. The article reported the face and content validity, reliability and clinical feasibility of the SPECT.

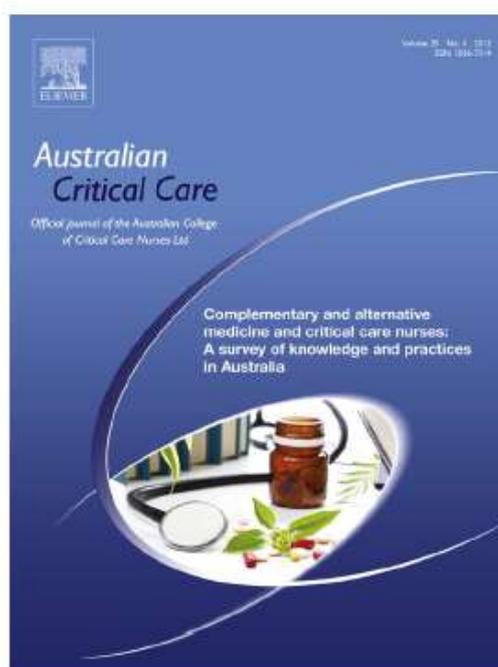
Part 5: **Reflecting** contains 5.1 General discussion where the main findings from the published papers are drawn together and what has been achieved by the research is reviewed. The study limitations and strengths are acknowledged in 5.2 and in 5.3 the study dissemination, impact and recommendations for future research are outlined. Part 6 contains appendices including the full bibliography.

Part 2: Exploring

2.1 Literature review

Gill, F. J., Leslie, G. D., Grech, C., & Latour, J. M. (2012). A review of critical care nursing staffing, education and practice standards. *Australian Critical Care*, 25(4), 224-237. <http://dx.doi.org/10.1016/j.aucc.2011.12.056>

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RESEARCH PAPER



A review of critical care nursing staffing, education and practice standards

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KEYWORDS

Critical care;
Qualifications;
Staffing ratios;
Education: Standards

Summary The aim of this paper is to review the differences and similarities in critical care nursing staffing, education and practice standards in the US, Canada, UK, New Zealand and Australia.

Search methods: A university library discovery catalogue, Science Direct, Scopus databases and professional websites were searched. Key terms used included, critical care, specialist, standards, competency, practice, scope, workforce, staffing, ratios, qualifications, adverse events, and patient outcomes. The search was

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limited to articles that referred to critical care environments including paediatric and neonatal settings.

Results: The database and hand search identified 40 relevant articles. Website searching resulted in a further 36 documents. A diversity of critical care nursing contexts and a lack of comparable workforce data made it difficult to quantify differences and similarities between countries. There is a general consensus about the importance of optimum staffing by registered nurses with a proportion of those holding relevant post-registration qualifications although there is no consistency in defining the educational preparation for a 'qualified' critical care nurse. Critical care nursing standards for the US, Canada, UK and New Zealand were predominantly developed by expert panels while the Australian standards were developed with a multi-methods study including observations of practice. All five standards documents were built upon national entry-to-practice nurse standards and contained similar constructs, although there was no construct common to all of the standards.

Conclusion: There is a lack of evidence to support nursing staffing with post registration specialty qualifications. Existing standards are predominantly opinion based rather than supported by research. The expected standards for nursing practice are fundamentally similar.

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Introduction

There is no universal agreed definition of what comprises the environment of critical care (CC) nursing practice, however it is generally accepted that CC is an encompassing term that applies to settings where patients with life threatening conditions or illness are nursed. These include adult and paediatric intensive care units (ICU), high dependency units (HDU) and coronary care units (CCU). CC and intensive care are terms that are used interchangeably.^{1,2} For the purpose of this paper specific areas or CC subsets are identified as reported in the source literature.

Critical care nursing is one of the largest nursing specialties, having been established more than half a century ago in countries like the United States (US), Europe and Australia^{3,4} to support technological advances in the management of patients experiencing life threatening illness. Since its inception as a specialty, practice standards have been developed in several countries to articulate and guide the practice and educational preparation of CC nurses.⁵⁻⁸ These standards have been developed by professional nursing organisations to reflect national and international criteria that nurses working in this field are expected to meet.

While data from professional organisations including the World Federation of Critical Care Nurses⁹ (WFCCN) and the American Association of Critical Care Nurses⁸ (AACN) indicate CC nurses comprise a substantial number of the workforce delivering acute hospital services, the context in which these nurses practice and the degree of similarity or differences in educational preparation

across countries are poorly understood. These factors impact on interpretation of similarities or differences in practice standards internationally.

A review was undertaken to compare Australian CC nurse staffing, education and practice standards with the US, Canada, the United Kingdom (UK) and New Zealand. The broader European perspective is also considered in some sections where it is relevant to UK CC nursing. This paper examines the literature to consider the differences and similarities in CC nurse staffing, ratios, qualifications, standards for minimum numbers of CC qualified nurses, post-registration CC nursing education and standards of practice.

Methods

Multiple and comprehensive literature search strategies were applied to generate this review. This included electronic search methods based on a key word search that encompassed a number of digital repositories combined with searching of professional websites. This was undertaken as relevant documents in addition to those published in scientific journals existed in the "grey" literature.

Initial search

An initial literature search was conducted using a university library discovery catalogue advanced search and the results refined using both Science Direct and Scopus databases. A 'discovery' catalogue provides sophisticated search functionality across a library's multiple collections of

print, audio-visual, archival material and electronic resources as well as searching relevant online journal articles and e-books. The capabilities of the discovery catalogue filter facilitated the searching process and enabled articles to be retrieved in order of relevance. This search strategy provides increased capabilities over single search engines such as Medline and Embase.^{10,11}

The following key terms were used individually and in combination: nursing, critical care, specialist, standards, competency, practice, scope, workforce, staffing, ratios, qualifications, adverse events, patient outcomes. No date limiter was used so as to capture all relevant articles. The search was limited to articles in the English language only referring to CC or intensive care unit (ICU) environments in the US, Canada, Europe and the UK, New Zealand and Australia. Countries identified were on the basis of shared similarities with Australian CC environments and the context of CC nursing practice.

The search embraced CC across the lifespan and thus included paediatric intensive care and neonatal intensive care. Articles related to advanced practice or nurse practitioner roles were excluded as the review was limited to the competent level clinician⁶ as defined by Benner's competent level of nursing practice,¹² rather than expert, consultant or extended roles.

Secondary searches

Following this initial search, a hand search of relevant journals and article reference lists was conducted. The web sites of the World Health Organisation (WHO), country government and national nursing and CC nursing organisations were also reviewed. Many key documents had not been published in scientific journals, therefore contact was made with representatives of CC nursing organisations to trace the most recent information and to confirm accessed documents were the official versions.

Results

Fig. 1 shows that the literature search initially resulted in a total of 3287 articles being retrieved. Thirty nine publications met the inclusion criteria.^{13–52} Hand searching resulted in one further document.⁵³ The website search and personal communication resulted in an additional 36 reference sources and documents retrieved from 21 websites comprising; position statements,

standards, guidelines, reports and a course curriculum as listed in Table 1.^{5,7–9,54–82}

Of 76 reference sources cited for this review, 36 articles or documents covered nursing staffing and qualifications, 21 articles or documents covered post-registration CC nurse education, 13 articles or documents covered practice standards and six websites were cited. Of the reference sources cited, 30 originated from the US or Canada, 22 from Europe or the UK and 20 from Australia and or New Zealand.

Findings and discussion

Similarities and diversities in CC nursing staffing

The US health system is the most expensive in the world⁸¹ with CC nurses making up 37% of nurses working in hospital settings.⁸³ When the intensive care provision in the UK and the US was compared by the average number of ICU beds; the US had 24 ICU beds compared to the UK with 4.5 ICU beds per unit.¹³ In addition in 1992 the proportions of monies spent on intensive care was 10% of the US total health care costs compared to 1% of the UK health care costs.¹³ A more recent publication reported that CC costs represented over 13% of US health costs.¹⁴ Canada, UK, Germany, The Netherlands, Australia and New Zealand all spend considerably less on health care per person than the US⁸¹ as is reflected by less than 10% of the nursing workforce^{62,75,76} working in Canadian, Australian and New Zealand CC units. Consideration needs to be given to the overall heterogeneity of international CC nursing contexts, with significant differences between regions and countries (particularly in the US) for nurse staffing categories, staffing ratios, qualifications and CC nursing education. These factors all influence the CC environment where CC nurses practice, and also impact upon patient outcomes.^{15,17–19}

Critical care nurse staffing

Available data indicates the approximate numbers of nurses working in CC or ICU in the US is 200 000⁶¹ (ICU), Canada 18 000⁶² (CC), Europe 20 000⁸⁴ (CC), UK (members of the British Association of Critical Care Nurses) 3000,⁸⁵ New Zealand and Australia 10 000^{16,76} (ICU). Further detail is presented in Table 2. The data for Europe and the UK is limited to those CC nurses who are members of professional organisations and therefore is likely to under-represent a true picture of the CC nursing workforce in these regions.

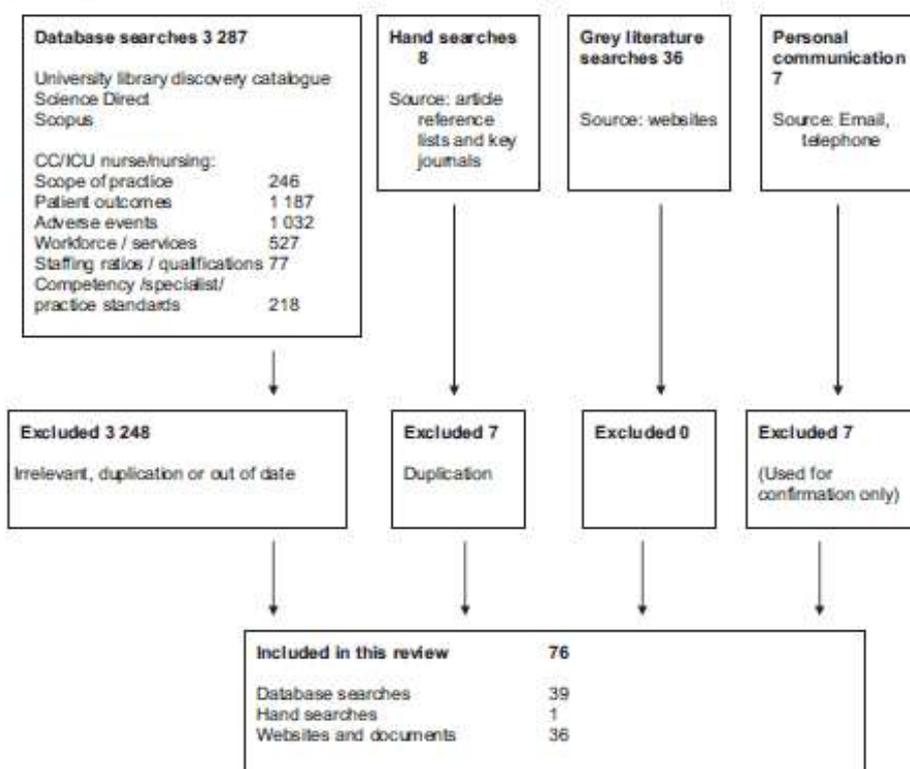


Figure 1 Literature search results.

Nurse to patient ratios

Acceptable nurse patient staffing ratios in CC settings has been the subject of considerable debate and research.^{18,20–28} In ICUs in particular ratios of one RN to one patient have been considered ideal but an economically restrictive staffing model. However, it has been demonstrated both in general and CC hospital environments that optimum RN staffing ratios actually reduce costs and importantly, improve patient outcomes.^{20–23,25–28,30,31,34,38} By way of illustration, a study by Marcin and colleagues²⁷ in a paediatric ICU found unplanned extubations were four times more likely to occur with a one RN to two patients staffing ratio than a one RN to one patient model. In an adult surgical intensive care setting (SICU), Fridkin et al.⁴⁰ found that increased nosocomial blood stream (central venous catheter) infections were associated with an increased patient to nurse ratio from 1.18 to 1.4. The authors concluded that the patient to nurse ratio was an independent risk factor for

central venous catheter blood stream infections in the SICU.

Although the Canadian Association of Critical Care Nurses (CACCN) website indicates that guidelines for nurse to patient ratios in CC are currently being developed,⁸⁶ a comparative review by Rose et al.⁴³ suggested that the usual nurse to patient ratio for ventilated patients in Canada was 1 RN to 2 patients although this may vary depending on level of patient acuity. This staffing ratio may be partly accounted for by the presence of respiratory therapists in Canadian and US CC settings but who are not part of the Australian CC workforce. In the US, patient acuity, the higher proportion of second tier nurses (who require supervision) as well as the role of the respiratory therapist, all impact on the staffing model in place. In an effort to develop a consistent approach to staffing ratios the AACN Certification Corporation developed the Synergy model of matching eight patient characteristics to eight nurse characteristics.⁴¹ This model included optimal staffing ratios to match patient

Author's personal copy

Table 1 Documents located by searching websites.

Source	Document
World Federation of Critical Care Nurses	Position statement on the provision of critical care nursing education — Declaration of Madrid; 2005 [cited 2011 February 28]. Available from: http://en.wfccn.org/
World Health Organisation (WHO) regional office for Europe	Nurses and Midwives: A Force for Health. A WHO European Strategy for Continuing Education for Nurses and Midwives. Copenhagen, Denmark: World Health Organisation; 2003 [cited 2011, June 28]. Available from http://www.euro.who.int/ The world health report 2006: working together for health. Geneva, Switzerland: WHO Press, World Health Organisation; 2006 [cited 2011, June 28]. Available from: http://www.who.int/ Survey on the situation of nursing and midwifery in the Member States of the European Region of the World Health Organisation 2009. Copenhagen, Denmark: Publications WHO Regional Office for Europe; 2010 [cited 2011, March 1]. Available from: http://www.euro.who.int/ WHO Europe CC nursing curriculum. WHO Regional Office for Europe, Copenhagen, Denmark; 2003 [cited 2011 June 15]. Available from: http://www.euro.who.int/
American Nurses Association	Nursing: scope and standards of practice. Washington, DC: American Nurses Association; 2004 [cited 2011 June 15]. Available from: http://www.nursesbooks.org/ Code of ethics with interpretative statements. [cited 2011, June 15]. Available from: http://www.nursingworld.org/
American Association of Critical Care Nurses	AACN Scope and standards for acute and critical care nursing practice. Aliso Viejo, CA: American Association of Critical Care Nurses; 2008 [cited 2011 March 1]. Available from: http://www.aacn.org/
Commonwealth Fund	Davis K, Schoen C, Stremkis K. Mirror, mirror on the wall: How the Performance of the U.S. Health Care System Compares Internationally 2010 Update. Washington, DC: Commonwealth Fund; 2010 [cited 2011, June 23]. Available from: http://www.commonwealthfund.org/
Canadian Nurses Association	Number of Valid CNA Certifications by Specialty/Area of Nursing Practice and Province/Territory. Canadian Nurses Association; 2010 [cited 2011 June 15]. Available from: http://www.cna-aaic.ca/CNA/ 2012 Certification by exam How to write the CNA certification exam General application guide for certification by exam. Canadian Nurses Association; 2011 [cited 2011 June 15]. Available from: http://www.cna-aaic.ca/CNA/ Exam Blueprint and Specialty Competencies. Canadian Nurses Association; 2010 [cited 2011 June 15]. Available from: http://www.cna-aaic.ca/CNA/ Workforce profiles of Registered Nurses in Canada. Canadian Nurses Association; 2008 [cited 2011 June 15]. Available from: http://www.cna-aaic.ca
Canadian Association of Critical Care Nurses	Standards for critical care nursing practice. Ontario, Canada: The Canadian Association of Critical Care Nurses; 2004 [cited 2011 March 3]. Available from: http://www.caccn.ca/ Standards for critical care nursing practice. London, Ontario: Canadian Association of Critical Care Nurses; 2009 [cited 2011, March 1]. Available from: http://www.caccn.ca/

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Table 1 (Continued)

Source	Document
College of Nurses of Ontario	Professional Standards. Toronto, Ontario: College of Nurses of Ontario; 2002 [cited 2011, March 20]. Available from: www.cno.org/
Nursing Council of New Zealand	Competencies for registered nurses. Wellington, New Zealand: Nursing Council of New Zealand; 2007 [cited 2011 June 15]. Available from: http://www.nursingcouncil.org.nz/
New Zealand Nurses Organisation CC Nurses Section	Philosophy and standards for nursing practice in critical care. Wellington, New Zealand: New Zealand Nurses' Organisation; 2002 [cited 2011 June 2]. Available from: http://www.nzno.org.nz/ Minimum guidelines for intensive care nurse staffing in New Zealand. Wellington, New Zealand: New Zealand Nurses' Organisation; 2005 [cited 2011, March 1]. Available from: http://www.nzno.org.nz/ New Zealand standards for critical care nursing education. Wellington, New Zealand: New Zealand Nurses' Organisation; 2010 [cited 2011 March 3]. Available from: http://www.nzno.org.nz/
Nursing and Midwifery Board of Australia	National competency standards for the registered nurse. Dickson, ACT: Australian Nursing & Midwifery Council; 2006 [cited 2011 March 1]. Available from: http://www.nursingmidwiferyboard.gov.au/
Australian College of Critical Care Nurses	Position statement on intensive care nurse staffing [Internet]. 2003 [cited 2011 March 2]. Available from: www.acccn.com.au/ Position statement on the provision of critical care nursing education. 2006 [cited 2011 March 2]. Available from: www.acccn.com.au/
College of Intensive Care Medicine of Australia and New Zealand	Minimum standards for intensive care units. 2010 [cited 2011 March 28]. Available from: http://www.cicm.org.au/
Australian Council on Healthcare Standards	Intensive care clinical indicators users manual. 2011 [cited 2011 March 1]. Available from: http://www.achs.org.au/
Australian Health Workforce Advisory Committee	The critical care nurse workforce in Australia 2001–2011. 2002 [cited 2011 March 1]. Available from: http://www.ahwo.gov.au/
Australian Institute on Health and Wealthfare	Nursing and midwifery labour-force 2008. 2010 [cited 2011 March 1]. Available from: http://www.aihw.gov.au/
The Intensive Care Society	Standards for intensive care units. The Intensive Care Society; 2007 [cited 2011 March 2]. Available from: http://www.ics.ac.uk/
European federation of Critical Care Nursing associations	Position Statement on workforce requirements within European CC nursing. European federation of Critical Care Nursing associations; 2007 [cited 2011 March 1]. Available from: http://www.efccna.org/

acuity.³⁷ Following the AACN approach, a number of US states legislated that hospitals develop staffing plans for CC⁵² including classification of the type of patients requiring one to one staffing ratio.⁴⁴

Australia, New Zealand, Europe and UK have all made recommendations that "critically ill patients" (in this instance meaning critically

unstable and highly complex patients) require a staffing ratio of at least one RN to one patient.^{67,71,73,74,77,79,87} It remains unknown if such recommendations are always translated into practice, particularly in a climate of nursing workforce shortage. Plowright's commentary on Numata et al.'s meta-analysis of CC nurse staffing

Table 2 Numbers of nurses recorded as working in CC/ICU or members of CC nursing organisations.

Country	Year of data collection	Workforce or organisation	Number of nurses	Data source
US	Not recorded	American Association Critical Care Nurses members	80 000	American Association of Critical Care Nurses ⁶³
US	Not recorded	Nurses working in ICUs	200 000	American Association of Critical Care Nurses and AACN Certification Corporation. Safeguarding the patient and the profession: the value of critical care nurse certification ⁶¹
Canada	2008	Nurses working in CC	18 000	Canadian Nurses Association. Workforce profiles of Registered Nurses in Canada ⁶²
Europe	Not recorded	European federation of Critical Care Nursing associations members	Approximately 20 000	European federation of Critical Care Nursing associations ⁶⁴
UK	Not recorded	British Association Critical Care Nurses members	3000	British Association of Critical Care Nurses ⁶⁵
Australia	2008	Nurses working in CC	42 000	Australian Institute of Health and Welfare. Nursing and midwifery labourforce ⁷⁶
Australia and New Zealand	2008 2006	Nurses working in ICUs	10 000	Australian Institute of Health and Welfare. Nursing and midwifery labourforce ⁷⁶ Martin J, Hart G, Hicks P. A unique snapshot of intensive care resources in Australia and New Zealand ¹⁶
Australia	Not recorded	Australian College of Critical Care Nurses members	2200	Australian College of Critical Care Nurses ⁶⁹

levels and mortality²³ indicated that staffing ratios in UK ICUs could be one RN to two or three critically ill patients.²⁴

Nurse registration qualifications

A nurse can be categorised as either a registered nurse (RN) with a university level bachelor degree, an RN with a hospital-based or college diploma, or a second-tier nurse, i.e. an enrolled nurse (EN)/licensed practical nurse (LPN). LPNs have an established role in the US and Canadian CC settings⁴³ with LPNs and diploma prepared RNs making up almost 50% of AACN members.⁸³ Less

than 40% of RNs in Canada are reported to hold a bachelor degree.⁶²

In 2010, survey responses from 33 European countries indicated that more than 50% of nursing programs were at degree level,⁵⁸ reflecting the recent and continuing shift to higher education for European RN preparation. In Australia direct patient care in CC settings is delivered largely by RNs educated at degree level, with second tier ENs primarily employed in less intensive acute care areas. This might be explained by a recent Australian pilot study exploring the use of ENs in a partnership model of care in ICU which reported that the additional resources and support required

to maintain them in these complex settings proved to be unsustainable.⁴⁵ The findings of this study suggested that ENs do not have the knowledge and skills required to deliver comprehensive patient care that RNs provide in this setting.

Nurse post-registration qualifications

The educational preparation of nurses to provide optimal care in CC settings is likely to be a factor in improving patient outcomes. However, the majority of published papers that examined the impact of nursing skill mix on patient outcomes referred to the proportion of RNs to second tier nurses and did not compare with, or measure, the impact of RNs with post-registration CC qualifications.^{18,23,30,34,46,48,50}

In 1999, the Australian College of Critical Care Nurses (ACCCN) developed a position statement on postgraduate CC nursing education.⁷² These principles were adopted by the European federation of Critical Care Nursing associations (EfCCNa),⁸⁸ the WFCN⁵⁴ and the New Zealand Nurses' Organisation Critical Care Nurses Section.^{68,88} According to the Australian Health Workforce Committee, a "qualified CC nurse" refers to a RN with a post-graduate qualification in CC nursing.⁷⁵

Internationally there is diversity among the nature of courses and the proportion of CC nurses who hold a recognised qualification. There is evidence that the level of staff experience impacts on patient outcomes,^{15,17,51} however only one study was identified that demonstrated staffing with RNs holding specialist qualifications improved patient outcomes and this was drawn from the neonatal intensive care literature.¹⁹ Survival for very low birth weight or preterm infants was related to the proportion of nurses with neonatal qualifications. The recommended specialist nurse provision ratio per shift was calculated and this equated to approximately 50% of the staff caring for intensive care or high dependency babies. A value of less than one indicated that the specialist staffing level was below the recommended ratio. The UK study conducted in 54 neonatal ICUs found that the median specialist nurse provision ratio was 1.3 (mean 1.42 SD ± 0.78). There was no difference in risk-adjusted infant mortality when the specialist nurse provision ratio was less than 1.0 compared to a ratio between 1.0 and 1.2. The odds of infant mortality decreased by 48% when the specialist nurse provision ratio was increased from less than 1.0 to more than or equal to 1.3.¹⁹ Although outside the adult CC context, this study suggested that the level and expertise of specialist RNs impact upon and improve outcome.

Standards for minimum numbers/percentage of qualified CC nurses

In the UK, it was recognised as early as the 1970s that appropriate ICU staffing models not only took into consideration sufficient RN workforce numbers but the post-registration education RNs required to competently practice in these settings.⁵³ This was endorsed by the UK Intensive Care Society⁷⁷ who recommended that at least 25% of nurses should have an intensive care qualification to work in this setting. In 2003 the Royal College of Nursing released a position paper⁴⁷ indicating that the level of staffing and skill-mix in UK ICUs should be determined by patient need and all but the lower grades of ICU RNs should hold a CC post-registration qualification. The recommendation from the EfCCNa⁸⁷ was less prescriptive, and instead called for an "adequate supply" of qualified CC nurses.

In the US and Canada there are no recommendations specifying a minimum percentage of qualified to 'unqualified' CC nurses. However a previous edition of the Canadian standards for CC nursing practice included a statement that health facilities provide 'qualified personnel' with a minimum of a degree and post-basic preparation or experience in CC to staff these settings.⁶⁶ Notably, this implied that 'experience' alone was considered equivalent to a CC post-registration qualification. The current edition of the Canadian Standards provides a succinct document outlining CC nursing practice standards only, with no reference to staffing standards.⁷ Australian and New Zealand CC workforce standards recommend that at least 50%, and preferably 75%, of nurses working in an ICU hold a CC post-registration nursing qualification.^{71,73,74}

Actual numbers of qualified CC nurses

There is limited data available to accurately estimate the CC nursing workforce holding a post-registration CC qualification. In the US there are reported to be more than 40 000 adult, neonatal and paediatric CC certified nurses⁸³ which, given that the AACN claims to represent more than 500 000 nurses caring for acutely and critically ill patients, represents less than ten per cent.⁸³ In Canada there were 1300 adult and paediatric CC certified RNs in 2010.⁶³ In Europe, UK and New Zealand data around the number of nurses holding a post-registration CC qualification is not routinely collected currently and therefore the proportion of qualified CC nurses unknown. In 2001, an Australian survey reported that Australian ICUs were staffed with between 55% and 78% of nurses with CC qualifications.³⁵ Given that this data is more

than 10 years old it is unlikely to reflect the current workforce.

Similarities and diversities in post-registration education leading to a critical care nursing 'qualification'

The W FCCN position statement on the provision of CC nursing education recommended that CC nursing organisations establish standards to be used as a framework for both CC course curriculum development and assessment of clinical practice.⁵⁴ Despite this, the nature of post-registration education remains varied. In the US nurses are required to work in direct patient care in a CC setting for 1750h over two years to be eligible to take the CCRN certification examination.⁶¹ In Canada, specialty education is a college or hospital based short course and working in a CC setting may not be mandatory. Courses are reported to reflect the CACCN Standards of practice^{7,43} and in Ontario, a standardised core competencies document for nurses working in adult ICU was reported as being developed.²⁹ The Canadian Nurses Association (CNA) administers the CC certification examination. This national credentialing examination is based on specialty competencies each developed by a national expert panel⁶⁴ and eligibility criteria includes a minimum of 3900h verified experience in the past five years, or a nursing degree or specialty post-basic course (of 300h duration) with a minimum of 1950h verified experience.⁶⁵ This again suggests that in Canada, experience is considered equivalent to a CC post-registration qualification.

In 1990 the duration of European CC courses ranged from a five day orientation to a two year structured education program.⁴⁴ In an attempt to standardise CC nurse education, the WHO – Europe published a CC nursing curriculum⁵⁵ that defined a qualified CC nurse as someone who had successfully completed a post-graduate qualification in CC (or intensive care) nursing. The duration of the course was 40 weeks delivered at a university or equivalent. Information about the uptake of the curriculum is not known and there remains variation in the provision of courses throughout Europe ranging from none to a curriculum established and regulated by a national body such as in The Netherlands.⁸⁰ In the UK, CC courses are no longer regulated and are undertaken through a university at degree or diploma level. There was work undertaken towards developing core competencies for CC nursing clinical post-registration awards, however, the diverse expectations by key stakeholders was reported as a barrier to the competencies

development.³² A number of UK based courses have used the competencies, although detailed information about the uptake of the competencies is not known. The Paediatric Intensive Care Society's Standards for the Care of Critically Ill Children include recommendations for a nationally consistent PIC nursing education program.⁷⁸ It is also not known about the uptake of these recommendations.

In Australia and New Zealand the majority of educational programs to prepare qualified specialist nurses, including CC nurses, are located at the university level. The qualification may be awarded at a graduate certificate, diploma or masters level with most programs requiring RNs to be concurrently working in an approved CC setting.³⁶ Despite the comparatively small population bases in Australia and New Zealand and that professional organisations in these countries released recommendations^{68,72} about curricula structure and clinical assessment, the delivery and outcomes of CC nursing programs remain varied.^{36,42}

Standards of practice for Critical Care Nurses

The practice of CC nurses and curriculum development for post-registration CC courses are primarily guided by standards of practice. These practice standards are used to identify graduate outcomes for the development of the competent level CC nurse. In 1996, Australia led the way in developing standards using empirical mixed methods research approaches to identify the minimum expected standards for the specialist CC nurse.⁶ In the US, Canada, UK and New Zealand, practice standards were developed predominantly by expert groups or panels.^{4,5,7,8}

United States

The AACN first developed Standards of Care for the Acute and Critical Care Nurse in 1978⁸³ with the current 2008 standards⁵ cited as building on the American Nurses Association's (ANA) RN scope and standards of practice⁶⁰ to delineate expectations in the CC environment. The standards apply to the care provided by both the acute and CC nurse. Developed by an expert panel, the six standards of care are intended to be used in conjunction with the nine standards of professional performance covering the scope of practice addressing the role and boundaries of practice for acute and CC nurses. The measurement criteria describe how each standard can be demonstrated. Standard five: 'ethics'

is detailed as also guided by the ANA code of ethics and AACN ethic of care.^{5,83}

Canada

The CACCN first developed Standards for Critical Care Nursing Practice in 1992 and published the fourth edition in 2009.⁷ The revision process entailed review by an expert panel with feedback from the organisation membership. RNs remain accountable to the regulatory authority's entry to practice standards for nurses.⁸² The third edition included standards for the CC unit environment as well as detailed nursing process outcome standards,⁶⁶ whereas the fourth edition now describes seven broad practice standards each having between four to eight criteria of how the standard is demonstrated.⁷

Europe and UK

The EfCCNa has not developed CC nursing standards for practice and there are no known regional or local standards of CC nursing practice. There are also no national practice standards for UK CC nursing although a competency framework was developed by the CC education group of the London Standing Conference to develop consistency for CC education and practice across the London region.⁴ Three key roles of the competent nurse were identified and the competency framework was interpreted into four competency statements.⁴ A national project also produced competencies for UK nurses on completion of a number of post-registration CC nursing courses³³ but it is unknown as to what extent they have been adopted. Although similarities exist between the 'London' competencies and the national CC competencies it was reported that there is no significant overlap.⁴

New Zealand

The Critical Care Nurses' Section of the New Zealand Nursing Organisation developed the Philosophy and Standards for Nursing Practice in Critical Care in 1996 and a working party revised the standards in 2002 after seeking consultation from its membership.⁸ The standards, formulated around and retaining the structure of the Nursing Council of New Zealand competencies for RNs,⁶⁹ were adapted to reflect the CC nursing context and intended to be applied in ICU, HDU and CCU. The standards were guided by the respective 1997 and 2000 editions of Nursing Council staffing standards^{67,73} with the five standards comprising clinical, education, management and where relevant, research components. Each standard contains between sixteen to twenty five elements and

Standard 5 includes a determination of the one to one CC nurse to patient ratio.⁸

Australia

The ACCCN (formerly the Confederation of Australian Critical Care Nurses) first published Standards for Nursing Care of Critically Ill Patients in 1985.⁶ These standards were the result of a series of CC nurses' workshops held nationally. Employing a competency based approach in the early 1990s a mixed methodology of practice observations, documentary analysis and interviews³⁹ resulted in the Competency Standards for Specialist Critical Care Nurses being adopted by the professional body and published in 1996.⁶ The research project involved data collection across a broad range of CC practice areas including neonatal and paediatric intensive care, resulting in the development of generic CC standards. A Delphi technique (expert panel of CC nurses) was then used to undertake a revision for the 2002 standards.⁶ The current revised edition comprises six domains that include twenty standards with each standard containing between one and six elements and examples of performance criteria. The national competencies for RN entry level practice were used as a framework⁷⁰ implying that the ACCCN standards reflect practice above entry level. ACCCN reports that the standards are currently being updated.⁸⁹

Standards of practice

A comparison of constructs used to develop practice standards from the US, Canada, New Zealand, Australia and for the UK, the London competencies, was undertaken. All of the standards were built upon, and extended from, their respective national RN entry-to-practice standards. As shown in Fig. 2, there is similarity across the CC standards with common constructs identified across four of the five documents; i.e. specialist knowledge and advanced skills (US, Canada, UK, Australia), promoting patient comfort and well being, assessment and management of care, risk management, safety and patient/family advocacy, communication, collaboration and resource utilisation (US, Canada, New Zealand, Australia). The common constructs identified in three of the five standards were; patient/family partnership and dignity, recognising own scope of practice and reflection, professional development (US, New Zealand, and Australia), planning of care (US, UK and Australia), leadership and evidence based practice (US, Canada, and Australia). Common in two standards were ethical decision making (US and Australia) and practice accountability (New Zealand and Australia).

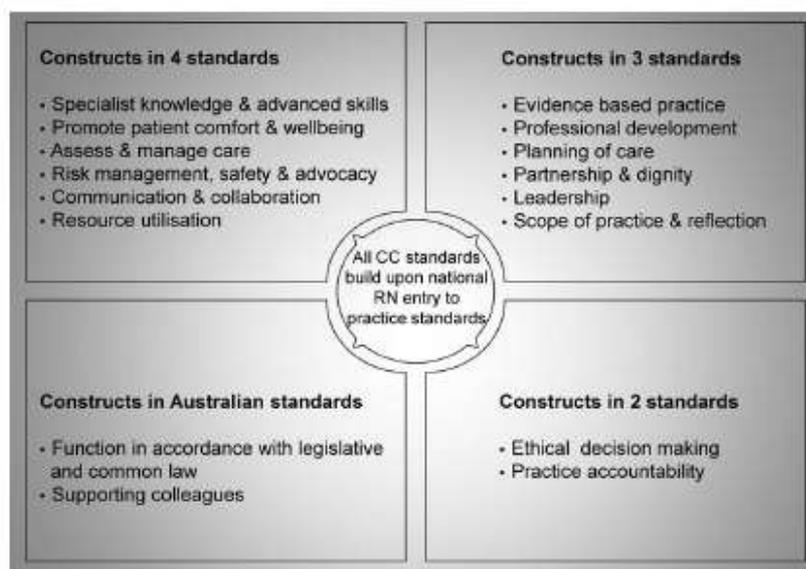


Figure 2 The constructs common to one, two, three or four of the five CC nursing practice standards. Note there were no constructs that were identified in all five standards.

In only one of the standards (Australia), were the constructs of functioning in accordance with legislative and common law and providing support to colleagues. There were no constructs that were identified in all five standards.

Four of the five CC standards have predominantly resulted from work undertaken by national panels of experts with only the Australian standards the result of a large research study that included observation of CC nurse clinical practice. Despite diversity in CC contexts across countries the CC standards contain similar constructs. The five standards contain varying amounts of specific detail and it was interesting to note that there was no construct found to be common to all.

There were two constructs that featured only in the Australian standards: functioning in accordance with legislative and common law and providing support to colleagues. Although entry level RNs are required to function in accordance with legislative and common law, the inclusion in the Australian CC standards was justified by the researchers because specialist RNs are expected to function at a higher level and in different contexts. This means that the same competency appears in both CC and entry-to-practice levels but the elements and performance criteria are different.³⁹ For the other CC standards it was perhaps considered sufficient

premise that they build upon entry-to-practice level standards where this construct is explicit. Creating a supportive environment for colleagues was the other construct identified only in the Australian standards. This was not addressed in the US, UK or New Zealand standards, while in the Canadian standards reference was made to acknowledging and valuing the contribution of health care providers. The specialist CC nurse role in caring for the wellbeing of staff or overcoming low morale, conflict and challenging patient care situations⁶ would appear to be an important aspect of practice, at least for the Australian context.

Limitations

While substantial information was obtained from grey literature (websites and reports) this review was not exhaustive and some information may have been missed. The review was also limited to five Western countries and regions and therefore may not capture trends in other areas of the world. In addition, it was not possible to make direct comparisons from all sources due to data being reported in different formats or not available. For example the workforce numbers for CC or ICU RNs, and the number of RNs with post

registration specialty qualifications is not consistently reported.

Conclusion

There is considerable diversity in CC nurse staffing, ratios, qualifications, standards for minimum numbers of CC qualified nurses and post-registration CC nursing education. The lack of comparable data makes it difficult to quantify differences and similarities between the regions and countries investigated in this review. There appears to be a consensus about the importance of optimum staffing by RNs with a proportion of those holding post-registration CC qualifications, although there is no consistency in defining a 'qualified' CC nurse. There is also a lack of evidence to support current CC standards for staffing by CC post-registration qualified nurses. This is a fundamental premise for staffing in Australian ICUs and yet indirect indicators have been used to support and justify the standards and staffing model. To support the standards and to make informed decisions about resource allocation there is a need to measure the impact of this staffing model on patient outcomes. This will become increasingly important in order to monitor and predict the effect of workforce shortfalls.

The standards for CC nursing practice for the US, Canada, UK, New Zealand and Australia guide both nursing practice and CC nursing education curricula. Four of the standards were developed by expert panels with the Australian standards the result of a mixed method research study. Although no construct was common to all five standards, they do contain similar constructs reflecting that despite the diversity of CC nursing contexts, the expected standards for CC nursing practice are fundamentally similar.

References

1. Fulbrook P. Critical care or intensive care? *Conn World Crit Care Nurs* 2010;7(2):107.
2. Wunsch H, Angus D, Harrison D, Collange O, Fowler R, Hoste E, et al. Variation in critical care services across North America and Western Europe. *Crit Care Med* 2008;36(10):2787–93.
3. Wiles V, Daffurn K. *There's a bird in my hand and a bear by the bed—I must be in ICU*. Melbourne, Australia: Australian College of Critical Care Nurses; 2002.
4. Bench S, Crowe D, Day T, Jones M, Wilebore S. Developing a competency framework for critical care to match patient need. *Intensive Crit Care Nurs* 2003;19(3):136–42.
5. American Association of Critical Care and Nurses. *AAACN scope and standards for acute and critical care nursing practice*. Aliso Viejo, CA: American Association of Critical Care Nurses; 2008. Available from: <http://www.aacn.org/> [accessed 01.03.11].
6. Australian College of Critical Care and Nurses. *Competency standards for specialist critical care nurses*. 2nd ed. Perth, Western Australia: Cambridge Media; 2002.
7. Canadian Association of Critical Care Nurses. *Standards for critical care nursing practice*. London, Ontario: Canadian Association of Critical Care Nurses; 2009. Available from: <http://www.caccn.ca/> [accessed 01.03.11].
8. Critical Care Nurses' Section. *Philosophy and standards for nursing practice in critical care*. Wellington, New Zealand: New Zealand Nurses' Organisation; 2002. Available from: <http://www.nzno.org.nz/> [cited 02.06.11].
9. World Federation of Critical Care Nurses. Available from: <http://en.wfccn.org/> [accessed 15.06.11].
10. Yang S, Hofmann M. Next generation or current generation? A study of the OPACs of 260 academic libraries in the USA and Canada. *Libr HI Tech* 2011;29(2):266–300.
11. Yang S, Wagner K. Evaluating and comparing discovery tools: how close are we towards next generation catalog? *Libr HI Tech* 2010;28(4):690–709.
12. Benner P. *From novice to expert: excellence and power in clinical nursing practice*. Menlo Park: Addison Wesley; 1984.
13. Endacott R. Staffing intensive care units: a consideration of contemporary issues. *Intensive Crit Care Nurs* 1996;12(4):193–9.
14. Halpern N, Pastores S, Greenstein R. Critical care medicine in the United States 1985–2000: an analysis of bed numbers, use, and costs. *Crit Care Med* 2004;32(6):1254–9.
15. Morrison AL, Beckmann U, Durie M, Carlless R, Gillies DM. The effects of nursing staff inexperience (NSI) on the occurrence of adverse patient experiences in ICUs. *Aust Crit Care* 2001;14(3):116–21.
16. Martin J, Hart G, Hicks P. A unique snapshot of intensive care resources in Australia and New Zealand. *Anaesth Intensive Care* 2010;38(1):149–58.
17. Robert J, Fridkin SK, Blumberg HM, Betsy Anderson, White N, Ray SM, et al. The influence of the composition of the nursing staff on primary bloodstream infection rates in a surgical intensive care unit. *Infect Control Hosp Epidemiol* 2000;21(1):12–7.
18. Rothschild JM, Bates DW, Franz C, Soukup JR, Kaushal R. The costs and savings associated with prevention of adverse events by critical care nurses. *J Crit Care* 2009;24(3):471.e1–7.
19. Hamilton StC, Redshaw KE, Tamow-Mordl MEW. Nurse staffing in relation to risk-adjusted mortality in neonatal care. *Arch Dis Child Fetal Neonatal Ed* 2007;92(2):F99–103.
20. Dang D, Johantgen M, Pronovost P, Jenckes M, Bass E. Post-operative complications: does intensive care staff nursing make a difference? *Heart Lung* 2002;31(3):219–28.
21. Marclin P. Nurse staffing and unplanned extubation in the pediatric intensive care unit. *Pediatr Crit Care Med* 2005;6(3):254–7.
22. Nichter MA. Medical errors affecting the pediatric intensive care patient: incidence identification, and practical solutions. *Pediatr Clin North Am* 2008;55(3):757–77.
23. Numata Y, Schutzer M, Globerman J, Sementluk P, Balka E, FitzGerald JM. Nurse staffing levels and hospital mortality in critical care settings: literature review and meta-analysis. *J Adv Nurs* 2006;55(4):435–48.
24. Plowright C. Commentary: Numata Y, Schutzer M, et al. (2006). Nurse staffing levels and hospital mortality in critical care settings: literature review and meta-analysis. *Nurs Crit Care* 2007;12(2):105–6.

25. Provonost P, Dang D, Dorman T. Intensive care unit nurse staffing and the risk for complications after abdominal aortic surgery. *Eff Clin Pract* 2001;4:199–206.
26. Thorens J, Kaelin R, Jollet P, Chevolet J. Influence of the quality of nursing on the duration of weaning from mechanical ventilation in patients with chronic obstructive pulmonary disease. *Crit Care Med* 1995;23(11):1807–15.
27. Van den Heede K, Lesaffre E, Diya L, Vleugels A, Clarke SP, Alken LH, et al. The relationship between inpatient cardiac surgery mortality and nurse numbers and educational level: analysis of administrative data. *Int J Nurs Stud* 2009;46(6):796–803.
28. West E, Mays N, Rafferty AM, Rowan K, Sanderson C. Nursing resources and patient outcomes in intensive care: a systematic review of the literature. *Int J Nurs Stud* 2009;46(7):993–1011.
29. Hynes P. The standardization of critical care nursing education and training: strategies for advancing clinical practice in Ontario's adult ICUs. *Dynamics* 2007;18(1):23–7.
30. Kane R, Shamliyan T, Mueller C, Duval S, Wilt T. The association of registered nurse staffing levels and patient outcomes: systematic review and meta-analysis. *Med Care* 2007;45(12):1195–204.
31. Needleman J, Buerhaus P, Pankratz VS, Leibson CL, Stevens SR, Harris M. Nurse staffing and inpatient hospital mortality. *N Engl J Med* 2011;364(11):1037–45.
32. Scholes J, Endacott R. *Evaluation of the effectiveness of educational preparation for critical care nursing*. London: English National Board for Nursing, Midwifery and Health Visiting; February 2002.
33. Scholes J, Endacott R. The practice competency gap: challenges that impede the introduction of national core competencies. *Nurs Crit Care* 2003;8(2):68–77.
34. Tourangeau A, Giovannetti P, Tu J, Wood M. Nursing-related determinants of 30-day mortality for hospitalized patients. *Can J Nurs Res* 2002;33(3):71–88.
35. Williams S, Ogle KR, Leslie G. ACCCN national nursing workforce survey of intensive care units. *Aust Crit Care* 2001;14(2):50–4.
36. Aitken L, Currey J, Marshall A, Elliott D. The diversity of critical care nursing education in Australian universities. *Aust Crit Care* 2006;19(2):46–52.
37. Curley M. Patient-nurse synergy: optimizing patients' outcomes. *Am J Crit Care* 1998;7(1):64–72.
38. Duffield C, Diers D, O'Brien-Pallas L, Alsbett C, Roche M, King M, et al. Nursing staffing, nursing workload, the work environment and patient outcomes. *Appl Nurs Res*, In press.
39. Dunn SV, Lawson D, Robertson S, Underwood M, Clark R, Valentine T, et al. The development of competency standards for specialist critical care nurses. *J Adv Nurs* 2000;31(2):339–46.
40. Fridkin SK, Pear SM, Williamson TH, Galgiani JN, Jarvis WR. The role of understaffing in central venous catheter-associated bloodstream infections. *Infect Control Hosp Epidemiol* 1996;17(3):150–8.
41. Hartigan C. The synergy model in practice establishing criteria for 1:1 staffing ratios. *Crit Care Nurse* 2000;20(2):112–6.
42. Pirret A. Master's level critical care nursing education: a time for review and debate. *Intensive Crit Care Nurs* 2007;23(4):183–6.
43. Rose L, Goldsworthy S, O'Brien-Pallas L, Nelson S. Critical care nursing education and practice in Canada and Australia: a comparative review. *Int J Nurs Stud* 2008;45(7):1103–9.
44. Atkinson BL. Training nurses for intensive care. *Intensive Care Nurs* 1990;6(4):172–8.
45. Brack S, Sandford M. Partnerships in intensive care unit (ICU): a new model of nursing care delivery. *Aust Crit Care* 2011;24(2):101–9.
46. Coombs M, Lattimer V. Safety, effectiveness and costs of different models of organising care for critically ill patients: literature review. *Int J Nurs Stud* 2007;44(1):115–29.
47. Galley J, O'Riordan B. Guidance for nurse staffing in critical care. *Intensive Crit Care Nurs* 2003;19(5):257–66.
48. Hickey P, Gauvreau K, Connor J, Sporing E, Jenkins K. The relationship of nurse staffing, skill mix, and magnet® recognition to institutional volume and mortality for congenital heart surgery. *J Nurs Adm* 2010;40(5):226–32.
49. Hickey PA, Gauvreau K, Jenkins K, Fawcett J, Hayman L. Statewide and national impact of California's staffing law on pediatric cardiac surgery outcomes. *J Nurs Adm* 2011;41(5):218–25.
50. Rischbleth A. Matching nurse skill with patient acuity in the intensive care units: a risk management mandate. *J Nurs Manag* 2006;14(5):397–404.
51. Westbrook JL, Rob M, Woods A, Parry D. Errors in the administration of intravenous medications in hospital and the role of correct procedures and nurse experience. *BMJ Qual Saf* 2011;20(12):1027–34.
52. Zoinierek C, Steckel C. Negotiating safety when staffing falls short. *Crit Care Clin North Am* 2010;22(2):261–9.
53. Burn JB. Design and staffing of an intensive care unit. *Lancet* 1970;295(7655):1040–3.
54. World Federation of Critical Care Nurses. Position statement on the provision of critical care nursing education — Declaration of Madrid, Madrid; 2005. Available from: <http://www.wfccn.org/> [accessed 28.02.11].
55. World Health Organisation. *WHO Europe critical care nursing curriculum*. WHO Regional Office for Europe, Copenhagen, Denmark; 2003. Available from: <http://www.euro.who.int/> [accessed 15.06.11].
56. World Health Organisation. *Nurses and midwives: a force for health. A WHO European strategy for continuing education for nurses and midwives*. Copenhagen, Denmark: World Health Organisation; 2003. Available from: <http://www.who.int/> [accessed 28.06.11].
57. World Health Organisation. *The world health report 2006: working together for health*. Geneva, Switzerland: WHO Press, World Health Organisation; 2006. Available from: <http://www.who.int/> [accessed 28.06.11].
58. World Health Organisation. *Survey on the situation of nursing and midwifery in the member states of the European Region of the World Health Organization 2009*. Copenhagen, Denmark: Publications WHO Regional Office for Europe; 2010. Available from: <http://www.euro.who.int/> [accessed 01.03.11].
59. American Nurses Association. Code of ethics for nurses with interpretive statements. Available from: <http://www.nursingworld.org/> [accessed 15.06.11].
60. American Nurses Association. *Nursing: scope and standards of practice*. Washington, DC: American Nurses Association; 2004. Available from: <http://www.nursesbooks.org/> [accessed 15.06.11].
61. American Association of Critical Care Nurses and AACN Certification Corporation. Safeguarding the patient and the profession: the value of critical care nurse certification. *Am J Crit Care* 2003;12(2):154–64.
62. Canadian Nurses Association. *Workforce profiles of registered nurses in Canada*. Canadian Nurses Association; 2008. Available from: <http://www.cna-alc.ca/> [accessed 15.06.11].
63. Canadian Nurses Association. *Number of valid CNA certifications by specialty/area of nursing practice*

- and province/territory. Canadian Nurses Association; 2010. Available from: <http://www.cna-alc.ca/> [accessed 15.06.11].
64. Canadian Nurses Association. *Exam blueprint and specialty competencies*. Canadian Nurses Association; 2010. Available from: <http://www.cna-alc.ca/> [accessed 15.06.11].
 65. Canadian Nurses Association. *2012 certification by exam how to write the CNA certification exam general application guide for certification by exam*. Canadian Nurses Association; 2011. Available from: <http://www.cna-alc.ca/> [accessed 15.06.11].
 66. Canadian Association of Critical Care Nurses. *Standards for critical care nursing practice*. Ontario, Canada: The Canadian Association of Critical Care Nurses; 2004. Available from: <http://www.caccn.ca/> [accessed 03.03.11].
 67. Critical Care Nurses' Section. *Minimum guidelines for intensive care nurse staffing in New Zealand*. Wellington, New Zealand: New Zealand Nurses' Organisation; 2005. Available from: <http://www.nzno.org.nz/> [accessed 01.03.11].
 68. Critical Care Nurses' Section. *New Zealand standards for critical care nursing education*. Wellington, New Zealand: New Zealand Nurses' Organisation; 2010. Available from: <http://www.nzno.org.nz/> [accessed 03.03.11].
 69. Nursing Council of New Zealand. *Competencies for registered nurses*. Wellington, New Zealand: Nursing Council of New Zealand; 2007. Available from: <http://www.nursingcouncil.org.nz/> [accessed 15.06.11].
 70. Australian Nursing & Midwifery Council. *National competency standards for the registered nurse*. Dickson, ACT: Australian Nursing & Midwifery Council; 2006. Available from: <http://www.nursingmidwiferyboard.gov.au/> [accessed 01.03.11].
 71. Australian College of Critical Care Nurses. *Position statement on intensive care nurse staffing*; 2003. Available from: <http://www.accn.com.au/> [accessed 02.03.11].
 72. Australian College of Critical Care Nurses. *ACCCN position statement on the provision of critical care nurse education*; 2006. Available from: <http://www.accn.com.au/> [accessed 02.03.11].
 73. College of Intensive Care Medicine of Australia and New Zealand. *Minimum standards for intensive care units*; 2010. Available from: <http://www.cicm.org.au/> [accessed 28.03.11].
 74. Australian Council on Healthcare Standards. *Intensive care clinical indicators user manual*; 2011. Available from: <http://www.achs.org.au/> [accessed 01.03.11].
 75. Australian Health Workforce Advisory Committee. *The critical care nursing workforce in Australia 2001–2011*; 2002. Available from: <http://www.ahwo.gov.au/> [accessed 01.03.11].
 76. Australian Institute of Health and Welfare. *Nursing and midwifery labourforce 2008*; 2010. Available from: <http://www.aihw.gov.au/> [accessed 01.03.11].
 77. The Intensive Care Society. *Standards for intensive care units*. The Intensive Care Society; 2007. Available from: <http://www.ics.ac.uk/> [accessed 02.03.11].
 78. The Paediatric Intensive Care Society. *Standards for the care of critically ill children*. London: The Paediatric Intensive Care Society; 2010. Available from: <http://www.ukpics.org.uk/> [accessed 30.10.11].
 79. British Association of Critical Care Nurses. *Standards for nurse staffing in critical care*. British Association of Critical Care Nurses; 2010. Available from: <http://www.baccn.org.uk/> [accessed 01.03.11].
 80. The Netherlands Board of Hospital Education. Available from: <http://www.czo.nl/> [accessed 28.06.11].
 81. Davis K, Schoen C, Strenk K. *Mirror, mirror on the wall: how the performance of the U.S. Health Care System compares internationally 2010 update*. Washington, DC: Commonwealth Fund; 2010. Available from: <http://www.commonwealthfund.org/> [accessed 23.06.11].
 82. College of Nurses of Ontario. *Professional standards*. Toronto, Ontario: College of Nurses of Ontario; 2002. Available from: <http://www.cno.org/> [accessed 20.03.11].
 83. American Association of Critical Care Nurses. Available from: <http://www.aacn.org/> [accessed 15.06.11].
 84. European federation of Critical Care Nursing Associations. Available from: <http://www.efccna.org/> [accessed 15.06.11].
 85. British Association of Critical Care Nurses. Available from: <http://www.baccn.org.uk/> [accessed 15.06.11].
 86. Canadian Association of Critical Care Nurses. Available from: <http://www.caccn.ca/> [accessed 15.06.11].
 87. European federation of Critical Care Nursing Associations. *Position statement on workforce requirements within European critical care nursing*. European Federation of Critical Care Nursing Associations; 2007. Available from: <http://www.efccna.org/> [accessed 01.03.11].
 88. The European Federation of Critical Care Nursing Associations. *Position statement on post-registration critical care nursing education within Europe*; 2004. Available from: <http://www.efccna.org/> [accessed 15.06.11].
 89. Australian College of Critical Care Nurses. Available from: <http://www.accn.com.au/> [accessed 15.06.11].

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2.2 Analysis of graduate courses

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An analysis of Australian graduate critical care nurse education

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Intensive care;
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Summary

Background: Preparation of specialist critical care nurses in Australia is at graduate level, although there remains considerable variation in courses offered in relation to qualification, content, assessment and outcomes. As higher education providers must now comply with the Australian Qualifications Framework (AQF) a study was conducted to examine existing critical care courses and graduate practice outcomes.

Methods: Twenty-two critical care courses were reviewed. Data sources included course provider, websites, course curricula and telephone interviews with course coordinators. A framework approach, was used consisting of five key stages: preliminary immersion of raw data, conceptualising a thematic framework, indexing, charting, mapping and interpretation of data.

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Findings: Analysis revealed considerable variations in course delivery and graduate practice outcomes. Most courses used professional competency standards as a framework for course curricula and clinical assessment, with inconsistency in their translation to graduate practice outcomes. Twenty-one courses included clinical assessment at graduate certificate level with no clinical assessment conducted at master level. The expected practice outcome for fifteen courses was safe practice with graduates not expected to practice at a specialist or team leadership level. Minimum graduate practice standards were not included in three courses as an expected outcome. **Conclusion:** The AQF requires graduate nurse education to be compliant with academic outcome standards. The findings of our study indicate variations between courses and subsequent graduate practice outcomes. It is therefore timely to establish national critical care education graduate practice standards.

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Introduction

Until the early 1990s specialty education programmes for registered nurses in Australia were largely offered by healthcare facilities as vocationally based professional development courses. With the transition of undergraduate nurse preparation to the higher education sector completed by 1993 (Lusk, Russell, Rodgers, & Wilson-Barnett, 2001), the opportunity for specialty education to also be provided by universities as a graduate qualification developed momentum. This move was supported by a number of national reviews over the next two decades.

In 1997 for example, findings from the National Review of Specialist Nurse Education were released. Funded by the Federal Government Department of Employment, Education, Training and Youth Affairs, the review identified inconsistencies impacting on specialty nurse education in Australia including variations in length of courses, type of qualification gained, the balance between clinical and theory components and course entry eligibility criteria. Recommendations from the review included calling for criteria to define a specialty, the educational preparation required for entry to the specialisation, and a framework for the provision of specialty nursing education (Russell, Gething, & Convery, 1997).

Five years later the National Review of Nursing Education: Our Duty of Care (Heath, 2002) again recommended the need for national consistency in nurse education including graduate specialty preparation. The National Nursing and Nursing Education Taskforce (2006) (N3ET) was subsequently set up to implement and monitor these recommendations together with recommendations from earlier reports including 'The Critical Care Workforce in Australia 2001–2011' (Australian Health Workforce Advisory Committee, 2002). The N3ET brought together a range of stakeholders and outcomes that included a number of reports and recommendations to initiate change towards national consistency in nursing and midwifery education, regulation and practice. The national specialisation framework for nursing and midwifery resulted which established criteria for recognition of a specialty. Eighteen national specialties met these criteria, along with 10 skill domains and 50 practice strands (National Nursing and Nursing Education Taskforce N3ET, 2006).

One of the specialties identified by the N3ET Taskforce (2006), critical care nursing, had been well established in Australia since 1986 and specialty education courses already widely offered across the country since the 1970s (Gill,

Leslie, Grech, & Latour, 2012; Ogle, Bethune, Nugent, & Walker, 2002). More recently, an important driver for critical care nurse education has been professional health workforce standards (Australian College of Critical Care Nurses, 2003; Australian Council on Healthcare Standards, 2011; College of Intensive Care Medicine of Australia and New Zealand, 2010), which recommend that at least 50% of nurses working in an intensive care unit hold a critical care post registration qualification. While this recommendation has been widely accepted, there have been varying interpretations of what comprises a 'critical care qualification'.

Despite a call for greater consistency in graduate critical care courses (Australian Health Workforce Advisory Committee, 2002), and to establish consensus among stakeholders on desirable graduate outcomes (Australian College of Critical Care Nurses, 2006; Leslie, 2006), currently the graduate level to prepare qualified critical care nurses still remains unspecified. Whilst the variation in the award level, cost, content, assessment and outcomes of critical care courses may be viewed favourably by some prospective students and health services who have a wide choice of programmes to select from, the confusion surrounding graduate outcomes and lack of practical transferability of the qualification is problematic. From an analysis of the findings and recommendations arising from national taskforces and other reviews into critical care graduate nurse education it was evident that a gap existed in current knowledge of expected outcomes from nurses who completed a critical care programme.

The Australian Qualifications Framework (AQF), first introduced in 1995 and revised in 2011, sets national policy and standards for the regulation of qualifications across the education and training sector: determining the level of qualification, knowledge, skills, application of knowledge and skills and volume of learning (Australian Government ComLaw, 2012; Australian Qualifications Framework Council, 2013). The new framework has ensured that Australian qualifications can be benchmarked internationally. The framework has adopted consistent terminology including the term 'postgraduate' being replaced by 'graduate' in reference to courses that follow on from a basic degree within the tertiary education sector (Australian Qualifications Framework Council, 2013).

As higher education course providers gear up for compliance with the AQF, and regulation under the Tertiary Education Quality and Standards Agency (2011), research into the existing status of graduate nurse specialty education is timely. This paper reports a descriptive analysis of

existing critical care courses' graduate practice outcomes across both the higher education sector and non-university organisations in Australia.

Methods

Research design

A national review of Australian critical care nursing courses (including both adult and paediatric specialties) was undertaken. Data sources included course provider websites, telephone interviews with course coordinators, documentation that consisted of curricula, course and unit outlines, and clinical practice assessment tools. The study site University Research Ethics Committee (SON&M 23-2011) approved the study. Data are reported collectively in order to avoid individually distinguishing participants or institutions.

Participants

Twenty-three course providers were identified using the Australian College of Critical Care Nurses (ACCCN) database ($n=18$) along with five additional courses that were identified by the research team. Support for the study was first obtained from two key stakeholders. The ACCCN Board of Directors were approached about the study and the Board agreed that the study aims were aligned with the College's goals. At a 2011 meeting of the Australian and New Zealand Council of Deans: Nursing and Midwifery heads of university nursing departments offering critical care courses were also informed about the aims and objectives of the study. Heads of university nursing departments and course coordinators from non-university critical care courses were then individually contacted by email and or by telephone, with a request to participate in the study.

Data collection

Initially the course provider websites were reviewed and available course documents downloaded. Arrangements were made to conduct semi structured telephone interviews at convenient times with all course coordinators. The first part of the telephone interview was to clarify the course structure and sub-specialties offered and identify any partnership or collaboration with healthcare providers including pre and co-requisites for student clinical practice experience. A semi-structured interview guide based on three existing position statements on critical care nurse education (Australian College of Critical Care Nurses, 2006; The European Federation of Critical Care Nursing Associations, 2004; World Federation of Critical Care Nurses, 2005), which had previously been circulated to course coordinators, was then used to guide the questions asked for the remainder of the interview. These three position statements were almost identical and in combination resulted in four central principles and 15 recommendations (Table 1).

After obtaining participant permission, the telephone interviews were audio-recorded. Interviews were conducted between November 2011 and May 2012 (duration ranged

from 35 to 90 min). Notes were taken during each interview, and these were checked, added to and completed using multiple data sources: the audio-recording, course specific documentation and course websites. Several course coordinators provided additional documentation (not available on the course website) such as curricula, unit outlines, assessment details and clinical assessment tools.

Data analysis

The deductive analytical process used to synthesise and interpret the qualitative data was based on the Framework Approach (Pope, Ziebland, & Mays, 2000; Ritchie & Lewis, 2003; Ritchie & Spencer, 1994). This approach provided the means to manage the multiple sources of qualitative data and undertake analysis systematically. It allowed exploration of the data in depth while simultaneously maintaining an effective and transparent audit trail (Ritchie & Lewis, 2003; Smith & Firth, 2011). For this study the process consisted of systematically working through five key stages (further illustrated in Fig. 1):

Step 1: The preliminary immersion in the raw data to become familiar with the range and diversity of data, listing of ideas and main themes.

Step 2: Setting up a thematic framework from the interview guide where issues, concepts and themes were sorted, examined and referenced.

Step 3: Indexing to systematically apply the thematic framework to the textual data.

Step 4: Charting to rearrange the data into the thematic framework, building a picture of the data as a whole.

Step 5: Mapping and interpretation to find patterns, associations, weighing up the salience and dynamics of issues to provide explanations for the findings.

Findings

Of the 23 course providers identified, 22 agreed to participate in the study, consisting of 18 university courses and four non-university (hospital, health service or college) courses. As illustrated in Fig. 1, the findings revealed that graduate practice outcomes were influenced by the following nine main issues.

Course structure

The courses offered by the four non-university providers were titled as certificate, graduate certificate or post-graduate certificate. While differences in terminology existed, all of these plus 16 of the 18 university courses had an exit award point at the graduate certificate level. All 18 of the university courses were nested within or articulated with a master programme. Five of the master award programmes included the specialty in the award nomenclature. Table 2 details the critical care specialties offered, the first award exit point and the award completion points.

Table 1 Interview guide.

Central Principles

1. Do nurses with critical care knowledge and expertise play an integral part in the education of critical care students?
2. Is a multidisciplinary, educational approach utilised?
3. How do you ensure your materials are based on the most current available information and research?
4. How do you foster the notion of life-long learning? (The completion of a course should not be seen as the end of personal development)

Recommendations

1. Programme curriculum: as a minimum the critical care dimensions of the following topics should be included in programmes (Yes or no)

- Anatomy and physiology
 - Pathophysiology
 - Pharmacology
 - Hygiene and microbiology
 - Clinical assessment (including interpretation of diagnostic and laboratory results)
 - Illnesses and alterations of vital body functions
 - Plans of care and nursing interventions
 - Medical interventions and prescriptions with resulting nursing care responsibilities
 - Psychosocial aspects (including cultural and spiritual needs of patient and family)
 - Technology applications
 - Responding to clinical emergencies
 - Global critical care perspectives
 - Patient and family education
 - Multicultural issues
 - Legal and ethical issues
 - Professional nursing issues and roles in critical care, including clinical teaching strategies, Team leadership and management issues
 - Use of current research findings to deliver evidence based multidisciplinary care
 - Information technology
 - Communication and interpersonal skills
 - Caring for the carer (including dealing with stress and peer support)
 - Health promotion and safety standards
2. How do you design and deliver the curricula to provide an appropriate (50%) mix of theoretical and clinical experience?
 3. Can you describe your expected graduate clinical practice outcomes?
 4. How do you assess the competence of students? What framework/s are used?
 5. How are assessors trained?
 6. How do you provide a balance between clinically oriented content and broader generic content that enables the specialist nurse to contribute to the profession through processes such as research, practice development and leadership?
 7. Can you explain your collaboration/relationship with the health care provider?
 8. How is the provision of appropriate clinical experience to facilitate the development of clinical competence managed? Is it a collaborative responsibility between education and health care providers?
 9. Do students should have access to support and guidance from appropriately experienced staff such as clinical teachers and nurse preceptors?
 10. How are clinical teachers and educators supported in their role? Is it by both education and health care providers?
 11. Can you explain the policies and processes for recognition of prior learning and alternative entry pathways?
 12. Can you explain any initiatives or strategies to help reduce the financial burden for students?
 13. Can you explain whether you do or plan to offer your course externally/online/by distance education?
 14. Do you have ideas to address the deficit of qualified critical care nurses?
 15. Is there credit transfer within the higher education sector for nurses completing the course?

Based on: ACCCN position statement on the provision of critical care nurse education (Australian College of Critical Care Nurses, 2006), Position statement on post-registration critical care nursing education within Europe (The European Federation of Critical Care Nursing Associations, 2004), Position statement on the provision of critical care nursing education – Declaration of Madrid (World Federation of Critical Care Nurses, 2005).

Contexts for student clinical practice

Course providers offered between one and five separate critical care specialty programmes. Thirteen programmes were titled critical care. This meant that the content was pitched broadly to address the areas of intensive care,

coronary care, cardiac nursing or for some, a combination of emergency nursing, high dependency nursing and/or trauma nursing. Two critical care programmes were only offered to nurses working in intensive care settings. Two critical care programmes targeted recruitment of students from rural critical care and acute care nursing areas,

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<p>STEP 1. Initial analysis: The preliminary immersion in the raw data to become familiar with the range and diversity of data, listing of ideas and recurrent themes.</p>	<ul style="list-style-type: none"> • Completion of interview guides using the multiple data sources (websites, documents, interviews) • Thorough review of the data • Listing ideas & recurrent themes. • Highlighting key points relevant to the research aims which were to review the graduate practice outcomes for Australian critical care courses and explore the keys factors determining outcomes* 		
<p>STEP 2. Setting up a thematic framework: from interview guide issues, concepts and themes were sorted, examined and referenced.</p>	<ul style="list-style-type: none"> • 22 sub themes topics categorised into 4 main themes reflecting the different stakeholder perspectives: Course providers, Health care providers, Students, Nursing profession • Terms used that stayed close to the topics emerging from the data set 	<p>Subthemes / topics:</p> <ul style="list-style-type: none"> • Type of course • Background of students • Clinical experience required pre-course • Clinical time during course • Course outcomes: level • Course outcomes: generic versus critical care specific • Delivery of course: nurses plus others' contribution • Reviewing materials • Life long learning 	<ul style="list-style-type: none"> • Curriculum topics • Theory – clinical mix • Use of ACCCN Competency Standards • Competency assessment • Assess or training • Course provider and health care provider relationship & collaboration • Recognition of prior learning • Strategies to support students • Access to the course • Innovative ideas
<p>STEP 3. Indexing: Systematically apply the thematic framework to the textual data.</p>	<ul style="list-style-type: none"> • Development of tables to index subtheme data for each case. • Formulation of the original data in a reduced form • Avoids too much abstraction at an early stage 	<p>Indexing:</p> <ul style="list-style-type: none"> • Course Providers, specialities and award exit points • Course learning outcomes • Definitions of graduate clinical practice outcomes • Clinical practice requirements • Student clinical performance assessment 	
<p>STEP 4. Charting: Rearranging the data into the thematic framework, building a picture of the data as a whole.</p>	<ul style="list-style-type: none"> • Review of the charted data and review of each interview guide to identify any gaps that may have occurred in the transfer of data • Concentrating on one main theme at a time to make sure all data are synthesised across all of the cases* 		
<p>STEP 5. Mapping and interpretation of the data: Finding patterns, associations, weighing up the salience and dynamics of issues to provide explanations for the findings.</p>	<ul style="list-style-type: none"> • Multiple associations between graduate practice outcomes and the four main stakeholder perspectives. • Organisation into nine main issues 	<p>Main issues:</p> <ol style="list-style-type: none"> 1. Course structure 2. Contexts for student clinical practice 3. Course provider articulated graduate outcomes 4. Course expectations for graduate clinical practice 	<ol style="list-style-type: none"> 5. Course delivery and theory content 6. Student clinical practice experience 7. Student clinical practice assessment 8. Healthcare employer and critical care nursing profession

Figure 1 Framework analysis stages.

and this was reflected in the course focus. Other specific specialty programmes offered were: coronary care (six), cardiac nursing (seven), high dependency nursing (two), paediatric intensive care or critical care (five).

Course provider articulated graduate outcomes

A range of documents that described courses, course aims and or graduate learning outcomes were examined. The amount of detail varied from three sentences explaining the

course structure and overall outcomes to highly detailed accounts of course aims and objectives, learning objectives and graduate qualities. There was little consistency in the terminology used. Those courses where only broad outcomes were listed were courses where the critical care specialty programme was a component of a generic award, and ten courses listed the generic university graduate outcomes only. Eight courses identified critical care graduate outcomes. Nine of the university course documents specified the outcomes for the first award exit point, whereas the remaining courses articulated the outcomes for master

Table 2 Course providers, specialties and award exit points.

Course provider		Specialties offered	First award exit point	Award completion point
Number	Type			
1	U	IC, Cor, HD, PIC	Graduate certificate	Master (clinical)
2	U	IC, Cor, Card, HD, PIC	Graduate certificate	Master (clinical)
3	N	CC (IC/Cor), Card	Postgraduate certificate	Postgraduate certificate
4	U	IC, Card	Graduate certificate	Master (generic)
5	U	RCC (ED, Card, IC), IC, Card	Graduate certificate	Master (generic)
6	U	RCC, IC, Card	Graduate certificate	Master (specialty)
7	U	CC (IC)	Graduate certificate	Master (generic)
8	U	CC (IC)	Graduate certificate	Master (generic)
9	U	CC, RCC, PCC	Postgraduate diploma	Master (generic)
10	U	CC	Graduate certificate	Master (clinical)
11	U	IC, Card	Graduate diploma	Master (generic)
12	U	CC (IC/Cor/ED/HD)	Graduate certificate	Master (specialty)
13	N	PCC	Certificate	Certificate
14	U	IC, Card, PCC	Postgraduate certificate	Master (specialty)
15	U	CC (IC/Cor)	Graduate certificate	Master (generic)
16	U	IC	Graduate certificate	Master (generic)
17	U	CC	Graduate certificate	Master (generic)
18	U	IC	Graduate certificate	Master (specialty)
19	U	CC (IC/Card/ED) and trauma	Graduate certificate	Master (generic)
20	N	CC, IC, Cor, PIC	Graduate certificate	Graduate certificate
21	N	IC	Professional certificate	Professional certificate
22	U	CC (IC/Cor/ED)	Graduate certificate	Master (specialty)

U, university; N, non-university; CC, critical care (adult); RCC, rural critical care (adult); IC, intensive care; Cor, coronary care; Card, cardiac nursing; HD, high dependency; PIC, paediatric intensive care; PCC, paediatric critical care; ED, emergency.

level. One course distinguished between graduate certificate, diploma and master level outcomes. Five courses identified that graduate practice outcomes should reflect professional or specialty competency standards. Seven courses specified the graduate practice outcome level as 'competent', for the other courses a variety of different terms was used with the exception of one course where the graduate practice outcome level was not described at all. Table 3 lists the graduate practice outcomes level as articulated for each course.

Course coordinators anecdotally reported that students with less critical care experience than previous years were now commencing courses, which was impacting on graduate practice outcome levels. They also reported only a small minority of students continued further than the first award exit point which could be driven by industrial award course allowance payments.

Course expectations for graduate clinical practice outcomes

Given that course expectations for graduate clinical practice outcomes were not always formally or explicitly articulated within course documents, course coordinators were asked to identify their 'working' expectations for graduates' clinical practice level based on two levels of outcome, either 'safe practice' or 'team leader' which all course coordinators readily recognised and understood (see Box 1).

Box 1 Expectations for graduate clinical practice outcomes.

Safe clinical practice	Team leader
Can safely care for most critically ill patients	Acts as a resource to others
Will require support when situation is rapidly changing or care becomes more complex	Coordinates care for a group of patients Can care for the sickest patients

The expectations for practice outcome levels varied: for 15 courses the outcome level was expected to be safe, for three courses the level was expected to be team leader. One course differentiated the expected outcomes as producing a safe practitioner at the graduate certificate level and a team leader at the graduate diploma level. For two courses no practice level was determined and for one course the practice outcome was determined by the health-care employer expectations. For two courses the first award exit point was at graduate diploma level and the outcome level for both was expected to be 'safe'.

Course delivery and theory content

Some courses appeared to be structured to achieve desired graduate outcomes. Others consisted of a number of

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Table 3 Graduate practice outcomes.

Course provider	Graduate practice outcome level
1	In accordance with specialty competency standards
2	Enhance specialty knowledge and competence (description of course structure only)
3	Beginning specialist nurse
4	Enhance practice by expanding knowledge and skills
5	Leadership and specialty expertise
6	Specialise in intensive care nursing (description of course structure only)
7	Advanced practice role
8	Advanced practice nurse
9	Clinically proficient graduate
10	Beginning specialist practitioner
11	Be able to care for the critically ill
12	Competence
13	Competence
14	Competence
15	Advanced nursing practice
16	Competence
17	Safe and competent practice
18	Clinical leaders
19	Not described
20	Competence
21	Competence
22	Clinical expertise

separate units (no scaffolding of learning evident) that collectively resulted in an award. For some courses the course coordinator had a clear understanding and knowledge of the whole course and expected graduate outcomes, whilst for some courses an individual who was aware of the whole of the specialty course curriculum and critical care graduate outcomes could not be identified.

Nine courses were delivered by internal mode only, eight courses were offered in both internal and online or external modes. Of note were five courses available only online or external, and for two of these courses there were no specified graduate practice outcome. The specialty content of courses was delivered predominantly at the graduate certificate level. The more broad content applicable to generic graduate outcomes was delivered more often at graduate diploma level. Master level work consisted of students conducting a self-directed project or minor thesis.

Teaching in all courses was delivered by nurses with critical care qualifications and experience. In addition, 13 courses used a range of other critical care disciplines, primarily medical (with some allied health: pharmacy, physiotherapy, dietetics) to either input to the curricula and/or to deliver lectures. For a few courses there were arrangements with the healthcare provider to deliver the 'clinical' or practice components. For three courses there was no input from other health disciplines except that students could access appropriate clinical experts in their practice area.

All university course providers recognised prior learning by students for credit transfer (based on experience or completion of other courses such as ICU transition programmes). By taking advantage of this fast tracking students were required to enrol in the graduate diploma or master level award. Course coordinators reported that this pathway often meant that these students had less developed generic academic skills, but may have had more clinical experience than other students.

All courses appeared to cover all of the content topics (Table 1) recommended in the combined position statements on critical care education (Australian College of Critical Care Nurses, 2006; The European Federation of Critical Care Nursing Associations, 2004; World Federation of Critical Care Nurses, 2005). For one course, 'non-critical care' subjects in the graduate diploma level could be completed before the graduate certificate level if students were clinically inexperienced and therefore considered to be ill prepared to achieve the graduate certificate level outcomes for the 'clinical practice' components. A review of course materials was undertaken annually or bi-annually by most course providers as required by TEQSA (2011).

Student clinical practice experience

Across the 22 courses, there was variation in the amount of critical care clinical experience required as a pre-requisite to commencing the course, ranging from nil (12 courses) to 12 months experience (six courses); with some courses also requiring employer support before offering a place (Table 4). Healthcare employer support generally meant being aware and approving of the student undertaking the course, and could also mean agreeing to provide clinical supervision, facilitate clinical rotations and or study leave.

For 19 of the courses, a minimum number of hours per week working (or clinical supervised time) in the specialty area during the course were also specified. Two courses also required students to complete a specified number of clinical practice hours (140 and 160 h) to pass the clinical component of the course. If the student was studying part-time (e.g. undertaking the certificate over three or four semesters), the minimum amount of clinical practice required was adjusted pro rata (Table 4).

In addition to the amount of pre-course and intra-course student critical care experience, there was a wide variety in critical care experiences in the students' practice settings. For example, nine courses enrolled students who worked in metropolitan tertiary intensive care or coronary care settings (College of Intensive Care Medicine of Australia and New Zealand, 2010).

Three courses enrolled students who worked in rural and regional critical care or acute care settings. In four courses hospital employers required students to rotate to other critical care areas during the course, and for three courses the course coordinators arranged or facilitated student rotations to other (higher or lower acuity or different specialty) settings to enable a wider range of student clinical experiences.

The clinical support provided to students during the course varied ranging from no support (if there was no university – healthcare employer partnership) to dedicated course educators working alongside students. For 18 courses

Table 4 Clinical practice requirements.

Prerequisite critical care experience	Number of courses	Minimum amount of clinical practice required during course	Number of courses
Nil	13	Be employed	4
Desirable	1	0.4FTE ^a	1
3 months	1	0.5–0.6 FTE	13
6–12 months	2	0.8 FTE	3
12 months	5	1.0 FTE	1

^a 1.0 FTE, full time employment.

a model for clinical support was used where experienced clinical staff acted as resources either informally or named as student preceptors, facilitators or assessors.

Student clinical practice assessment

For 21 of the 22 courses investigated, student clinical performance was assessed in some form. For 17 courses the ACCCN Competency Standards (Australian College of Critical Care Nurses, 2002) were used as the guiding framework for clinical performance assessment. For two courses it was articulated that the Competency Standards had been modified to reflect outcomes appropriate for course graduates.

As shown in Table 5 the most commonly used models for rating clinical performance were Benner's novice to expert model (1984) and Bondy's rating scale (1983), in five courses, the rating scale had been modified. One course used a combination of both models. Another course used Tolhurst and Bonner's clinical assessment criteria (2000), consisting of a combination of ACCCN Competency Standards (2002), Bondy's scale and Benner's model. Eight courses either did not use or did not identify a model or rating scale.

Student clinical performance assessment was most commonly undertaken in the healthcare setting by clinical staff with varying amounts of collaboration, support and preparation from the course provider. Assessors were sometimes appointed as adjunct university staff or accredited by the course provider in some form. Assessor inter-rater reliability was inconsistently addressed. Direct assessment

by observation and discussion with an assessor was the most common form of student clinical performance assessment.

The nature of clinical practice assessment varied and included: written assessments, direct observation of practice, sampling of practice in core areas or detailed evidence of meeting all of the Competency Standards and associated elements. Clinical assessment could include individual skill assessment or aspects of each competency (e.g. turns on oxygen flow to 10L/min, performs a primary assessment), skills could be grouped as competencies for core business or 'entrustable professional activities' (Frank et al., 2010) such as 'provides nursing care for the mechanically ventilated patient', or the requirement could be left for the student to demonstrate achievement of the ACCCN Competency Standards. Lists of essential and desirable skills to be achieved were commonly used.

For 18 courses clinical performance assessment was confined to the graduate certificate level. Clinical assessment at the graduate diploma level was undertaken for the two university courses where the graduate diploma level was the first exit point. One course required clinical performance assessment at both graduate certificate level and graduate diploma level. No course included clinical performance assessment at master level.

Healthcare employer and the critical care nursing profession: expectations, influence and support

The healthcare employer and the critical care nursing profession both influenced graduate practice outcomes. These stakeholders drove the demand for nurses working in critical care to hold graduate qualifications, directed the course focus and content, the mode of delivery, as well as the student course entry criteria. The level of clinical support provided to students depended on the perceived value by the healthcare employer and the willingness of experienced nurses working in the clinical area to contribute to student learning. As already noted, the Australian workforce standards for nurses working in intensive care (Australian College of Critical Care Nurses, 2003; Australian Council on Healthcare Standards, 2011; College of Intensive Care Medicine of Australia and New Zealand, 2010) impacted on healthcare employers' demand for 'qualified' critical care nurses. Flexibility for students to work and/or study part-time was determined by the healthcare employer.

Table 5 Student clinical performance assessment.

Assessment	4 Benner competent (or modified) 8 Bondy supervised or independent (or modified) 9 Other framework or not specified/referenced
Competency standards	17 ACCCN or modified/adapted 2 ANMC 1 ANCI 1 No standards identified
Clinical practice assessed by	3 Course Clinical Educator (plus 1 Course Coordinator) 20 Healthcare Provider Clinical Facilitator 5 Student self assessment

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Relationships between course providers, healthcare employers and the critical care nursing profession

Most courses had input from and an ongoing relationship with healthcare employers and the critical care nursing profession. Fourteen courses were steered by some form of collaborative advisory board or operated a clinical partnership arrangement. Eleven courses had input from practicing critical care nurses as assessors, lecturers, or course coordinators. For the three courses without a collaborative arrangement or formal link with healthcare employers, the course coordinators reported that this was a weakness for their course. Collaboration with the critical care nursing profession then was reported to be reliant on individual contacts and personal relationships.

Discussion

This paper builds on Aitken, Currey, Marshall, and Elliott (2006) earlier work examining 16 university critical care courses, and provides a contemporary overview of Australian courses preparing 'qualified' critical care nurses. Analysis of 22 courses revealed considerable variations exist in delivery, practice assessment and graduate practice outcomes. For most courses the ACCCN Competency Standards (Australian College of Critical Care Nurses, 2002) were used as a framework for course curricula and as a basis for clinical assessment tools, yet there remains inconsistency in their translation to graduate practice outcomes. For some courses there was a separation between the theoretical and clinical practice development components of the course. Clinical practice assessment was often managed in the healthcare setting and graduate practice outcome level was then determined by local standards not by the course provider. This could result in a disjointed rather than coordinated approach to the achievement of graduate outcomes. Importantly there was an inconsistency in the level of importance placed on graduates meeting any clinical practice outcome standards. In fact a minimum clinical practice outcome was not always a course outcome criterion.

For almost all courses where clinical practice assessment was undertaken, this was a component of the graduate certificate only. The expected graduate practice outcome for most courses was safe practice, meaning that the graduate could care for most critically ill patients but would require support. The graduate was not expected to practice at team leader level. This outcome level was influenced by many factors, including the pre-course practice entry level, local expectations and the practice setting.

It appears that for the graduate certificate level, the graduate practice outcome has been established at safe practice. A leadership level of practice was more of an expectation in a broad sense at graduate diploma and master level, where interestingly critical care specific clinical practice was not assessed. This finding was in contrast to earlier work by Marshall, Currey, Aitken, and Elliott (2007) and Aitken, Currey, Marshall, and Elliott (2008) where critical care nursing stakeholders identified different outcome expectations for graduate certificate, graduate diploma and master level. It is interesting that stakeholders identified a graded level in leadership and

practice as this is not reflected in clinical assessment in awards beyond graduate certificate. Consideration needs to be given whether the current system meets the critical care nursing profession's expectations for the preparation of 'qualified' critical care nurses.

It was noted that two university courses required graduates to complete a minimum number of practice hours. This suggests that despite the movement towards competency or outcomes based approaches to graduate education (Jobst et al., 2010; LeCuyer, DeSocio, Brody, Schlick, & Menkens, 2009), it appears that the structure or process based educational system still operates within Australian graduate nurse education. Whilst we know that nurses' competency levels develop rapidly over the first few years of their clinical experience, Takase (2012) identified that competency development is not linear or stepwise. Competency development is impacted on by many factors and different aspects of competency develop at different rates. This knowledge about competency development highlights the need for a consistent competency based outcomes approach to developing and measuring graduate clinical practice and the need to move away from minimum practice hours to minimum practice outcomes.

Inconsistencies in the level of academic qualifications in the higher education sector have been addressed by the AQF (2011, 2013). The TEQSA (2011) specifies that standards achieved by students should be benchmarked against similar courses of study. Interpretation and application of this standard for critical care nurse education is and will remain problematic if only generic academic standards are used. For instance all courses indicated that all of the recommended course content topics were covered with students also required to be working (and often assessed) within their clinical specialty for the duration of the course. The majority of courses required students to be working at least 0.5 FTE or the equivalent to a half time workload. Thus the overall volume of learning in the courses appeared to be large in relation to the AQF (2013). An interesting finding was that there was a clear lack of emphasis on psycho-emotional care beyond crisis and death which contrasts with our earlier study exploring health consumers' priorities for critical care nurse education (Gill, Leslie, Grech, & Latour, 2013).

Among all of the inconsistency in course delivery and clinical practice assessment it was reassuring that most courses used the two guiding documents produced by the ACCCN Position Statement on the Provision of Critical Care Nurse Education (2006), and the Competency Standards for Specialist Critical Care Nurses (2002). However, these documents have not been consistently interpreted as evidenced by the wide variety in courses and graduate practice outcomes. It appears that these documents lack sufficient direction in setting graduate practice standards.

Whilst N3ET established a broad framework around specialty nursing a framework for specialty education has yet to be developed and graduate course providers awarding specialist qualifications currently remain largely unregulated in terms of practice outcomes. In the UK, the National Competency Framework for Critical Care Nurses was developed to reduce the variation that existed between courses (Price, 2013). In Australia there remains a lack of clarity around

how clinical practice outcomes can be aligned with levels of academic outcome and an uncertainty about how this will evolve in the future. With the advent of the AQF, and the need to comply with the national framework it is now imperative to address the variation in Australian critical care courses by developing and implementing AQF compliant graduate practice outcome standards.

A limitation to the study was that the same types of data for each course were not always available to the researchers. Issues around intellectual property and maintaining competitive market share meant that some course providers chose not to divulge all their course materials. A further challenge in making comparisons between courses was that terminology used in course documents was inconsistent. For example, the titles used for graduate certificate or graduate diploma level qualifications, and how graduate learning outcomes were articulated differed between courses as well as from the AQF taxonomy (2013).

Conclusion

The analysis of graduate critical care courses revealed wide variations between courses and subsequent graduate practice outcomes, which may be representative of many other specialities in nursing. For most courses the professional competency standards were used to guide course curricula and clinical assessment tools, although there was inconsistency in their translation. Most courses included clinical practice assessment at graduate certificate level with no clinical assessment being undertaken at master level. The expected practice outcome for most courses was safe practice with graduates not expected to practice at 'specialist' or team leader level. Minimum graduate practice standards were not always an expected outcome.

From January 2015 all specialty nursing course providers will be required to be compliant with academic outcome standards (Australian Qualifications Framework Council, 2013; Tertiary Education Quality and Standards Agency, 2011). Importantly what is lacking is an equivalent framework to regulate graduate practice outcome standards as this example from critical care demonstrates. It is timely to establish national course practice standards for each specialty, aligning with the AQF qualification learning outcome descriptors. Achieving national adoption of graduate practice standards will then require a regulatory process that ideally will fit within a framework for specialty nurse education.

References

- Aitken, L., Currey, J., Marshall, A., & Elliott, D. (2006). The diversity of critical care nursing education in Australian universities. *Australian Critical Care*, 19(2), 46–52.
- Aitken, L., Currey, J., Marshall, A., & Elliott, D. (2008). Discrimination of educational outcomes between differing levels of critical care programmes by selected stakeholders in Australia: A mixed-method approach. *Intensive and Critical Care Nursing*, 24(2), 68–77. <http://dx.doi.org/10.1016/j.iccn.2007.09.001>
- Australian College of Critical Care Nurses. (2002). *Competency standards for specialist critical care nurses* (2nd ed.). Perth, Western Australia: Cambridge Media.
- Australian College of Critical Care Nurses. (2003). *Position statement on intensive care nurse staffing* [Internet]. Retrieved from: http://www.acccn.com.au/images/stories/downloads/staffing_intensive_care_nursing.pdf
- Australian College of Critical Care Nurses. (2006). *ACCCN position statement on the provision of critical care nurse education* [Internet]. Retrieved from: http://www.acccn.com.au/images/stories/downloads/provision_CC_nursing_edu.pdf
- Australian Council on Healthcare Standards. (2011). *Intensive care clinical indicators user manual* [Internet]. Retrieved from: <http://www.achs.org.au/>
- Australian Government ComLaw. (2012). *Higher education standards framework: Industry, innovation, science, research and tertiary education*. Retrieved from: <http://www.comlaw.gov.au/Details/F2012L00003/Download>
- Australian Health Workforce Advisory Committee. (2002). *The critical care nursing workforce in Australia 2001–2011* [Internet]. Retrieved from: [http://www.ahwo.gov.au/documents/Publications/2002/The critical care nurse workforce in Australia.pdf](http://www.ahwo.gov.au/documents/Publications/2002/The%20critical%20care%20nurse%20workforce%20in%20Australia.pdf)
- Australian Qualifications Framework Council. (2011). *Australian Qualifications Framework*. South Australia: Australian Qualifications Framework Council. Retrieved from: http://www.aqf.edu.au/Portals/0/Documents/Handbook/AustQualsFrmwrkFirstEditionJuly2011_FINAL.pdf
- Australian Qualifications Framework Council. (2013). *Australian Qualifications Framework*. South Australia: Australian Qualifications Framework Council. Retrieved from: [http://www.aqf.edu.au/Portals/0/Documents/2013 docs/AQF 2nd Edition January 2013.pdf](http://www.aqf.edu.au/Portals/0/Documents/2013%20docs/AQF%202nd%20Edition%20January%202013.pdf)
- Benner, P. (1984). *From novice to expert: Excellence and power in clinical nursing practice*. Menlo Park: Addison Wesley.
- Bondy, K. (1983). Criterion-referenced definitions for rating scales in clinical evaluation. *Journal of Nursing Education*, 22(9), 376–382.
- College of Intensive Care Medicine of Australia and New Zealand. (2010). *Minimum standards for intensive care units* [Internet]. Retrieved from: [http://www.cicm.org.au/cmsfiles/IC-01 Minimum Standards For Intensive Care Units - Current September 2011.pdf](http://www.cicm.org.au/cmsfiles/IC-01%20Minimum%20Standards%20For%20Intensive%20Care%20Units%20-%20Current%20September%202011.pdf)
- Frank, J. R., Snell, L. S., Cate, O. T., Holmboe, E. S., Carraccio, C., Swing, S. R., & Harris, K. A. (2010). Competency-based medical education: Theory to practice. *Medical Teacher*, 32(8), 638–645. <http://dx.doi.org/10.3109/0142159X.2010.501190>
- Gill, F., Leslie, G., Grech, C., & Latour, J. (2012). A review of critical care nursing staffing, education and practice standards. *Australian Critical Care*, 25(4), 224–237. <http://dx.doi.org/10.1016/j.aucc.2011.12.056>
- Gill, F., Leslie, G., Grech, C., & Latour, J. (2013). Health consumers' experiences in Australian critical care units: Postgraduate nurse education implications. *Nursing in Critical Care*, 18(2), 93–102. <http://dx.doi.org/10.1111/j.1478-5153.2012.00543.x>
- Heath, P. (2002). *Our duty of care: National review of nursing education*. Canberra: Commonwealth of Australia. Retrieved from: <http://www.voced.edu.au/content/ngv16709>
- Iobst, W. F., Sherbino, J., Cate, O. T., Richardson, D. L., Dath, D., Swing, S. R., & Frank, J. R. (2010). Competency-based medical education in postgraduate medical education. *Medical Teacher*, 32(8), 651–656. <http://dx.doi.org/10.3109/0142159X.2010.500709>
- LeCuyer, E., DeSocio, J., Brody, M., Schlick, R., & Menkens, R. (2009). From objectives to competencies: Operationalizing the NONPF PMHP competencies for use in a graduate curriculum. *Archives of Psychiatric Nursing*, 23(3), 185–199. <http://dx.doi.org/10.1016/j.apnu.2008.06.004>
- Leslie, G. D. (2006). Specialty preparation for critical care nursing. *Australian Critical Care*, 19(2), 43. [http://dx.doi.org/10.1016/s1036-7314\(06\)80007-x](http://dx.doi.org/10.1016/s1036-7314(06)80007-x)

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- Lusk, B., Russell, R. L., Rodgers, J., & Wilson-Barnett, J. (2001). Preregistration nursing education in Australia, New Zealand, the United Kingdom, and the United States of America. *Journal of Nursing Education*, 40(5), 197–202. Retrieved from: <http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=2001072451&site=ehost-live>
- Marshall, A., Currey, J., Aitken, L., & Elliott, D. (2007). Key stakeholders' expectations of educational outcomes from Australian critical care nursing courses: A Delphi study. *Australian Critical Care*, 20(3), 89–99. <http://dx.doi.org/10.1016/j.aucc.2007.05.001>
- National Nursing and Nursing Education Taskforce. (2006). *National Nursing and Nursing Education Taskforce Final Report*.
- National Nursing and Nursing Education Taskforce N3ET. (2006). *A National Specialisation Framework for Nursing and Midwifery: Defining and identifying specialty areas of practice in Australia*. Melbourne, Victoria: Department of Human Services. Retrieved from: http://www.nnnet.gov.au/downloads/recsp_framework.pdf
- Ogle, K., Bethune, E., Nugent, P., & Walker, A. (2002). *Nursing education and graduates – Part 1: Profiles for 1999 and 2000, with projections for 2001*. Canberra: Commonwealth of Australia.
- Pope, C., Ziebland, S., & Mays, N. (2000). Analysing qualitative data. *British Medical Journal*, 320(January (8)), 114–116. Retrieved from: http://edocs.library.curtin.edu.au/eres_display.cgi?url=dc60090915.pdf©right=1
- Price, A. (2013). National critical care competency framework. *Nursing in Critical Care*, 18(2), 103–104. http://dx.doi.org/10.1111/nicc.nicc12013_1
- Ritchie, J., & Lewis, J. (Eds.). (2003). *Qualitative research practice: A guide for social science students and researchers*. London: Sage Publications Ltd.
- Ritchie, J., & Spencer, L. (1994). Qualitative data analysis for applied policy research. In A. Bryman, & R. Burgess (Eds.), *Analysing qualitative data*. London: Routledge.
- Russell, L., Gething, L., & Convery, R. (1997). *National review of specialist nurse education*. Commonwealth of Australia.
- Smith, J., & Firth, J. (2011). Qualitative data analysis: The framework approach. *Nurse Researcher*, 18(2), 52–62. Retrieved from: <http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=2010938895&site=ehost-live>
- Takase, M. (2012). The relationship between the levels of nurses' competence and the length of their clinical experience: A tentative model for nursing competence development. *Journal of Clinical Nursing*, <http://dx.doi.org/10.1111/j.1365-2702.2012.04239.x>
- Tertiary Education Quality and Standards Agency. (2011). *Higher Education Standards Framework (Threshold Standards)*. Retrieved from: <http://www.comlaw.gov.au/Details/F2012L00003/Download>
- The European federation of Critical Care Nursing Associations. (2004). *Position statement on post-registration critical care nursing education within Europe [Internet]*. Retrieved from: <http://www.efccna.org/>
- Tolhurst, G., & Bonner, A. (2000). Development of Clinical Assessment Criteria for Postgraduate Nursing Students. *Collegian (Royal College of Nursing, Australia)*, 7(2), 20–25. Retrieved from: <http://linkinghub.elsevier.com/retrieve/pii/S1322769608603613?showall=true>
- World Federation of Critical Care Nurses. (2005). *Position statement on the provision of critical care nursing education – Declaration of Madrid [Internet]*. Retrieved from: http://en.wfccn.org/pub_education.php

2.3 Health consumers views

Gill, F. J., Leslie, G. D., Grech, C., & Latour, J. M. (2013b). Health consumers' experiences in Australian critical care Units: postgraduate nurse education implications. *Nursing in Critical Care*, 18(2), 93-102.

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RESEARCH

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Health consumers' experiences in Australian critical care units: postgraduate nurse education implications

Fenella J Gill, Gavin D Leslie, Carol Grech and Jos M Latour

ABSTRACT

Aim: To explore critical care patients and families experiences and seek their input into nurses' postgraduate educational preparation and practice.

Background: There is an inconsistency in the expected standard of practice to 'qualify' Australian critical care nurses. There has also been a lack of health consumer input in the development of postgraduate course curriculum and content.

Method: Following institutional ethics committee approval, purposive sampling was used to select participants for focus groups and individual interviews who had experienced intensive care or coronary care.

Findings: Seventeen participants provided data which created two main thematic categories; *the role of the critical care nurse* and; *minimum practice standards for postgraduate critical care course graduates*. Both physical patient care and socio-emotional support of patients and family were identified as important for the critical care nurse role. The level of socio-emotional support provided by nurses was reported to be inconsistent. Components of socio-emotional support included communication, people skills, facilitating family presence and advocacy. These components were reflected in participants' concepts of *minimum practice standards for postgraduate critical care course graduates*; talking and listening skills, relating to and dealing with stressed people, individualizing care and patient and family advocacy.

Conclusion: Health consumers' views emphasize that socio-emotional skills and behaviours need to be explicitly described in postgraduate critical care nursing course curricula and instruments developed to consistently assess these core competencies.

Key words: Patients' and families' views • Postgraduate educational preparation • Specialist intensive care nursing

BACKGROUND

As in many tertiary health sectors globally, critical care nursing in Australia is one of the largest specialties,

with nearly 40 000 nurses working in adult critical care settings (Australian Institute of Health and Welfare, 2011; Gill *et al.*, 2012). Australian critical care nursing workforce standards recommend that at least 50% of nurses practising in adult or paediatric intensive care units (ICU) should hold a specialist (postgraduate) critical care qualification (Australian College of Critical Care Nurses, 2003; College of Intensive Care Medicine of Australia and New Zealand, 2010; Australian Council on Healthcare Standards, 2011). To meet this mandate numerous postgraduate courses are offered, predominantly from the university sector (Aitken *et al.*, 2006). However, the nature of the award level, course content, assessment and outcomes vary considerably across programs despite national competencies (Australian College of Critical Care Nurses, 2002; Aitken *et al.*, 2006). In addition there is a lack of health consumer input in the development of curriculum and course content.

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Health consumers comprise patients, their families and significant others (Australian Health Workforce Advisory Committee, 2002). Having care patient-centred was identified as one of the six aims for health care improvement by The American Institute of Medicine (Committee on Quality Health Care in America Institute of Medicine, 2001). In Australia, 'patient-centredness' is also a focus for quality of health care outcomes (Australian Commission on Safety and Quality in Health Care, 2010) with increasing emphasis on the family unit, recognizing the importance family or significant others play in a patient's health care experience (Institute for patient-and-family-centred care, n.d., Australian Institute for Patient and Family Centred Care, n.d.).

In the critical care context, a task force from the USA used available evidence and expert panel consensus to develop practice guidelines to effectively support the family of patients in the ICU (Davidson *et al.*, 2007). A weakness in the development of these guidelines was the lack of high level evidence and ironically, a lack of consultation with patients and families (McKinley and Elliott, 2008). In contrast The CoBaTrICE Collaboration (2006), who developed the core competencies for an international intensive care medicine training program in Europe, surveyed the views of patients and families. The survey showed that while clinical knowledge and skills were prioritized as most important, communication with patients and with families were also rated highly by respondents (The CoBaTrICE Collaboration, 2007).

Studies of critical care patient and family experiences published over the last 25 years have consistently reported the importance of relationships with nurses and how these strongly impact upon patient and family experiences and satisfaction (Hupcey, 1999; Llenore and Ogle, 1999; Bailey *et al.*, 2010; Hunziker *et al.*, 2012). Despite health consumers noting that they need both emotional support and physical care, the findings from these studies do not appear to have impacted positively on nurses' provision of patient and family centred care. (Høye and Severinsson, 2010; Hinkle and Fitzpatrick, 2011; Spreen and Schuurmans, 2011; Karlsson *et al.*, 2012). This has wide ranging implications for models of critical care practice, including the design of postgraduate education for critical care nurses.

Postgraduate critical care nurse education programs have traditionally placed emphasis on clinical competence, treatment modalities and biotechnology. Whether critical care nurses provide adequate emotional support as well as physical care to patients and their families, and whether education programs sufficiently prepare graduates for this role is largely unknown.

AIM

The aim of this study was to explore the views of patients and families about their experiences with critical care nurses and seek their input into critical care nurses' postgraduate educational preparation and practice outcomes.

DESIGN

Exploratory focus groups and individual interviews were conducted with former critical care patients and family members in four Australian states and territories. While focus groups and individual interviews are not substitutes for each other, the information from each has been found to be complementary (Kaplowitz and Hoehn, 2001). Thematic data analysis was used.

Participants

Purposive sampling was used to select patients and family members who had experienced care in an ICU (adult or paediatric) or coronary care unit (CCU). Figure 1 shows the participant selection process. Eligible participants were able to communicate in English and were willing to participate in either a focus group or individual interview. Participants were recruited using a two-step approach. First, state and territory based health consumer organizations with a membership that included individual health consumers were contacted. Four organizations circulated an invitation to their individual members to participate in focus groups. The sessions were held in venues arranged by the health consumer organizations. A number of participants who consented to participate were not available on the arranged dates necessitating a second strategy for data collection. These participants were individually interviewed.

Data collection

Three focus groups and five individual interviews were conducted during November 2011 and January 2012 and lasted between 40 and 100 min. Individual interviews and focus groups were not conducted in a predetermined sequence. Participant characteristics were obtained using a combination of the pre-interview information form and the participant responses during interview, no patient records were reviewed.

The chief investigator (F. G.) facilitated the sessions and commenced the discussion with an open-ended statement: 'please describe your experience in ICU or CCU'. All participants responded by describing the circumstances that led to their own or their family member's ICU or CCU admission. A second open-ended question was: 'Can you talk about what you

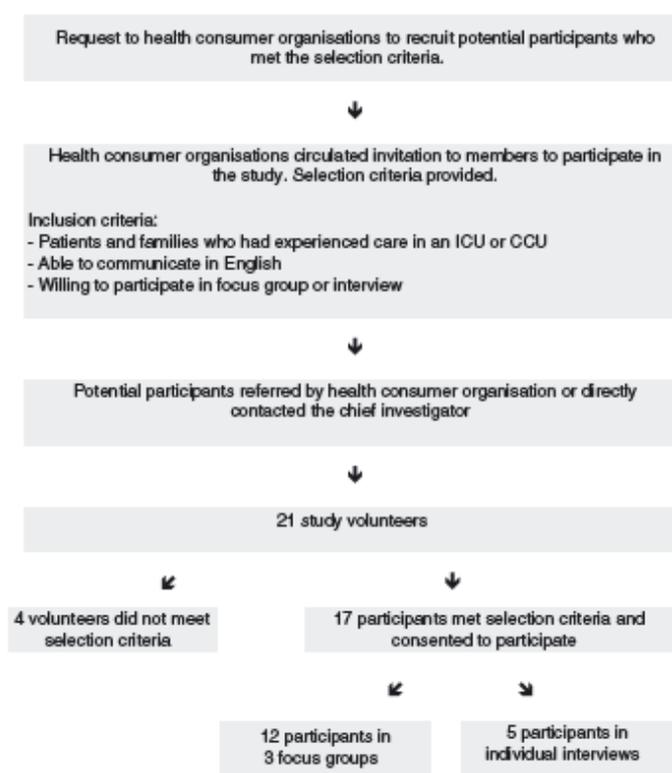


Figure 1 Participant selection process.

consider to be the role of the critical care nurse?' This prompted the group or the individual to discuss their relationship with nurses and to explore what they considered to be important. The final question was: 'What do you think is important to include in minimum standards for graduates of postgraduate critical care nursing education programs?' This allowed the group or individual to recap on the main points identified so far and to place these in the context of critical care nurse educational standards.

The focus groups and interviews were audio-recorded and the chief investigator (F.G.) reviewed the audiotapes and field notes following each session in order to identify aspects for further explanation and to check for confirmation (Lambert and Loiselle, 2008) about the emerging themes in subsequent interviews and to identify data saturation (Creswell, 1998; Guest *et al.*, 2006).

Data analysis

A systematic approach was used to conduct, analyse and report this study (Tong *et al.*, 2007; Schou

et al., 2012). The audiotapes were transcribed verbatim and the field notes were used to maintain contextual detail (Tong *et al.*, 2007). Using thematic analysis as the methodological framework, a structured multi-step process was followed (Krueger, 1994; Liamputtong, 2011). In the first step, all transcripts were read through by the chief investigator (F.G.) to obtain an overall perspective of the information, and reflect on its meaning. In the next step, the transcript content data were independently coded using the interview questions as the primary categories (Creswell, 2009). The sections on the transcribed text that reflected similar ideas were grouped together under the interview question categories and given a representative code. The identified codes were examined using a constant comparison process where each code was compared with the rest of the data to establish the themes. There were several revisions to the organization of the themes and development of subthemes imputed from the codes (Braun and Clarke, 2006).

A second investigator (G.L.) not involved with the initial coding then crosschecked the codes.

All records of coding, changes to coding and organization of themes were retained to provide an audit trail of the decisions made during the data analysis process (Rabiee, 2004). Respondent validation or participant checking was undertaken to confirm with the participants that the themes developed were recognized as accurate representations of their experiences (Tong *et al.*, 2007; Creswell, 2009; Richards, 2009; Thomas and Magilvy, 2011). Feedback requested that communication issues be listed first in order to emphasize its priority for minimum standards for graduates of postgraduate critical care courses.

The final analysis was performed by two auditors (C. G. and J. M. L.). The auditors provided constructive feedback, and consensus was achieved on the identified quotations representing the themes and subthemes.

Ethical considerations

All participants were sent an information sheet with a written invitation to participate, a form to collect participant characteristics and a consent form. The recall of critical care experiences had the potential to result in emotional distress for participants. In anticipation of this event, provision was made for independent counselling. Approval was obtained from the University Human Research Ethics Committee (SON&M 23-2011).

FINDINGS

Participants

Seventeen former patients and family members were recruited. The characteristics of the patients and family members are listed in Table 1. Two participants each described two experiences as family members; three

Table 1 Participants' characteristics

P code	MF	Age (years)	Related critical care experience	Patient admission	Patient critical care LOS (days)	Patient hospital LOS (days)	Patient reason for critical care admission
1	F	65	Wife	ICU	120	150	Pneumonia
2	M	57	Patient	ICU	7	165	Sepsis
3	F	42	Wife	ICU	20	120	Spinal injury and stroke
4	M	57	Parent	PICU	1	30	Ventriculo-peritoneal shunt
			Parent	ICU	1	Not specified	blockage
							Ingestion
5	F	68	Daughter	ICU/CCU	21	Not specified	Heart failure and stroke
			Sister	ICU	3	21	Sudden collapse, died, organ donor
6	F	56	Patient	CCU	3	7	Atrial fibrillation
7	M	61	Patient	ICU	10	28	Sepsis
			Husband	CCU	3		Atrial fibrillation
8	F	21	Daughter	CCU	3	7	Atrial fibrillation
9	F	61	Wife	ICU	4	10	Heart and renal failure
			Patient	ICU	1	10	Suspected envenomation
10	F	53	Wife	ICU	91	660	Trauma injuries and sepsis
11	M	74	Patient	ICU	7	Not specified	Complications of heart disease
				CCU	6		
12	M	49	Parent	PICU	>100	>200	Congenital airway abnormality
13	F	55	Daughter	ICU	2	7	Head injury
14	F	61	Patient	ICU	28	60	Pneumonia, Acute respiratory distress syndrome, critical care myopathy
15	F	49	Patient	ICU	21	56	Allergic reaction to drug
				CCU	14	70	Heart lung transplant
							Heart failure
16	M	51	Husband	ICU	21	56	Allergic reaction to drug
				CCU	14	70	Heart lung transplant
							Heart failure
17	F	54	Patient	ICU	6	15	Bilateral lung transplant
			Sister	ICU	28	210	Cerebral haemorrhage

CCU, coronary care unit; ICU, intensive care unit; LOS, length of stay; P code, participant code; PICU, paediatric ICU.

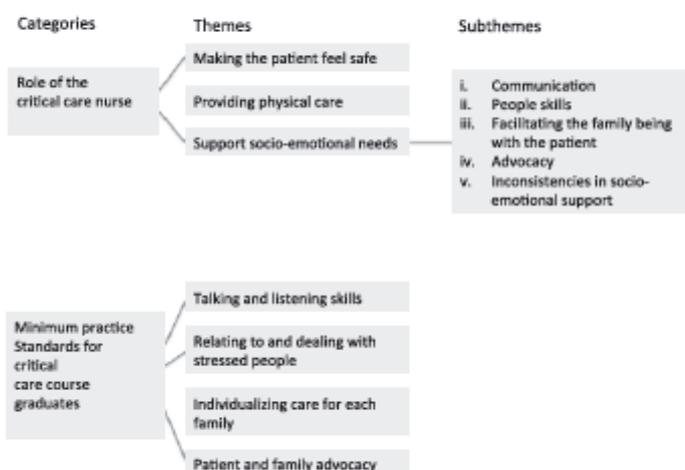


Figure 2 Findings of the focus groups and individual interviews.

participants had experiences as both a patient and a family member. One participant described experiences as a CCU patient over three admissions and one patient described experiences as both an ICU and a CCU patient. One participant described experiences as a parent over a number of paediatric intensive care unit (PICU) admissions. The median time since the participants' critical care experience was three (0–25) years. The ability to recall their experiences with critical care nurses was variable but did not appear to be linked to the recency of the experience.

On the basis of the preset focus group or interview questions two main categories from the qualitative analysis were identified; the role of the critical care nurse and minimum practice standards for postgraduate critical care course graduates. The themes and subthemes are shown in Figure 2. Participants' codes are included following each in text quote.

The role of the critical care nurse

Making the patient feel safe

Participants described feeling looked after and comforted by the nurses' constant bedside presence: 'If I happened to open my eyes and look around there was always someone there which as a patient is extremely comforting' (P14). Participants recalled their feelings of anxiety if the nurse left the bedside: 'I felt frightened when they went on their breaks and I could hear them say to the nurse in the next cubicle – could you keep an eye on my patient?' (P14).

Providing physical care

For the physical patient care nurse role, participants described how nurses were the '...primary care givers

... giving first line care' (P8). Physical care included monitoring patient progress '...to observe, make a judgment call and to know, to liaise' (P16), and '...team communication' (P11). Importantly the nurses' role in providing physical care was viewed as a component of the overall care that included providing socio-emotional support to the patient and family '...clinical first, then in partnership help the family understand what is going on' (P5).

Support socio-emotional needs

In supporting both the patient's and family members' socio-emotional needs five subthemes were identified. Examples of the participant's quotations justifying the five subthemes are listed in Table 2.

- **Communication:** Participants explained that the nurse's role in communication was informing the patient and family about changes, explaining procedures, providing summaries of progress, preparing them about what to expect to happen next and patient and family teaching. Participants considered that information giving was an important role for nurses: 'Nurses tend to leave the information giving to the doctors' (P13) yet are '...better at talking to people than doctors' (P1). Effective nurse communication with the patient and family included being friendly, explaining and talking through procedures as well as assisting the patient and family to communicate with each other. Participants described their distress when nurses did not seek ways for effective communication with patients who were unable to verbally communicate. Nurses' communication

Table 2 Quotations related to subthemes of the theme support socio-emotional needs

Subthemes	Quotations
Communication	<p>... from shift to shift & when the patient is deteriorating (P3),</p> <p>... to give you the right amount of information ... to get to the next stage. (P6),</p> <p>When they (nurses in the CCU) gave you your drugs they didn't just give you the jar and say here take those, they would pop them out and ask you why do you take this one, why do you take that one? (P15).</p> <p>... some staff were not prepared to try and communicate (P10)</p> <p>My son worked out a card with letters on it so that I could nod my head when we got to a letter ... of course no one told him about this. (P14).</p>
People skills	<p>They were very good at picking up the sort of things that made you feel a bit more comfortable. (P12).</p> <p>A tense situation and suddenly with laughter it resolves itself more or less (P16).</p> <p>It's about understanding how to deal with people & having that right balance between professionalism & personalization (P12).</p>
Facilitating the family being with the patient	<p>... the family is integral to the patient. ... to help, to sit beside, to communicate (P3).</p> <p>I really resented the fact that they could tell you when to go. It's a crucial thing that you are there (P8).</p> <p>... it is lovely seeing people (P14).</p>
Advocacy	<p>The nurse could point me in the right direction. ... if someone couldn't help they could put me in touch with someone who could (P10)</p> <p>(Nurses are) advocates for patients – especially when working with junior doctors (P13)</p> <p>(Nurses assist you to) ... ask the doctors directly ... you have to be assertive & organized (P17).</p>
Inconsistencies in socio-emotional support	<p>(My mother) felt a little bit almost worried for me when she knew this girl was going to be my nurse for a few hours. ... I thought I'd been left to die because of her rather abrasive way of handling the situation (P15).</p> <p>There doesn't seem to be support for the family ... (this unit) didn't seem to me very friendly towards the parent. I was a visitor' (P4).</p> <p>What you don't always get is the good emotional care (P16).</p> <p>Nurses are there all the time, a security blanket, but the assistance they provide is not consistent (P7).</p>

role also included inter-professional communication, as the nurse was viewed as a team member and was fully informed about the patient's condition '...the nurses were the 24/7 eyes/hand/ears and were very good at relaying what was going on' (P12).

- **People skills:** were described in terms of social connectedness and being able to make the family feel welcome. Nurses with people skills were described as having personality, were friendly, polite, respectful and used the right amount of self-disclosure and humour. Nurses were able to develop trust with families. Showing compassion was described as nurses having empathy, giving the patient and family confidence and '...making you feel like a human being and you are important' (P9).
- **Facilitating the family being with the patient:** By recognizing the importance of family presence, the nurses' role was facilitating and supporting family when at the patient bedside: 'You don't come back in and get frightened by what's happened because you can see the changes. You are able to watch and see exactly what is going on so you are not coming back in and finding another 14 tubes hanging out of him that weren't there before which can be a little bit frightening' (P12).

- **Advocacy:** Participants described how nurses acted as advocates '... the eyes, the ears, the voice' (P17) for the patient and family and '...unless you have written yourself a note you might not remember but the nurses are there to help you when you talk with the doctor' (P15). Participants' examples of nurse advocacy are presented in Table 3.
- **Inconsistencies in socio-emotional support:** Participants described how the level of socio-emotional support provided by nurses was inconsistent. This variation could be between different critical care units, between shifts or between individual nurses. These varying levels of socio-emotional care could result in families feeling stressed about their relationships with nurses. In addition, participants described how an individual nurse's behaviour could have a negative impact on others: 'An individual staff member can influence the rest of the team's attitude' (P3).

Minimum practice standards for postgraduate critical care course graduates

Talking and listening skills

The participants considered that postgraduate critical care course graduates should be able to talk with the

Table 3 Participants' descriptions of the nurse advocacy role

Arranging family conferences when the nurse recognized that the family was not fully informed about the patient's condition or progress.
Re-explaining information provided by doctors in ways that the family could understand.
Ensuring the patient received optimal care by monitoring the care being given (especially by junior or inexperienced doctors) and intervening, speaking up or seeking other advice.
Delivery of safe nursing care by checking medications.
Meeting the patient needs for sleep, for choice and dignity.
Helping the family to access resources and support services, assist with managing visitor rosters.
Helping the family adapt to the critical care environment, understand how the 'system' worked, establish a routine and role.

patient and family using appropriate language, with adequate English language skills and cultural competence being essential: 'Things should be discussed in plain English...some staff with poor English don't even say please or thank you' (P2) and '...dealing with sick, scared and muddled people – some nurses make no effort' (P10). It was recommended that the use of technical terms and jargon be avoided: 'If you don't understand the language it means you get very confused' (P12). Listening skills were identified as being important to be able to '...get to know the patient' (P11) and family as individuals. The course graduates should also be able to recognize when patients were attempting to communicate with them '...you lose the ability to indicate your needs and that's the basic part of being a human' (P15).

Relating to and dealing with stressed people

The participants identified that postgraduate critical care course graduates should be able to show compassion at the same time as providing timely physical patient care. The course graduate should also have the ability to resolve conflict: 'They should be really, really good at being able to relate to people who are a little bit stressed and have the ability to be quite empathic about what is going on rather than being strictly clinical' (P12).

Individualising care for each family

The participants described that postgraduate critical care course graduates should be able to determine each individual family and patient needs. These needs varied between families and also changed during the critical care stay '...not everyone reacts the same way – it needs training to understand that' (P12).

Patient and family advocacy

The participants explained that postgraduate critical care course graduates should have the confidence to speak up on behalf of, and show respect for the patient and family. Advocacy included assisting the patient and family to understand, adapt to and learn how to cope with 'the system' or critical care environment: '...once I got to know the routine we got really good care' (P1).

DISCUSSION

Critical Care patients' and families' views were that both physical patient care and social-emotional support were considered to be essential components of the critical care nurse role. The physical care was considered 'a given' and provision of socio-emotional support to patients and families was equally important. These interpretations provide health consumers' perspectives, which are new insights about the competencies for critical care nursing.

When McKinley and Elliott (2008), assessed the Australian applicability of the North American guidelines for the support of the family in patient-centered intensive care (Davidson *et al.*, 2007), they identified practice challenges to implementing the guidelines. They reported that Australian postgraduate critical care education for nurses and doctors does not include specific training in supporting the family in areas such as family presence at resuscitation, conflict management, meeting facilitation or palliative care. They also highlighted inconsistencies in the level of family support achieved in Australian ICUs (McKinley and Elliott, 2008).

Our study found that patients' and families' priorities for critical care nurses' postgraduate educational preparation and practice reflected the same components of socio-emotional care identified for the role of the critical care nurse; talking and listening skills, relating to and dealing with stressed people, individualizing care for each family and patient and family advocacy. This emphasis on communication, social skills and emotional care is consistent with the CoBaTriCE study in Europe, undertaken to inform specialist Medical Curricula for critical care, which found that patients and relatives highly valued the quality of communication as a key element of professional competency (The CoBaTriCE Collaboration, 2007).

Many Australian postgraduate critical care nursing course curricula utilize two publications as a basis to their curricula and to support student assessment: Position Statement on the Provision of Australian

College of Critical Care Nurses (2006), and the Competency Standards for Specialist Critical Care Nurses (Australian College of Critical Care Nurses, 2002; Aitken *et al.*, 2006; Gill *et al.*, 2012). Health consumers' views were not sought in the development of either of these publications. While the Position Statement articulates that the appropriate preparation of specialist critical care nurses is vital for the provision of quality care to patients and their families (Australian College of Critical Care Nurses, 2006), there is little emphasis placed on providing the components of socio-emotional care highlighted by this study. It is interesting to note that both the World Federation of Critical Care Nurses (2005) and The European federation of Critical Care Nursing Associations (2004) also appear not to have included consumer consultation in the preparation of their position statements, and likewise lack an emphasis on the socio-emotional care aspect.

The Competency Standards document (Australian College of Critical Care Nurses, 2002) is more explicit about the provision of socio-emotional or psychosocial support, with specific competencies addressing communication, therapeutic relationships and advocacy. To what extent the Competency Standards have been adopted as a framework for postgraduate critical care course curricula and whether provision of socio-emotional support (and its components) is reflected in expected clinical practice outcomes is unknown.

The feedback from participants in this study was that Australian critical care nurse postgraduate education programs need to emphasize the development of skills and behaviour to provide effective patient and family support. Internationally this appears also to be true. Radtke *et al.* (2012) conducted focus groups with ICU nurses in the USA to evaluate a training program for communication with critically ill patients. They found a wide variation amongst participants in the value they placed on communication in the ICU and their perceived competence in communicating. They also identified that nurses sometimes avoided communication with these patients. Similarly, an Irish study found that there was no significant relationship between ICU nurses' self-reported theoretical knowledge of family needs and their self-reported family-centred practices. Of the 48 participants in the study, nearly 70% held an ICU qualification yet while knowledge of best practice was good, this was not translated into clinical practice and they placed low value on this aspect of their role (Buckley and Andrews, 2011).

Critical care nurses and physicians have also been found to underestimate relatives perceived needs

(Bijttebier *et al.*, 2001). We previously explored adult critical care nurse attitudes to a clinical assessment tool based upon the Competency Standards, finding both postgraduate students and their assessors reported that too much emphasis was placed on psychosocial support of the patient and family (Gill *et al.*, 2006). This finding reflected attitudes towards the value placed on skill-based assessment measuring the development of psychomotor and technical skills rather than the 'soft' skills associated with providing patient and family-centred care. This may mean that placing an emphasis on family and patient support skills in minimum standards for postgraduate critical care course graduates will be met with resistance. To address this, curriculum developers, critical care educators and course graduates need to be provided with evidence that patients and their families' value this care and regard this as a critical measure of the standard of care provided.

A limitation of this study could be as participants were recruited through health consumer organizations they may have held stronger views than the wider population of critical care nursing health consumers. As one participant's critical care experience was 25 years ago, this may have resulted in recall bias. In addition there were only two participants with experience as parents in the PICU setting. Therefore, more research into patient and families perspectives in specific critical care settings is warranted.

CONCLUSION

We have been able to obtain patients and family perspectives of what they consider to be important for critical care nurses' postgraduate educational preparation and practice outcomes to inform curricula change. The use of focus groups and individual interviews captured the views of a variety of participants (both patients and family members) across several Australian cities.

The study found that consumers of critical care value physical care and socio-emotional support equally in care provided by nurses. The level of socio-emotional support provided was reported to be inconsistent, which could result in patient and families' feeling stressed by their relationships with nurses. The implications of the study findings are for Educators to consider how the design and delivery of postgraduate critical care nurse curricula, including assessment activities, can best assist course graduates to value and subsequently provide patient and family-centred care.

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WHAT IS KNOWN ABOUT THE TOPIC?

- The importance of patient and family relationships with nurses in critical care and the strong impact these relationships have upon patient and family experiences and satisfaction.
- Health consumers need both emotional support and physical care, yet previous study findings do not appear to have impacted positively on nurses' provision of patient and family centred care.

WHAT THIS PAPER ADDS?

- Patients' and families' views emphasized that both physical patient care and socio-emotional support were of equal importance and considered to be essential components of the critical care nurse role.
- The level of socio-emotional support provided by individual nurses was inconsistent.
- Australian critical care nurse postgraduate education programs need to focus on the development and assessment of socio-emotional support skills and behaviours.
- Placing an emphasis on family and patient support skills in minimum standards for postgraduate critical care course graduates will provide clear guidance for curriculum development.

REFERENCES

- Aitken L, Currey J, Marshall A, Elliott D. (2006). The diversity of critical care nursing education in Australian universities. *Australian Critical Care*; 19: 46–52.
- Australian College of Critical Care Nurses. (2002). *Competency Standards for Specialist Critical Care Nurses*. Perth: Cambridge Media.
- Australian College of Critical Care Nurses. (2003). Position statement on intensive care nurse staffing. http://www.aoccn.com.au/images/stories/downloads/staffing_intensive_care_nursing.pdf (accessed 02/03/11).
- Australian College of Critical Care Nurses. (2006). ACCCN position statement on the provision of critical care nurse education. http://www.aoccn.com.au/images/stories/downloads/provision_CC_nursing_edu.pdf (accessed 02/03/11).
- Australian Commission on Safety and Quality in Health Care. (2010). *Patient-centred care: improving quality and safety by focusing care on patients and consumers*. Sydney: ACSQHC.
- Australian Council on Healthcare Standards. (2011). Intensive care clinical indicators user manual. <http://www.achs.org.au/> (accessed 01/03/11).
- Australian Health Workforce Advisory Committee. (2002). The critical care nursing workforce in Australia 2001–2011. <http://www.aihw.gov.au/documents/Publications/2002/The%20critical%20care%20nurse%20workforce%20in%20Australia.pdf> (accessed 01/03/11).
- Australian Institute for Patient and Family Centred Care. (n.d.). <http://www.aipfcc.org.au/care.html> (accessed 07/12/11).
- Australian Institute of Health and Welfare. (2011). Nursing and midwifery labour force 2009. <http://www.aihw.gov.au/publication-detail/?id=10737419682> (accessed 17/03/12).
- Bailey JJ, Sabbagh M, Loiselle CG, Boileau J, McVey L. (2010). Supporting families in the ICU: A descriptive correlational study of informational support, anxiety, and satisfaction with care. *Intensive and Critical Care Nursing*; 26: 114–122.
- Bijttebier PB, Vancost SV, Delva DD, Ferdinande PF, Frans EF. (2001). Needs of relatives of critical care patients: perceptions of relatives, physicians and nurses. *Intensive Care Medicine*; 27: 160–165.
- Braun V, Clarke V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*; 3: 77–101.
- Buckley P, Andrews T. (2011). Intensive care nurses' knowledge of critical care family needs. *Intensive and Critical Care Nursing*; 27: 263–272.
- College of Intensive Care Medicine of Australia and New Zealand. (2010). Minimum standards for intensive care units. <http://www.cim.org.au/cmsfiles/IC-01%20Minimum%20standards%20For%20Intensive%20Care%20Units%20-%20Current%20September%202011.pdf> (accessed 28/03/12).
- Committee on Quality Health Care in America Institute of Medicine. (2001). *Crossing the Quality Chasm: A New Health System for the 21st Century*. Washington DC: The National Academies Press.
- Creswell J. (1998). *Qualitative Inquiry and Research Design: Choosing Among Five Traditions*. Thousand Oaks: Sage Publications.
- Creswell J. (2009). *Research Design: Qualitative, Quantitative and Mixed Methods Approaches*. Thousand Oaks: Sage Publications, Inc.
- Davidson J, Powers K, Hedayat K, Tieszen M, Kon A, Shepard E, Spuhler V, Todres D, Levy M, Barr J, Ghandi R, Hirsch G, Armstrong D. (2007). Clinical practice guidelines for support of the family in the patient-centered intensive care unit American College of Critical Care Medicine Task Force 2004–2005. *Critical Care Medicine*; 35: 605–622.
- Gill F, Leslie GD, Southerland K. (2006). Evaluation of a clinical performance assessment tool (CPAT) within a critical care context. *Australian Critical Care*; 19: 105–113.
- Gill FJ, Leslie GD, Grech C, Latour JM. (2012). A review of critical care nursing staffing, education and practice standards. *Australian Critical Care*. 25: 224–237.

- Guest G, Bunce A, Johnson L. (2006). How Many interviews are enough? *Field Methods*; 18: 59–82.
- Hinkle JL, Fitzpatrick E. (2011). Needs of American relatives of intensive care patients: perceptions of relatives, physicians and nurses. *Intensive and Critical Care Nursing*; 27: 218–225.
- Høye S, Severinsson E. (2010). Multicultural family members' experiences with nurses and the intensive care context: a hermeneutic study. *Intensive and Critical Care Nursing*; 26: 24–32.
- Hunziker S, McHugh W, Sarnoff-Lee B, Cannistraro S, Ngo L, Marcantonio E, Howell M. (2012). Predictors and correlates of dissatisfaction with intensive care. *Critical Care Medicine*; 40: 1554–1561.
- Hupcey JE. (1999). Looking out for the patient and ourselves – the process of family integration into the ICU. *Journal of Clinical Nursing*; 8: 253–262.
- Institute for patient-and-family-centred care (n.d.), <http://www.ipfcc.org/faq.html>. (accessed 06/12/11).
- Kaplowitz MD, Hoehn JP. (2001). Do focus groups and individual interviews reveal the same information for natural resource valuation? *Ecological Economics*; 36: 237–247.
- Karlsson V, Bergbom I, Forsberg A. (2012). The lived experiences of adult intensive care patients who were conscious during mechanical ventilation: a phenomenological-hermeneutic study. *Intensive and Critical Care Nursing*; 28: 6–15.
- Krueger R. (1994). *Focus Groups: A Practical Guide for Applied Research*. Thousand Oaks: Sage Publication.
- Lambert SD, Loiselle CG. (2008). Combining individual interviews and focus groups to enhance data richness. *Journal of Advanced Nursing*; 62: 228–237.
- Liamputtong P. (2011). *Focus Group Methodology*. London: Sage Publications.
- Llencore E, Ogle KR. (1999). Nurse–patient communication in the intensive care unit: a review of the literature. *Australian Critical Care*; 12: 142–145.
- McKinley S, Elliott R. (2008). Implications for Australian practice of North American guidelines for the support of the family in the patient-centred intensive care. *Collegium*; 15: 11–17.
- Rabiee F. (2004). Focus-group interview and data analysis. *Proceedings of the Nutrition Society*; 63: 655–660.
- Radtke JV, Tate JA, Happ MB. (2012). Nurses' perceptions of communication training in the ICU. *Intensive and Critical Care Nursing*; 28: 16–25.
- Richards L. (2009). *Handling Qualitative Data*. London: Sage Publications Ltd.
- Schou L, Høstrup H, Lyngsø EE, Larsen S, Poulsen I. (2012). Validation of a new assessment tool for qualitative research articles. *Journal of Advanced Nursing*; 68: 2086–2094.
- Spreen AE, Schuurmans MJ. (2011). Visiting policies in the adult intensive care units: A complete survey of Dutch ICUs. *Intensive and Critical Care Nursing*; 27: 27–30.
- The CoBaTrICE Collaboration. (2006). Development of core competencies for an international training programme in intensive care medicine. *Intensive Care Medicine*; 32: 1371–1383.
- The CoBaTrICE Collaboration. (2007). The views of patients and relatives of what makes a good intensivist: a European survey. *Intensive Care Medicine*; 33: 1913–1920.
- The European federation of Critical Care Nursing associations. (2004). Position statement on post-registration critical care nursing education within Europe. <http://www.efccna.org/downloads/Position%20statement%20on%20education%20EfCCNa.pdf> (accessed 15/06/11).
- Thomas E, Magilvy JK. (2011). Qualitative rigor or research validity in qualitative research. *Journal for Specialists in Pediatric Nursing*; 16: 151–155.
- Tong A, Sainsbury P, Craig J. (2007). Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*; 19: 349–357.
- World Federation of Critical Care Nurses. (2005). Position statement on the provision of critical care nursing education – Declaration of Madrid. http://en.wfocn.org/pub_education.php (accessed 15/06/11).

Part 3: Developing

3.1 Methodology using a web-based survey tool

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Using a web-based survey tool to undertake a Delphi study: Application for nurse education research

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SUMMARY

Background: The Internet is increasingly being used as a data collection medium to access research participants. This paper reports on the experience and value of using web-survey software to conduct an eDelphi study to develop Australian critical care course graduate practice standards.

Methods: The eDelphi technique used involved the iterative process of administering three rounds of surveys to a national expert panel. The survey was developed online using SurveyMonkey. Panel members responded to statements using one rating scale for round one and two scales for rounds two and three. Text boxes for panel comments were provided.

Collecting data and providing feedback: For each round, the SurveyMonkey's email tool was used to distribute an individualized email invitation containing the survey web link. The distribution of panel responses, individual responses and a summary of comments were emailed to panel members. Stacked bar charts representing the distribution of responses were generated using the SurveyMonkey software. Panel response rates remained greater than 85% over all rounds.

Discussion: An online survey provided numerous advantages over traditional survey approaches including high quality data collection, ease and speed of survey administration, direct communication with the panel and rapid collation of feedback allowing data collection to be undertaken in 12 weeks. Only minor challenges were experienced using the technology. Ethical issues, specific to using the Internet to conduct research and external hosting of web-based software, lacked formal guidance.

Conclusions: High response rates and an increased level of data quality were achieved in this study using web-survey software and the process was efficient and user-friendly. However, when considering online survey software, it is important to match the research design with the computer capabilities of participants and recognize that ethical review guidelines and processes have not yet kept pace with online research practices.

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Introduction

The Delphi technique is characterized as a series of surveys interspersed with controlled feedback. It has been widely used in a variety of nursing contexts to obtain previously unknown opinions of a group of informed individuals. Typical examples include identifying research priorities (Cowman et al., 2012; Fletcher-Johnston et al., 2011; Ramelet and Gill, 2012), developing quality indicators (Boulkedid et al., 2011; Uphoff et al., 2012; Wilson et al., 2012) or

for gaining consensus on education assessments (Crookes and Brown, 2010; Sowter et al., 2011). The main premise is that the collective opinion of the group or panel is more valid than individual opinions. Hasson et al. (2000), identified that no universal guidelines exist for conducting a Delphi technique and historically postal surveys were commonly used to collect data (Keeney et al., 2010). Logistically, this process was both time consuming and costly.

The advent of the Internet is now increasingly being used to conduct surveys in populations who regularly use the World-Wide-Web (Allen and Roberts, 2010; Boulkedid et al., 2011; Kaplowitz et al., 2004), particularly those with a higher level of education and access to online facilities (Barrios et al., 2011). A web-based Delphi technique (eDelphi) is not only an environmentally friendly and cost effective way to carry out research, it enables participants to easily respond from diverse geographical locations, is time efficient, allows direct import into data analysis software, enables a quick turnaround time

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between rounds, and improves data quality (Barrios et al., 2011; Chang et al., 2010; Joinson and Reips, 2007; Kaplowitz et al., 2004; Okoli and Pawlowski, 2004). Commercially available web-based survey software offers a number of advantages over developing systems internally. They are usually quick to set up, relative low in cost and provide a high level of data security. Currently, there are over 300 web-survey commercial software products available, with SurveyMonkey (n.d.) being a market leader (Allen and Roberts, 2010; Fan and Yan, 2010). Therefore, for researchers interested in undertaking a national survey to elicit the opinions of an expert panel of Australian critical care nurses, a web-based Delphi technique seemed an attractive option.

The aim of this eDelphi study was to survey a national panel of experts to elicit their opinion on critical care course graduate practice standards. SurveyMonkey (SM) was selected to administer the eDelphi process as it was user-friendly, had been used with different web browsers, computer configurations and Internet services, supported SPSS for data importation and employed high level data protection measures that were consistent with industry standards (Allen and Roberts, 2010; Fan and Yan, 2010; Funke et al., 2011; SurveyMonkey, 2011). This paper reports on the experience and value of using web-survey software to conduct an eDelphi study.

Approach

Design

Using SM, the eDelphi technique consisted of the familiar iterative process of administering three rounds of surveys to a national panel of critical care nurses. The approach used has been entitled a 'reactive eDelphi' as in the first survey round panel members were asked to rate the importance of predetermined statements rather than provide responses to open questions (Keeney et al., 2010; McKenna, 1994).

Survey Development

Generating first round statements from earlier research using Delphi technique has previously been described (Chang et al., 2010; Fletcher-Johnston et al., 2011). In this study the initial 84 statements (clustered into six domains) were developed as a result of a literature review (Gill et al., 2012) as well as previous work undertaken by the researchers. This research consisted of a) an analysis of existing critical care programs and b) identification of health consumers' views about the role of the critical care nurse and minimum practice standards for critical care course graduates (Gill et al., 2013).

Subscription to the SM professional 'Gold plan' provided access to additional features such as SPSS integration that are not accessible via the widely used free plan. One of the existing online templates was selected to create the draft first round survey. The subsequent surveys could then be created each time by copying and editing the previous one. The appropriate identifying logo was uploaded to display as a header on each page. The first page was an introduction and provided ethics approval information, and the second page provided instructions to the panel participants. Using one of the available colour and layout themes to present the survey and text was straightforward for simple requirements, although customizing the theme was not as user-friendly as one might expect from a word processing package. For example, the process involved using HTML (the HyperText Markup Language used to interpret and compose text displayed in a web browser) to underline or bold text, change font size or colour. This perceived 'barrier' resulted in the template being used unchanged.

Questions were built by copy and pasting the statements from a Word document, selecting the question type, response options and allocation of a weighting for each response option. A compulsory response for each question was selected to ensure a complete data set (Cantrell and Lupinacci, 2007). There was an additional field for comments after each domain or group of statements and for overall

suggestions. For the round one survey, a seven point rating scale was used, and response choices ranged from 0 (not at all important) to 6 (extremely important). Seven rather than five points were selected for greater data granularity and to support analysis of responses using continuous data analyses (Dawes, 2008; Watson et al., 2008).

For rounds two and three, a second categorical scale was included and was easily copied from the first scale and then edited. The categorical competency scale was included for participants to identify the level of practice expected of course graduates for each statement. The five categories were adapted from Miller's (1990) assessment framework and more recent work by The Cobatrice Collaboration (2006). The response categories were; no knowledge required, has knowledge of or describes, demonstrates under supervision, demonstrates independently, and teaches or supervises others.

Demographic characteristic questions were built to require selection from multiple-choice options. In the second and third rounds participants were directed past the demographic details section if there had been no changes to their details. This SM software function is called Question Logic (Jancey et al., 2011). The survey's final page thanked participants and provided information about the next survey.

Distribution of eDelphi Survey Rounds

The SM email collector method was selected to distribute a personalized email message to each panel member (Joinson and Reips, 2007) with a URL link to the survey. A list containing the panel email addresses, names and identification (ID) numbers compiled in a Word document was inserted into the respondent field. Each panel member was assigned an ID number to track responses between rounds and provide individual feedback. Participants' names, email and IP addresses were separated from the ID numbers when data were imported into the SPSS database. For each round of surveys, emails were scheduled for distribution, with three follow up reminder emails to non-responders per round (Cowman et al., 2012; Delbecq et al., 1986; Edwards Philip et al., 2009; Geist, 2010). Based on recommendations in the literature, each survey round was open for two weeks (Delbecq et al., 1986; Fan and Yan, 2010). The list of responders from each round was copied into new recipient lists for subsequent rounds. Depending on the research design, such as when tracking responses is not required, survey response collector options include using a web-link, embedding a survey on a website, or posting a web-link on Facebook (SurveyMonkey, n.d.).

Piloting the survey is a crucial step for a good Delphi research design (Latour et al., 2009; Presser et al., 2004), in particular to assess for face and content validity, reliability and feasibility (Cowman et al., 2012; Diaz-Guzman et al., 2012; Okoli and Pawlowski, 2004; Powell, 2003). The survey and data collection processes were pilot tested as recommended by Presser et al. (2004). A total of fourteen academics and critical care nurses were invited to complete the pilot survey and provide feedback and comments about the statements, process, survey instructions, and ease of completing the survey. No difficulties were encountered with the process of distributing the survey or receiving responses. Feedback resulted in minor wording changes and editing for clarity only. The round one survey could be completed in less than 30 min as recommended by Okoli and Pawlowski (2004).

Panel

In the Delphi method non-probability sampling techniques are employed. There is the purposive selection of a panel of 'experts', a term used in this context to mean informed individuals with knowledge about a specific subject.

There is no agreement on an ideal panel size, this being a balance between large numbers being difficult to manage and having high attrition rates versus a small panel size potentially introducing bias and lack of generalizability (Delbecq et al., 1986). It is more pertinent to

consider how many varieties of groups are needed to represent all relevant perspectives. Compared to homogenous groups, diverse, heterogeneous panels will require larger samples to ensure validity of results (Keeney et al., 2010). In this study, a heterogeneous group of experts was selected in order to obtain the perspectives of four stakeholder groups: experts in critical care nursing standards, course stakeholders, practice stakeholders and course graduates. Health consumer views had already informed the generation of statements for the structured first survey.

The panel was thus selected so that the spectrum of remaining stakeholder opinion could be determined, also ensuring an appropriate distribution across states and territories in Australia. Clear selection criteria were applied to maximize generalizability and to minimize the potential for introduction of researcher bias. This was guided by the five step procedure (Box 1) originally described by Delbecq et al. (1986), and more recently by Okoli and Pawlowski (2004). Potential panel members were directly contacted by email and one hundred and five nurses agreed to participate. The eDelphi survey data were collected between July and September 2012. The study method is illustrated in Fig. 1.

Depending on the survey design there is considerable variation on what is considered to be an acceptable response rate (Johnson and Owens, 2003; Keeney et al., 2010). However, Keeney et al. (2010) indicate that response bias can occur if attrition is substantial and a 70% response for each round is considered acceptable to maintain rigor. Table 1 details the strategies that were used to maximize the panel response rates that resulted in response rates greater than 85% over the three survey rounds.

Providing Feedback to Panel Members

Following each of the three survey rounds, each panel member who completed a survey received feedback consisting of the distribution of responses and a summary of comments, together with a copy of the ID numbered coded individual responses. These data informed each participant of his or her position relative to the rest of the panel (Boulkedid et al., 2011). The distribution of group responses was gen-

erated using SM's results analysis section. In round one a stacked bar chart depicting seven colour coded response choices was generated for the importance scale of statements, grouped within domains (group of statements). For rounds two and three, results for both scales (importance and level of practice), were produced. Fig. 2 shows an example of a chart used to provide round one feedback illustrating the distribution of responses by level of importance. Fig. 3 shows an example of a round two chart presenting the distribution of responses by level of graduate practice. The charts were downloaded together with a summary of comments and were inserted into a Word document. The summary document and the individual responses were emailed directly to each panel member, as this could not be achieved via SM (as the email collector is limited to distribution of emails containing the survey URL link and to collection of responses).

Data Analysis

The round one survey panel responses and qualitative feedback were reviewed and comments included for thematic analysis (Braun and Clarke, 2006). Comments were then categorized into themes; the scope or area of practice, suggestions for changes to the wording of existing statements, and new concepts. This process resulted in the revision of the survey for round two.

The SM software was used to generate stacked bar charts to provide the panel with a distribution of responses following each round. In SM, each round is developed as a separate survey. This means that data need to be exported to other software to undertake data analysis between/across rounds or data sets. Data were exported into SPSS version 19 (SPSS Inc., 2010). Descriptive statistics were used to report and review the panel demographic characteristics. Stability of panel responses between rounds two and three surveys was also assessed.

Ethical Considerations

Ethics approval was obtained from the University Human Research Ethics Committee (HREC) (SON&M 23-2011). Consent was inferred by panel members' agreement to participate in the study and submission of the completed surveys. Research conducted over the web poses additional threats to privacy and confidentiality in that the data exist as virtual records and although owned solely by the researcher, are potentially accessible by others (Ahern, 2005; Duffy, 2002). This potential threat is less of a concern when the nature of the research is not sensitive, however, respect for and paying due regard to the rights of human participants to privacy and confidentiality is a paramount principle of research ethics (National Health and Medical Research Council, 2007).

SM employs a number of security measures including Secure Sockets Layer (SSL) encryption of passwords, servers kept in locked cages, digital surveillance, intrusion detection systems, weekly network security audits, firewall restrictions and daily hacker safe scans. Data are backed up hourly, with daily centralized back up and off site data storage (SurveyMonkey, 2011). Participants were informed that researcher access to the survey was password protected, and data were collected and hosted on secure web servers. The process of undertaking the pilot study confirmed that the format of the collected data could be reliably and directly downloaded to SPSS for data analysis. Participants were informed that in order to provide feedback and track responses between rounds, data were treated confidentially but were not anonymous. Participants' names, email and IP addresses were separated from the ID numbers when data were imported into SPSS to ensure that only the principal researcher was able to link participants' responses to their identifying information. Downloaded data were then stored on a password protected computer. Finally, as soon as the final data download and analysis were completed, data were deleted from the web servers to further protect participants' privacy (Fan and Yan, 2010). This additional step involved contacting SM

Box 1

Steps in selecting panel members.

Step 1	Identify the most appropriate categories of experts or stakeholder groups for the panel. Four groups were identified
Step 2	Populate the stakeholder groups with names derived from: previous research participation, publications on topic, professional email lists, professional organization board and advisory panel involvement. Course graduates were contacted via email distributed by course coordinators *
Step 3	Contact individuals
Step 4	Ask them to nominate other experts Create sub-lists for each stakeholder group Rank experts based upon criteria of representation of professional role/state or territory/specialty practice area/public or private health service
Step 5	Invite experts according to their ranking for each stakeholder group Target size for each group was 25 Stop soliciting experts when group size is reached or total population invited

*Course graduates volunteered to participate and were all selected. Adapted from Delbecq et al. (1986), and Okoli and Pawlowski (2004).



Fig. 1. Study method for the development of the critical care course graduate practice standards.

customer support to request data be deleted and the account canceled. The deleted data could still potentially be retrievable as permitted by applicable law for up to 12 months (SurveyMonkey, 2011).

Discussion

Using SM to undertake this eDelphi technique provided a number of advantages over traditional survey approaches; these included the high quality of the data collected, ease and speed of administering the surveys, communicating with the panel and the generation of panel feedback. These advantages enabled data collection to be undertaken in 12 weeks.

The panel response rate and attrition rate over three rounds have the potential to impact on the rigor of a Delphi study (Keeney et al., 2010). Online panel response rates have been reported as lower than mail or telephone surveys (Fan and Yan, 2010). The panel response rate for this study was greater than the 70% determined a priori (Keeney et al., 2010) and was sustained over the three rounds. Response rates in Delphi studies have varied (Boulkedid et al., 2011), although similar response rates have been previously reported using mail (Duffield, 1993) as well as eDelphi methods (Sowter et al., 2011; Stagers et al., 2002). This study's high response rate was attributed to the combination of measures taken including the online project administration, the careful selection of appropriate panel as

Table 1
Strategies used to enhance panel response rate and motivation.

Panel members provided with a clear explanation of the eDelphi process and informed that their commitment would involve three rounds of surveys and feedback over several months (Fan and Yan, 2010)
Selection of panel members who strongly identified with the study aim (Barrios et al., 2011; Edwards Philip et al., 2009)
The University logo displayed on each page of the survey, and the HREC approval and contact details provided on the first page to strengthen participants' perceptions about the link between the research and the academic institution (Allen and Roberts, 2010).
Participants' commitment to participate obtained prior to survey distribution (Boukledid et al., 2011; Edwards Philip et al., 2009; Keeney et al., 2010)
Personalized communication with panel (Edwards Philip et al., 2009; Fan and Yan, 2010)
Ongoing email communication, feedback and reminders (Edwards Philip et al., 2009; Keeney et al., 2010)
Careful wording in survey title to avoid email being filtered to recipients' junk mailboxes (Fan and Yan, 2010)
Quick turnaround time to reduce panel attrition and retain interest
Each round results returned to panel members (Edwards Philip et al., 2009)
Survey limited to three rounds to reduce panel fatigue
Communication of the value and importance of each panel members contribution and impact on the research outcome (Fan and Yan, 2010)

well as salience of the topic to the panel members (Edwards Philip et al., 2009).

The quality of data collected online was also very good, both in terms of completeness and participants' comments. This advantage of online data collection has been previously reported (Barrios et al., 2011), although no difference between paper based and online data quality has been found (Geist, 2010). In this study to maximize data completeness, the survey was set up to require compulsory responses to each statement. This appeared to be effective until a problem arose during round two data collection when three respondents reported that they had been unable to progress past a certain question and so were unable to complete the survey. This was resolved by removing the requirement for compulsory responses. As the responses were not anonymous, participants who had only partially responded were then individually followed up. An email with a new URL link was sent to those who had not fully completed the survey (as well as non-responders) thanking

them for their patience, informing them that the technical problem had been resolved, and requesting completion of the survey by an extended closing date. No further problems were experienced.

Over the three rounds of surveys, panel members provided a large volume of comments and feedback. This high level of panel engagement might be attributed to a number of factors that also featured in the high response rates to each survey round; selection and recruitment of appropriate panel members, the design of the survey, inviting participant feedback throughout the survey, the ease of survey response through the online platform and returning summaries of responses and comments to the panel after each round.

Administration of the three rounds of surveys and the related email reminders was an efficient process that permitted communication to be scheduled to maximize its effectiveness, such as planning the intervals between when emails were delivered to the panel (Fan and Yan, 2010). SM permits easy generation of charts to present the

Domain: Quality of care and patient safety By the end of the critical care program the graduate will be able to

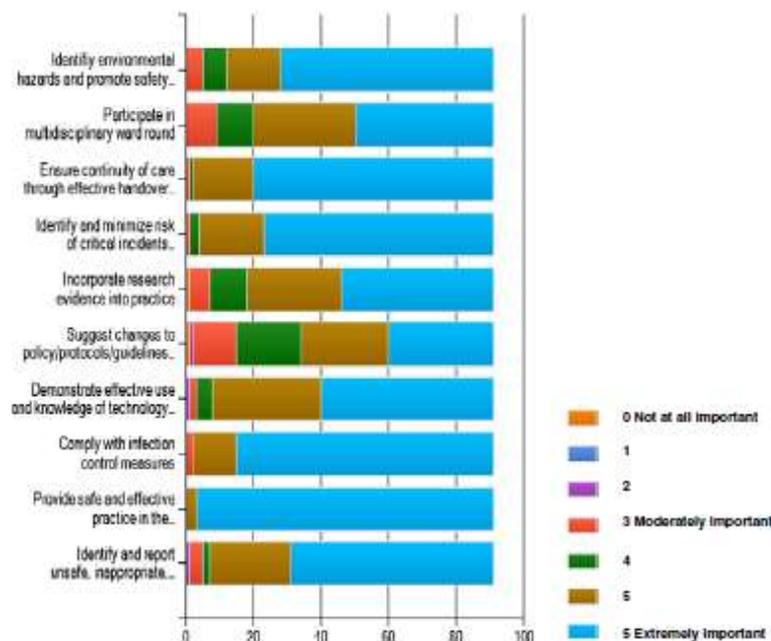


Fig. 2. Round one stacked bar chart depicting for one domain the distribution of responses indicating each statement's rating for level of importance.

Domain: Resuscitation level of practice rating scale By the end of the critical care program the graduate

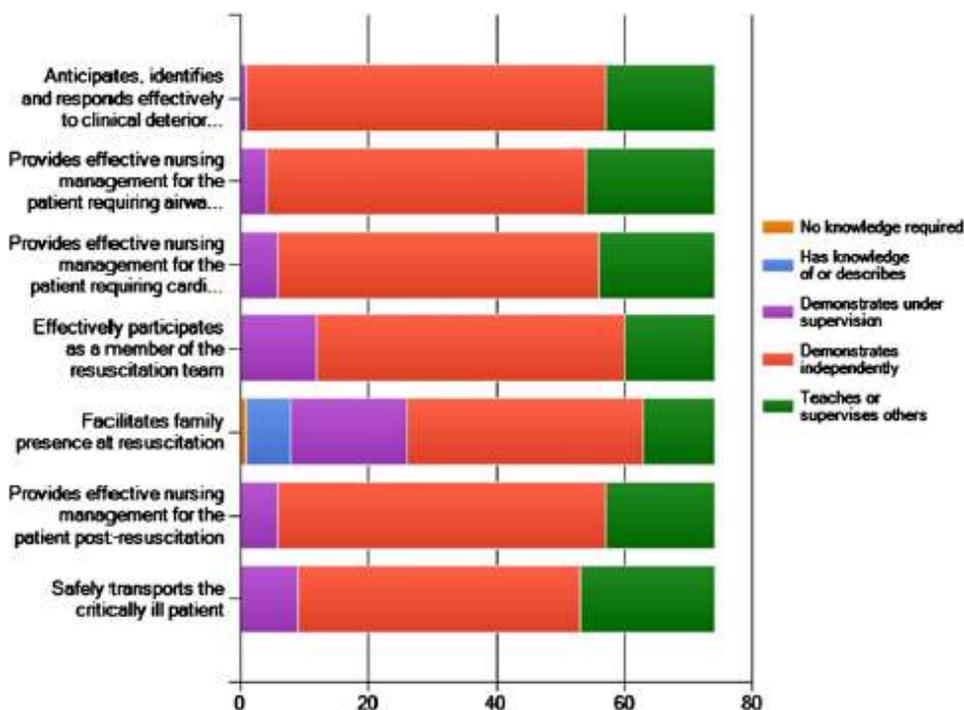


Fig. 3. Round two stacked bar chart depicting for one domain the distribution of responses indicating each statement's rating for level of practice.

distributions of panel responses in a user friendly format (colour coded stacked bar charts). This process would have been much more complex and time consuming if it was necessary to first export data to other software, and then manipulate data to present feedback to the panel.

Using SM to administer the eDelphi surveys required consideration of the ethical issues that were specific to using the Internet to conduct research and to the external hosting or outsourcing of web-based software. In this study the potential threats to participant privacy and confidentiality were identified and steps taken to minimize the risks. The threat to data security was not considered high risk as data were not as sensitive as may be the case for other health research. In designing Internet-based research, consideration needs to be given as to whether the potential threat to data security outweighs the benefits of using an externally hosted commercial software product. An alternative where researchers have more control of data would be to develop and host the web survey internally using secure university domains (Allen and Roberts, 2010).

At the time of University HREC review, the application of the underlying ethical principles to newer research methods, such as online surveys, appeared to be lagging behind research in practice. The specific ethical considerations are not yet articulated either across universities' HRECs (Allen and Roberts, 2010), or within national research ethics guidelines (National Health and Medical Research Council, 2007). It has also been suggested that HREC members may lack the expertise to review Internet-based research proposals (Duffy, 2002). A logical step would be that universities develop coordinated institution wide approaches to online surveying and implement policies to guide researchers (Allen and Roberts, 2010).

Limitations

There were limitations to this study, in particular that its success was dependent on participants' email access and computer skills (Duffy, 2002). It was considered that this would not be a barrier for these participants, as they had all used email previously, and were all familiar with using the Internet (Barrios et al., 2011). This premise was supported by the high response rates achieved over the three rounds. In addition, the SM email collector could be monitored to identify when there were email delivery failures or partially completed surveys. This occurred on a small number of occasions and the email address details were checked, the email resent or participants followed up.

SM did not permit emails to be sent with files attached or without a URL link. This necessitated emailing feedback directly to panel members after each round. Using SM for the first time involved a learning curve and significant time to set up and test the survey before piloting. The software also required basic computing skills. Skills in using HTML (HyperText Markup Language) would be beneficial for those users who wish to further customize surveys.

Conclusion

This eDelphi study aimed to obtain the opinions of a national panel of experts on critical care course graduate practice standards and was achieved using an online platform. The three rounds of surveys, including panel feedback between rounds, were facilitated by the ability to easily communicate with panel members located across Australia. Preparing feedback to provide to the panel collectively and individually

was achieved using a combination of SM and Word software features. This enabled the three rounds of data collection and participant feedback to be achieved within a timeframe of 12 weeks. The high response rate over the three rounds, and high level of data quality were attributed to the combined effectiveness of the strategies employed. This could not have been achieved using traditional methods. In designing this study it was already known that the potential panel participants regularly used email. In considering whether to use online survey software such as SM, it will be important to match the research design with the computer capabilities of the panel (using email and other software), as well as to carefully select panel members.

Using new technology requires a basic level of computer skills as well as time to develop new skills. The process of using web based survey software was overall efficient and user friendly. Only minor challenges were experienced as part of the learning curve of using unfamiliar technology. Specific research ethical issues were raised by the use of externally hosted web-based survey software. Although the threats to participant privacy and confidentiality were minimized, these risks will need to be carefully considered by others. Ethical review guidelines and processes need to address online research practices.

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References

- Ahern, N.R., 2005. Using the internet to conduct research. *Nurse Researcher* 13 (2), 55–70 [Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=eazh&AN=20090829>].
- Allen, P.J., Roberts, L.D., 2010. The Ethics of Outsourcing Online Survey Research. IGI Global.
- Barrios, M., Villarroya, A., Borrego, A., Ollé, C., 2011. Response rates and data quality in web and mail surveys administered to PhD holders. *Social Science Computer Review* 29 (2), 208–220. <http://dx.doi.org/10.1177/0894439310368031>.
- Boulkedid, R., Abdoul, H., Loustau, M., Sibony, O., Albeni, C., 2011. Using and reporting the Delphi method for selecting healthcare quality indicators: a systematic review. *PLoS One* 6 (6), e20476. <http://dx.doi.org/10.1371/journal.pone.0020476>.
- Braun, V., Clarke, V., 2006. Using thematic analysis in psychology. *Qualitative Research in Psychology* 3, 77–101. <http://dx.doi.org/10.1191/1478088706qp0630a>.
- Cantrell, M.A., Lupinacci, P., 2007. Methodological issues in online data collection. *Journal of Advanced Nursing* 60 (5), 544–549. <http://dx.doi.org/10.1111/j.1365-2648.2007.04448.x>.
- Chang, A., Gardner, G., Duffield, C., Ramis, M., 2010. A Delphi study to validate an Advanced Practice Nursing tool. *Journal of Advanced Nursing* 66 (10), 2320–2330. <http://dx.doi.org/10.1111/j.1365-2648.2010.05367.x>.
- Cowman, S., Gedlin, G., Clarke, E., Moore, Z., Craig, G., Jordan-O'Brien, J., Strapp, H., 2012. An international Delphi study identifying the research and education priorities in wound management and tissue repair. *Journal of Clinical Nursing* 21 (3–4), 344–353. <http://dx.doi.org/10.1111/j.1365-2702.2011.03950.x>.
- Crookes, P., Brown, R., 2010. The Development of a Pre-registration Nursing Competencies Assessment Tool for Use Across Australian Universities Strawberry Hills, NSW, Australia.
- Dawes, J., 2008. Do data characteristics change according to the number of scale points used? *International Journal of Market Research* 50 (1), 61–77 [Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=eazh&AN=27996447&site=ehost-live>].
- Delbecq, A., Gustafson, D., Van de Ven, A., 1986. Group Techniques for Program Planning: A Guide to Nominal Group and Delphi Processes. Green Briar Press, Middleton, Wis.
- Diaz-Guzman, E., Colbert, C.V., Mannino, D.M., Davenport, D.J., Arroliga, A.C., 2012. 24/7 in-house intensivist coverage and fellowship education. *Chest* 141 (4), 959–966. <http://dx.doi.org/10.1378/chest.11-2073>.
- Duffield, C., 1993. The Delphi technique: a comparison of results obtained using two expert panels. *International Journal of Nursing Studies* 30 (3), 227–237.
- Duffy, M.E., 2002. Methodological issues in Web-based research. *Journal of Nursing Scholarship* 34 (1), 83–88. <http://dx.doi.org/10.1111/j.1547-5009.2002.00083.x>.
- Edwards Philip, J., Roberts, L., Clarke Mike, J., DiGiuseppe, C., Wentz, R., Kwan, I., Pratap, S., 2009. Methods to increase response to postal and electronic questionnaires. *Cochrane Database of Systematic Reviews* (3). <http://dx.doi.org/10.1002/14651858.MRD000008.pub4>.
- Fan, W., Yan, Z., 2010. Factors affecting response rates of the web survey: a systematic review. *Computers in Human Behavior* 26 (2), 132–139. <http://dx.doi.org/10.1016/j.chb.2009.10.015>.
- Fletcher-Johnston, M., Marshall, S.K., Straitman, L., 2011. Healthcare transitions for adolescents with chronic life-threatening conditions using a Delphi method to identify research priorities for clinicians and academics in Canada. *Child: Care, Health and Development* 37 (6), 875–882. <http://dx.doi.org/10.1111/j.1365-2214.2011.01318.x>.
- Funke, F., Reips, U.-D., Thomas, R.K., 2011. Sliders for the smart: type of rating scale on the web interacts with educational level. *Social Science Computer Review* 29 (2), 221–231. <http://dx.doi.org/10.1177/0894439310376896>.
- Geist, M.R., 2010. Using the Delphi method to engage stakeholders: a comparison of two studies. *Evaluation and Program Planning* 33 (2), 147–154. <http://dx.doi.org/10.1016/j.evalprogplan.2009.06.006>.
- Gill, F.J., Leslie, G.D., Grech, C., Latour, J.M., 2012. A review of critical care nursing staffing, education and practice standards. *Australian Critical Care* 25 (4), 224–237. <http://dx.doi.org/10.1016/j.aucc.2011.12.056>.
- Gill, F.J., Leslie, G.D., Grech, C., Latour, J.M., 2013. Health consumers' experiences in Australian critical care units: postgraduate nurse education implications. *Nursing in Critical Care* 18 (2), 93–102. <http://dx.doi.org/10.1111/j.1478-5153.2012.00543.x>.
- Hasson, F., Keeney, S., McKenna, H., 2000. Research guidelines for the Delphi survey technique. *Journal of Advanced Nursing* 32 (4), 1008–1015. <http://dx.doi.org/10.1046/j.1365-2648.2000.011-01567.x>.
- Jancey, J., Meulemans, L., Phillips, M., 2011. Health professionals' perceptions of sexual assault management: a Delphi study. *Health Education Journal* 70 (3), 1–11 [Retrieved from http://espace.library.curtin.edu.au/view/action/singleViewer.do?dvs=1339485669876-9838&locale=en_US&VIEWER_URL=/view/action/singleViewer.do?&DEVELOPER_ID=108&frameId=1&usePid1=true&usePid2=true].
- Johnson, T., Owens, L., 2003. Survey Response Rate Reporting in the Professional Literature. American Association for Public Opinion Research.
- Johnson, A.N., Reips, U.-D., 2007. Personalized salutation, power of sender and response rates to Web-based surveys. *Computers in Human Behavior* 23 (3), 1372–1383. <http://dx.doi.org/10.1016/j.chb.2004.12.011>.
- Kaplowitz, M.D., Hadlock, T.D., Levine, R., 2004. A comparison of web and mail survey response rates. *Public Opinion Quarterly* 68 (1), 94–101. <http://dx.doi.org/10.1093/poq/nfh006>.
- Keeney, S., McKenna, H., Hasson, F., 2010. *The Delphi Technique in Nursing and Health Research*. Wiley, Chichester.
- Latour, J., Hazelzet, J., Duivenvoorden, H., van Goudoever, J., 2009. Construction of a parent satisfaction instrument: perceptions of pediatric intensive care nurses and physicians. *Journal of Critical Care* 24 (2), 255–266. <http://dx.doi.org/10.1016/j.jccr.2008.06.002>.
- McKenna, H.P., 1994. The Delphi technique: a worthwhile research approach for nursing? *Journal of Advanced Nursing* 19 (6), 1221–1225. <http://dx.doi.org/10.1111/j.1365-2648.1994.tb01207.x>.
- Miller, G., 1990. The assessment of clinical skills: competence/performance. *Academic Medicine* 65 (9), s63–s67 [Retrieved from <http://graphix.covind.com/bgw.hs.curtin.edu.au/vfpdfx/FPD/DN/CBNDLL1.CD0/f5046/ovf/live/gv023/00001888/00001888-19900900-0000-45.pdf>].
- National Health and Medical Research Council, 2007. National statement on ethical conduct of human research [Retrieved from <http://nhmrc.gov.au/publications/nhmrc>].
- Okoli, C., Pawlowski, S., 2004. The Delphi method as a research tool: an example, design considerations and applications. *Information Management* 42, 15–29. <http://dx.doi.org/10.1016/j.im.2003.11.002>.
- Powell, C., 2003. The Delphi Technique: myths and realities. *Journal of Advanced Nursing* 41 (4), 376–382.
- Prexer, S., Couper, M.P., Lessler, J.T., Martin, E., Martin, J., Rothgeb, J.M., Singer, E., 2004. Methods for testing and evaluating survey questions. *Public Opinion Quarterly* 68 (1), 109–130. <http://dx.doi.org/10.1093/poq/nfh008>.
- Ramelet, A.S., Gill, F., 2012. A Delphi study on National PICU nursing research priorities in Australia and New Zealand. *Australian Critical Care* 25 (1), 41–57. <http://dx.doi.org/10.1016/j.aucc.2011.08.003>.
- Sowler, J., Coris, J., Clarke, D.J., 2011. The development of evidence based guidelines for clinical practice portfolios. *Nurse Education Today* 31 (8), 872–876. <http://dx.doi.org/10.1016/j.nedt.2010.12.027>.
- SPSS Inc., 2010. IBM SPSS Statistics (Version 19). Retrieved from <http://www.spss.com>.
- Staggers, N., Gassert, C., Curran, C., 2002. A Delphi study to determine informatics competencies for nurses at four levels of practice. *Nursing Research* 51 (6), 383–390.
- SurveyMonkey, n.d. [Internet]. Retrieved from <http://www.surveymonkey.com>.
- SurveyMonkey, 2011. SurveyMonkey User Manual. SurveyMonkey [Retrieved from <http://help.surveymonkey.com/ef/assets/docs/pdf/UserManual.pdf?nohitcept/1>].
- The CollaTRICE Collaboration, 2006. Development of core competencies for an international training programme in intensive care medicine. *Intensive Care Medicine* 32 (9), 1371–1383. <http://dx.doi.org/10.1007/s00134-006-0215-5>.
- Uphoff, E., Wenckes, L., Punt, C., Grol, R., Woltersheim, H., Hermens, R., Ottevanger, P., 2012. Development of generic quality indicators for patient-centered cancer care by using a RAND modified Delphi method. *Cancer Nursing* 35 (1), 29–37. <http://dx.doi.org/10.1097/NCC.0b013e318210e3a2>.
- Watson, R., McKenna, H., Cowman, S., Keady, J., 2008. *Nursing Research Design and Methods*. Churchill Livingstone Elsevier, Philadelphia.
- Wilson, S., Hauck, Y., Bremner, A., Finn, J., 2012. Quality nursing care in Australian paediatric hospitals: a Delphi approach to identifying indicators. *Journal of Clinical Nursing* 21 (11–12), 1594–1605. <http://dx.doi.org/10.1111/j.1365-2702.2011.04004.x>.

3.2 eDelphi technique to develop practice standards

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Development of Australian clinical practice outcome standards for graduates of critical care nurse education

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Aims and objectives. To develop critical care nurse education practice standards.

Background. Critical care specialist education for registered nurses in Australia is provided at graduate level. Considerable variation exists across courses with no framework to guide practice outcomes or evidence supporting the level of qualification.

Design. An eDelphi technique involved the iterative process of a national expert panel responding to three survey rounds.

Methods. For the first round, 84 statements, organised within six domains, were developed from earlier phases of the study that included a literature review, analysis of critical care courses and input from health consumers. The panel, which represented the perspectives of four stakeholder groups, responded to two rating scales: level of importance and level of practice.

Results. Of 105 experts who agreed to participate, 92 (88%) completed survey round I; 85 (92%) round II; and 73 (86%) round III. Of the 98 statements, 75 were rated as having a high level of importance – median 7 (IQR 6–7); 14 were rated as having a moderate level of importance – median 6 (IQR 5–7); and nine were rated as having a low level of importance – median 4 (IQR 4–6)–6 (IQR 4–6). The majority of the panel rated graduate level of practice as 'demonstrates independently' or 'teaches or supervises others' for 80 statements. For 18 statements, there was no category selected by 50% or more of the panel. The process resulted in the development of 98 practice standards, categorised into three levels, indicating a practice outcome level by the practitioner who can independently provide nursing care for a variety of critically ill patients in most contexts, using a patient- and family-focused approach.

What does this paper contribute to the wider global clinical community?

- A rigorous research approach was used to develop standards for critical care nurse education graduate practice.
- The graduate practice standards provide a clear definition for professional health workforce standards.
- These standards can be used by course providers to achieve consistent graduate practice outcomes.

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Conclusion/relevance to clinical practice. The graduate practice outcomes provide a critical care qualification definition for nursing workforce standards and can be used by course providers to achieve consistent practice outcomes.

Key words: assessment, Delphi study, graduate-level education, intensive care, nursing, nursing education research, postregistration qualifications

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Introduction

Internationally, critical care is one of the largest nursing specialties. Registered nurses (RNs) who choose to work in this specialty are often expected or required to undertake postregistration critical care nurse education. In some countries, national and regional critical care workforce standards include staffing of critical care units with a minimum proportion of nurses who hold postregistration specialty qualifications. However, globally there are considerable variations. For example, no minimum proportion has been specified in the USA or Canada; an 'adequate' supply of qualified critical care nurses is recommended by the European federation of Critical Care Nursing associations (2007); in the UK, the British Association of Critical Care Nurses advocated that every patient has immediate access to an RN with a postregistration qualification (Bray *et al.* 2010); and in Australia and New Zealand, it is recommended that at least 50%, preferably 75%, of nurses working in ICU hold a critical care postregistration qualification (Australian College of Critical Care Nurses 2003, Critical Care Nurses' Section 2005, College of Intensive Care Medicine of Australia & New Zealand 2010, Australian Council on Healthcare Standards 2011).

Background

Level of qualification and expected learning outcomes vary widely across critical care nurse education programmes (Gill *et al.* 2012) to fulfil the demand for specialist critical care nurses. In Europe, and within Europe, the UK, there have been steps taken towards achieving a greater consistency in critical care courses and graduate practice outcomes (Critical Care Networks-National Nurse Leads 2013, European federation of Critical Care Nursing associations – EfCCNa 2013). Also within Europe, instruments have been developed to assess basic intensive care knowledge of Finnish nurses (Lakanmaa *et al.* 2014b), and in Cyprus to determine what competencies were expected of

postgraduate critical care nurses (Hadjibalassi *et al.* 2012). A different approach was taken in the USA and Canada where the credentialing or certification process enables critical care nurses to test themselves against a national standard (Canadian Nurses Association 2011, American Association of Critical Care Nurses n.d.). However, deficiencies remain in areas such as consumer consultation and no specific graduate academic and practice outcomes have been developed elsewhere. Given the current transition of nursing to higher education in Europe (Collins & Hewer 2014) and the continuing demand for qualified specialist nurses in critical care across the world, it is important that it is clear what can be expected of the graduate of specialist education.

In Europe, the National Competency Framework for adult critical care nurses in the UK (Critical Care Networks-National Nurse Leads 2013, Price 2013) and the Critical Care Nursing Competence Framework for the European critical care nursing workforce (European federation of Critical Care Nursing associations – EfCCNa 2013) have both been developed to guide practice and inform postregistration critical care nurse education programmes. The format of the UK competencies is for three steps of competence to identify specific expectations for competency development at various stages: step 1 identifies the competencies expected prior to the nurse commencing a critical care education programme within a 12- to 18-month time frame, and steps 2 and 3 identify the competencies to be achieved during the critical care education programme (Critical Care Networks-National Nurse Leads 2013). The different practice environments and postregistration nurse education systems in North America make it difficult to directly compare to the Australian context (Gill *et al.* 2012), although the Canadian Standards for Critical Care Nursing Practice (Canadian Association of Critical Care Nurses 2009) include statements suggesting that expectations for postregistration critical care nurse educational outcomes may be similar. Additionally, both the USA and Canada offer a certification process (Canadian Nurses

Association 2011, American Association of Critical Care Nurses n.d.) for critical care nurses to test themselves against national standards, which is an alternative strategy to achieve consistency in critical care nurse practice.

In Australia, the critical care environment includes adult and paediatric intensive care, cardiac care as well as any 'area specifically staffed and equipped for the continuous care of critically ill patients' (Australian College of Critical Care Nurses 2002, p. vi). The critical care nursing workforce comprises RNs. The pathway to nursing registration is by undertaking a bachelor degree (Lusk *et al.* 2001, Gill *et al.* 2012). Often, new graduates employed in critical care settings initially undertake local education programmes and are then encouraged or expected to commence graduate-level 'formal' critical care education. This is predominantly provided in the higher education (university) sector (Aitken *et al.* 2006, Gill *et al.* 2013a). This has meant a shift from the vocational-based postregistration courses offered by healthcare facilities to almost all courses now being offered by universities.

The transition process for both nurse registration preparation and postregistration courses to the higher education (university) sector is currently being experienced in Europe (Collins & Hewer 2014), and there may be lessons to learn from the Australian experience. There are reports of difficulties in specialist nursing education already being experienced in Europe as a consequence of the Bologna process (Millberg *et al.* 2011). The Australian Qualifications Framework (AQF) has set national policy and regulation for postschooling college- and university-level qualifications, ensuring that academic courses can be benchmarked both nationally and internationally (Tertiary Education Quality & Standards Agency 2011, Australian Qualifications Framework Council 2013). However, a framework to guide minimum practice standards for specialist graduate nursing programmes has not been identified. The lack of regulation or guidance has contributed to the considerable variation in critical care courses across the country. While circumstances may differ, this problem is seen in most jurisdictions where critical care nursing is a specialty.

Variation in graduate practice outcomes exists despite the widespread use of the Competency Standards for Specialist Critical Care Nurses in Australia. The Competency Standards were developed to articulate the practice of the specialist critical care nurse, as a framework for curricula development and as a basis for clinical assessment (Australian College of Critical Care Nurses 2002). Critical care course providers have reported modifying the Competency Standards to reflect their expectations for course graduate

practice outcomes (Aitken *et al.* 2006, Gill *et al.* 2013a). The inconsistency in interpreting the Competency Standards in this context and local differences, such as employer expectations of graduates and critical care practice environments, have all contributed to the variation across courses (Gill *et al.* 2013a).

It is also apparent that health consumer input into the development of critical care course curriculum and content has been deficient across countries offering postregistration critical care nurse education (Gill *et al.* 2013b). In Australia, this is likely to change with the introduction of a new national programme for safety and quality in Australian hospitals introduced in January 2013. Working in partnership with consumers is one of the ten hospital standards considered essential to improve patient safety and quality of care (Australian Council on Healthcare Standards 2012). While health consumers have become an increasing focus for quality healthcare outcomes internationally, critical care nurse education curricula have traditionally placed emphasis on clinical competence and technical expertise (Gill *et al.* 2013a), rather than developing relationships with and supporting critical care patients and their families. However, compelling reports with wide-reaching impact such as the Mid-Staffordshire NHS Foundation Trust Public Inquiry (The Mid Staffordshire NHS Foundation Trust Public Inquiry 2013) reinforce the importance of why health consumers and other key stakeholders need to be at the forefront of practice standard development. Given the environment of increasing health consumer involvement, it is interesting to note that health consumers were not consulted in the development of either of the UK or the European competency frameworks (Critical Care Networks-National Nurse Leads 2013, European federation of Critical Care Nursing associations – EFCCNa 2013). Similarly, in the USA there is little evidence to indicate that consumers play an active role in the development of certified critical care nurses.

To address this complex milieu of influencing factors and views, a project was designed in three stages to develop comprehensive practice standards for graduates of critical care nurse education. To achieve this, we first undertook a contextual review (Gill *et al.* 2013a) and then identified health consumers' priorities for critical care graduate practice standards (Gill *et al.* 2013b). These findings informed the current study reported here, which was to obtain the views of nursing stakeholders using an eDelphi technique. Taking into account drivers associated with new hospital and higher education regulatory environments, the aim of this study was to develop critical care nurse education practice outcome standards that would be applicable in the

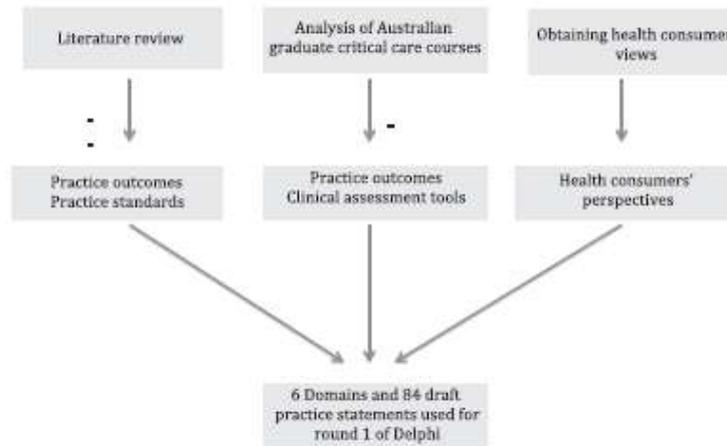
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Figure 1 Process of developing draft statements.

Australian context but could also fill a gap in the approach to curricula development for an international critical care nurse audience.

Method

An eDelphi technique was used that consisted of the iterative process of administering three rounds of surveys to a national panel of critical care nurse experts using web-survey software. In the first survey round, panel members were asked to rate the importance of statements rather than using the classic Delphi technique of responding to open questions (Keeney *et al.* 2010). The statements were developed as a result of earlier phases of a large study that included a literature review, analysis of 22 critical care courses and input from health consumers (Gill *et al.* 2012, 2013a,b). The process of developing the draft statements is illustrated in Fig. 1.

Ethics approval was obtained from the University Human Research Ethics Committee (SON&M 23-2011). Panel members were informed that consent was inferred by the submission of the completed surveys. A detailed description of the study methodology has been described in an earlier paper (Gill *et al.* 2013c) and is summarised below.

The panel

The panel members were purposively selected to obtain the perspectives of stakeholders. Four groups were identified: an advisory group, course stakeholders, practice stakeholders and course graduates (within 12 months of completing a critical care course). Well-defined selection criteria were

applied to populate each of the groups. The sampling strategy was guided by the five-step procedure (Box 1) originally described by Delbecq *et al.* (1986) and more recently by Okoli and Pawlowski (2004). Thus, the diverse group represented nursing stakeholders from each state and territory and from a range of critical care contexts (including adult and paediatric intensive care, cardiac care and critical care). The target size for each group was 25 to allow for some attrition over the Delphi rounds.

Box 1. Steps in selecting panel members

Step 1	Identification of the most appropriate stakeholder groups for the panel. Four groups were identified
Step 2	Population of the stakeholder groups with names derived from: related research participation, related publications, professional email lists, professional college board and advisory panel involvement. Course graduates were contacted via email distributed by course coordinators*
Step 3	Contacting individuals Ask them to nominate other experts
Step 4	Creation of sublists for each stakeholder group Ranking of experts based upon criteria of representation of professional role/state or territory/specialty practice area
Step 5	Invite experts according to their ranking for each stakeholder group Target size for each group was 25 Stop soliciting experts when group size is reached or total population invited

*Course graduates from four states and one territory volunteered to participate and were all selected.
Adapted from Delbecq *et al.* (1986), and Okoli and Pawlowski (2004).

Survey development

The initial survey contained 84 statements describing the scope of clinical practice expected of an RN critical care course graduate organised into six domains: (1) patient- and family-centred care (11 statements); (2) quality of care and patient safety (10 statements); (3) resuscitation (five statements); (4) assessment, monitoring and data interpretation (four statements); (5) critical illness management (43 statements); and (6) teamwork and leadership (11 statements).

The survey and data collection processes were first pilot tested, as recommended by Presser *et al.* (2004), by 14 academics and critical care nurses who provided feedback and comments about the statements, process, survey instructions and ease of completing the survey. No difficulties were encountered with the process, and feedback resulted in minor wording changes and editing for clarity only. For the round I survey, a seven-point rating scale was used and response choices ranged from not at all important to extremely important. Panel members were also invited to make comments and suggestions in order to include further statements or clarify the options offered.

For round II and III surveys, a second categorical competency scale was included for participants to identify the level of practice expected of course graduates for each statement derived from the round I results. The five categories were adapted from Miller's assessment framework (Miller 1990) and more recent work by The CoBaTrICE Collaboration (2006). The response categories were as follows: no knowledge required; has knowledge of or describes; demonstrates under supervision; demonstrates independently; and teaches or supervises others. In round II, panel members were also invited to make comments and provide feedback.

Distribution of eDelphi survey rounds

Web-survey software SurveyMonkey was used to administer the eDelphi process (Gill *et al.* 2013c). For each round of surveys, three follow-up reminder emails per round were sent to nonresponders. The round II surveys were sent only to participants who responded to round I, and for round III, surveys were sent only to participants who responded to round II. Following each of the first two survey rounds, each panel member who completed a survey received feedback consisting of the distribution of responses and a summary of comments, together with a copy of his/her individual responses. Following round I, a summary of the panel's comments and a stacked bar chart depicting the

seven response choices were generated for the level of importance scale for each statement, grouped within domains (group of statements).

Based upon the round I survey panel's comments, the round II survey instructions for the panel reiterated four key points that the standards:

- Should represent what panel members considered to be appropriate for national critical care course graduate standards, not only what currently existed in their own area of practice.
- Differed from the existing ACCCN Competency Standards for Specialist Critical Care Nurses (2002) as they related to critical care nursing education and expected graduate outcomes.
- Were in addition to, or beyond, beginning general or RN competencies (Nursing & Midwifery Board of Australia n.d.) and were at the level of critical care course graduate.
- Were identified as minimum critical care course graduate practice standards rather than a graduate award level.

Following round II, stacked bar charts for both scales (level of importance and level of practice) were produced, with a summary of comments and suggestions for further development of the statements. Stability of group responses between round II and round III was calculated to guide decision-making for stopping the Delphi technique after three rounds or conducting a fourth round. A fourth round may have been required if significant differences were found between the last two consecutive rounds.

Data analysis

The round I survey panel feedback was reviewed, and comments relevant to the topic were included for thematic analysis. This method is a step-by-step process focusing on the search of repeated patterns of meaning across the data sets to identify prominent themes (Creswell 2009, Liamputtong 2010). In the first step, all comments were read through to obtain an overall perspective of the information and reflect on its meaning. In the next step, the content data were independently coded using the domains and statements as the primary categories. The comments that reflected similar ideas were grouped together and given a representative code. The identified codes were examined using a constant comparison process where each code was compared with the rest of the data to establish and summarise the prominent themes.

The SurveyMonkey software was used to generate the stacked bar charts illustrating the distribution of responses

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by level of importance. Data were imported into SPSS version 19 (IBM Corp 2012), and descriptive statistics including frequency distributions were computed. Median and interquartile ranges were calculated as data were not continuous or normally distributed. A chi-squared test was used to compare differences between the participant characteristics across rounds I and III. To measure the stability of responses between rounds II and III, differences were compared using the Wilcoxon signed-rank test. Group stability occurred if there was no significant difference between response-category frequencies for two consecutive Delphi rounds (Chaffin & Talley 1980, Keeney *et al.* 2010). Differences between four groups were compared using the Kruskal-Wallis test. Differences between two groups were compared using the Mann-Whitney test. Level of significance was set at $p < 0.05$.

For the level of importance scale, statements were ranked by highest median and smallest IQR. Statements with a median of 7 and lower quartile range of 6 to 7 were defined as having a high level of importance, statements with a median 6 and IQR 5–7 a moderate level of importance and statements with a median <6 and IQR >5–7 a low level of importance. For the level of practice scale, statements were ranked within each domain by highest percentage. Panel agreement was defined as 50% or more for one category. The final steps to determine the statements for the graduate practice standards were undertaken by combining panel ratings for both scales.

Results

The eDelphi survey data were collected between July–September 2012. Of the 105 experts who agreed to participate, 92 responded to the first round. The response rate in round II was 85 (92%) and in round III 73 (86%). Table 1 details the response rates for each stakeholder group.

Group	Agreed to participate	Respondents round I (%)	Respondents round II (%)	Respondents round III (%)
Advisory	27	25 (92)	24 (96)	19 (74)
Course coordinators	22	17 (77)	16 (94)	15 (94)
Practice stakeholders	37	34 (92)	30 (88)	26 (87)
Course graduates	19	16 (84)	15 (93)	11 (73)
Total	105	92 (88)	85 (92)	73 (86)

Table 1 Panel and group response rates for three survey rounds

Panel demographic characteristics

Table 2 presents the demographic characteristics of the panel for round I ($n = 92$) and round III ($n = 73$). There were no statistically significant differences between panel members between round I and round III. The characteristics of the panel members in round III showed that nearly half (47%) worked in nursing practice or education roles. The remainders were course coordinators (14%), course graduates (15%) or worked in nursing research roles (23%). Typically, panel members worked in a clinical role (52%), in the adult intensive care setting (58%) and with 16 years or more critical care experience (62%). More than 20% held PhD qualifications.

Round I

Panel comments were categorised into three themes: (1) the scope or area of practice, (2) suggestions for changes to the existing statements and (3) new concepts. This process resulted in editing of 31 statements, the addition of 18 new statements and deletion of three statements, resulting in a total of 99 statements. The round II survey consisted of the described revisions to the statements and the addition of the second scale to indicate the level of practice expected for a course graduate.

Round II

From panel comments in round II, three main issues arose and a number of suggestions were provided. The issues were as follows: (1) despite the provision of guiding statements, panel members continued to identify that the different graduate practice expectations depended on the award level of course, (2) the need to define terms such as 'advanced', 'under supervision' and 'independently' and (3) one duplication (the statement for the patient requiring interventional cardiology being identified as inclusive of the

Table 2 Delphi panel characteristics for rounds I and III

	Round I (n = 92)		Round III (n = 73)		p-value
	n	%	n	%	
Age					
<31	11	11.9	8	11	p = 0.99
31–40	14	15.2	10	13.7	
41–50	37	40.4	31	42.4	
>50	30	32.6	24	32.8	
Gender					
Female	75	81.5	60	82.2	p = 0.91
Male	17	18.5	13	17.8	
Work environment					
Public health service	68	73.9	29	39.7	p = 0.34
Private hospital	3	3.3	3	4.1	
University	19	20.7	17	23.3	
Combined hospital and university	10	10.9	6	8.2	
Critical care specialty area					
Adult ICU	55	59.8	42	57.5	p = 0.97
Paediatric ICU	11	12	8	11	
Cardiac care	5	5.4	5	6.8	p = 0.92
Critical care	19	20.7	17	23.3	
Other	2	2.2	1	1.4	
Clinical or nonclinical					
Clinical	49	53.3	38	52	p = 0.92
Nonclinical	29	31.5	25	34.2	
Combined	12	13	11	15	
State or territory					
Qld	13	14.1	11	15	p = 0.97
NSW	21	22.8	14	19.2	
ACT	3	3.3	3	4	
VIC	16	17.4	14	19.2	
TAS	2	2.2	2	2.7	
SA	11	12	7	9.6	
NT	1	1.1	1	1.4	
WA	26	28.3	21	28.8	
Years nursing					
2–5	9	9.8	6	8.2	p = 0.99
6–10	8	8.7	6	8.2	
11–15	7	7.6	7	9.6	
16–20	13	14.1	10	13.7	
>20	55	59.8	44	60.3	
Years in critical care					
<5	12	13.1	8	11	p = 0.97
6–10	11	12	10	13.7	
11–15	15	16.3	13	17.8	
16–20	13	14.1	9	12.3	
>20	41	44.6	36	49.3	
Qualification specialty*					
Adult ICU	53	57.6	41	56.2	p = 0.98
Paediatric ICU	11	12	9	12.3	
Cardiac	7	7.6	5	6.8	
Critical care	24	26	22	30	
Other	6	6.5	4	5.5	

ICU, intensive care unit; Qld, Queensland; NSW, New South Wales; ACT, Australian Capital Territory; VIC, Victoria; TAS, Tasmania; SA, South Australia; NT, Northern Territory; WA, Western Australia.

*Some panel members held more than one qualification.

statement for the patient requiring cardiac catheterisation). Further suggestions for statements were related to curricula detail rather than outcome practice standards. In addition, a number of statements were identified as being relevant to all patients rather than grouped within the respiratory section. While no further changes were made to the round III survey, the comments and suggestions were addressed in the resultant graduate practice standards.

Round III

Following deletion of the duplicated statement, there were 98 statements for round III.

Stability of responses between rounds II and III. Comparison of the median responses for the level of importance scale from round II and III surveys found one statistically significant difference in the teamwork and leadership domain ($z = -1.98$, $p = 0.047$). For the remaining five domains, there were no statistically significant differences, implying at least a reasonable stability of responses between consecutive rounds. Given this level of agreement between rounds, the small amount of feedback and suggestions received in round II, as well as the potential panel burden to participate in another survey, a fourth round was considered to be unwarranted.

Level of importance scale. Of the total 98 statements, 75 statements were rated as having a high level of importance – median 7 (IQR 6–7); 14 statements were rated as having a moderate level of importance – median 6 (IQR 5–7); and nine statements were rated as having a low level of importance – median 4 (IQR 4–6)–6 (IQR 4–6; Table S1).

Differences between groups. The panel consisted of four groups representing nursing stakeholders: advisory group, course stakeholders, practice stakeholders and course graduates, and it was of interest whether their responses differed. Comparison was made between the groups based on domain by stakeholder group mean scores in respect of their responses to the level of importance scale. No statistically significant differences were found between the four groups' mean rank responses (Table 3).

The panel consisted of participants from adult and paediatric intensive care, cardiac and critical care settings. Given the diverse panel backgrounds, it was also of interest whether panel responses differed between settings, in particular between the adult and paediatric practice settings. Comparison was made between these two groups, and there were no statistically significant differences

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Table 3 Comparison round III mean rank responses for level of importance in each domain. (a) Stakeholder groups: advisory group ($n = 19$), course coordinators ($n = 15$), graduates ($n = 11$), practice group ($n = 26$). (b) Adult ($n = 64$) and paediatric ($n = 8$) critical care groups

(a)			
Domain	H or χ^2	df	p -value*
Patient- and family-centred care	0.56	3	0.91
Quality of care and patient safety	4.33	3	0.23
Resuscitation	0.89	3	0.83
Assessment, monitoring and data interpretation	2.94	3	0.40
Critical care management	2.49	3	0.48
Teamwork and leadership	2.94	3	0.40
(b)			
Domain	Z		p -value†
Patient- and family-centred care	-0.14		0.89
Quality of care and patient safety	-0.40		0.69
Resuscitation	-2.52		0.01
Assessment, monitoring and data interpretation	-0.72		0.47
Critical care management	-1.43		0.15
Teamwork and leadership	-1.06		0.29

*Kruskal-Wallis test; df, degrees of freedom.

†Mann-Whitney U -test (2 tailed).

between the two groups' mean rank responses for level of importance for five of the six domains (see Table 4). A statistically significant difference ($p = 0.01$) was found for the resuscitation domain. This could be explained by one statement within the domain where paediatric nurses indicated that 'Facilitates family presence during resuscitation' was of significantly higher importance ($p = 0.008$).

Level of practice scale. The second rating scale comprised five categories of level of clinical practice. The majority of the panel rated graduate level of practice as 'demonstrates independently' for 73 statements and 'teaches or supervises others' for seven statements. These were considered the highest level of practice. Of those 80 statements, there were three statements where 75% or more of the panel agreed on the category. These were: 'Individualises emotional and psychological support for the patient and family', 'The patient with acute coronary syndrome' (term used to describe symptoms attributed to obstruction of the coronary arteries and includes angina and myocardial infarction) and 'The patient with shock'. For 77 statements, between 50–75% of the panel agreed on the category. For the remaining 18 statements, there was no category selected by 50% or more of the panel (Table S2).

Critical care course graduate practice standards. The final steps to determine the statements for the graduate practice standards were to combine panel ratings for both scales, delete further repetition and use panel suggestions and comments to refine statement wording. The statements, within domains, are presented in a structured format using three levels of practice standards (See Box 2). Note that this was a final step undertaken by the researchers in the interpretation process (not determined *a priori*). The levels do not infer level of practice; they only define the process used to categorise the panel support for the standards and reflect three levels of panel support.

For one statement in the domain of 'Critical illness management', under the section 'Care of special populations Neonatal patients', the median panel rating for level of importance was <4 (IQR 2–5). The statement was not included. The graduate practice standards are presented in Table 4.

Box 2. Three levels of graduate practice standards

Level 1: for statements with high level of importance rating of median 7 and panel rating >50% for level of practice category 'demonstrates independently' and/or 'teaches or supervises others'

Level 2: for statements with moderate level of importance rating of median ≥ 6 (IQR 5–7) and panel rating of the highest percentage for level of practice category 'demonstrates independently'

Level 3: for statements with low level of importance rating of median range 4 (IQR 4–6)–6 (IQR 4–6) and panel highest percentage rating for level of practice category 'demonstrates independently'

Discussion

The study findings have revealed practice standards for graduates of critical care nurse education based upon the Australian context. These standards, categorised into three levels of practice, are considered to be appropriate for RNs who have completed a graduate-level critical care programme. The standards clearly indicate a practice outcome level by the practitioner who can provide nursing care for a variety of critically ill patients in most contexts, using a patient and family-focused approach.

In considering these findings in an international context, it is worthwhile comparing the study findings with other standards or frameworks. In Finland, an instrument was designed to assess basic competence in intensive and critical care nursing rather than nursing practice outcomes follow-

Table 4 Graduate practice standards

<p>Domain: A patient and family focused approach to care</p> <p>Level 1</p> <ul style="list-style-type: none"> • Promotes a compassionate and therapeutic environment for the well-being of the patient and family • Communicates effectively with the patient and family including patients who are intubated/nonverbal • Involves patients and families in decisions about care and treatment • Assists families to adapt to the critical care environment • Acts as a patient and family advocate • Protects patient and family dignity • Protects patient and family privacy and confidentiality • Demonstrates respect of the patient and family's cultural and religious beliefs • Facilitates and supports family choices to be present at the patient bedside • Provides effective nursing management for the patient and family requiring end of life care <p>Level 2</p> <ul style="list-style-type: none"> • Individualises socio-emotional support for the patient and family • Provides patient and family education • Addresses patient and family ethical concerns <p>Domain: Quality of care and patient safety</p> <p>Level 1</p> <ul style="list-style-type: none"> • Identifies and reports unsafe, inappropriate, incompetent practice • Provides safe and effective practice in the administration of drugs and therapeutic interventions • Identifies and minimises risk of critical incidents and adverse events • Complies with infection control measures • Communicates effectively in the multidisciplinary team • Identifies and reports environmental hazards and promotes safety for patients, families and staff • Demonstrates effective use and knowledge of technology/bio-medical equipment <p>Level 2</p> <ul style="list-style-type: none"> • Incorporates research evidence into practice • Ensures continuity of care from patient admission to discharge/transfer • Suggests changes to policy/protocols/guidelines <p>Domain: Resuscitation</p> <p>Level 1</p> <ul style="list-style-type: none"> • Anticipates, identifies and responds effectively to clinical deterioration • Provides effective nursing management for the patient requiring airway management • Provides effective nursing management for the patient requiring cardiopulmonary resuscitation • Effectively participates as a member of the resuscitation team • Provides effective nursing management for the patient post-resuscitation • Safely transports the critically ill patient 	<p>Level 2</p> <ul style="list-style-type: none"> • Facilitates family presence during resuscitation <p>Domain: Assessment, monitoring and data interpretation</p> <p>Level 1</p> <ul style="list-style-type: none"> • Effectively prioritises patient care needs • Anticipates, monitors, recognises and responds to trends in physiological variables • Provides effective nursing management of invasive patient monitoring • Gathers, analyses and integrates data from a variety of sources (technological and patient derived) to inform clinical decision-making • Undertakes a comprehensive physical, mental and socio-emotional patient assessment <p>Domain: Critical illness management</p> <p>Level 1</p> <ul style="list-style-type: none"> • Requiring intravenous fluids • Requiring vasoactive drugs • Requiring blood products • Requiring analgesia • Requiring sedation • With or at risk of delirium <p>Respiratory Care</p> <p>Level 1</p> <ul style="list-style-type: none"> • Requiring oxygen therapy • Requiring noninvasive mechanical ventilatory support • Requiring invasive mechanical ventilation • Weaning from mechanical ventilation • Requiring intercostal catheters/pleural drains • With chronic respiratory failure and mechanical ventilation <p>Cardiac Care</p> <p>Level 1</p> <ul style="list-style-type: none"> • With arrhythmias • With acute coronary syndrome • With heart failure • Requiring cardiac pacing <p>Level 2</p> <ul style="list-style-type: none"> • Pre- and/or postcardiac surgery <p>Level 3</p> <ul style="list-style-type: none"> • Requiring interventional cardiology • With a mechanical assist device <p>Shock and sepsis care</p> <p>Level 1</p> <ul style="list-style-type: none"> • With sepsis • With shock • With electrolyte, glucose, acid-base and blood gas disturbances • With gastrointestinal dysfunction • At risk of or actual altered skin integument • With multiorgan failure • With altered haematological function <p>Renal and hepatic care</p> <p>Level 1</p> <ul style="list-style-type: none"> • With renal failure • Requiring renal replacement therapy • With liver failure
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- Level 3
 - Postorgan transplantation
- Surgical and trauma care
 - Level 1
 - With altered level of consciousness
 - With raised intracranial pressure
 - With trauma
 - With comorbidities following complex surgery
 - Who is a potential organ and tissue donor
 - Level 2
 - Acute spinal cord injury
 - Thermal injury
- Care of special populations
 - Level 1
 - Culturally and linguistically diverse patients
 - Level 2
 - Bariatric patients
 - Mental health patients
 - Level 3
 - Obstetric patients
 - For adult critical care nurses: Paediatric patients
- Domain: Teamwork and leadership
 - Level 1
 - Recognises own scope of practice
 - Acts as a positive role model
 - Takes a collaborative approach to decision-making
 - Recognises and actively manages own stress and supports others
 - Effectively manages and coordinates the care of a variety of patients
 - Level 2
 - Supports other staff to enable delivery of effective care
 - Effectively engages in bedside teaching
 - Level 3
 - Performs in the ACCESS/Admissions/Resource Nurse Role
 - Acts as Shift Coordinator/Team Leader
 - Supervises, and delegates to others, the delivery of patient care

ing a critical care education programme (Lakanmaa *et al.* 2014a). In Cyprus, broad competencies were developed to inform postgraduate critical care nursing curricula rather than articulate graduate practice outcomes (Hadjibalassi *et al.* 2012). Therefore, these two instruments were not included in the following comparison. There are similarities in the domains, subdomains and competencies articulated by the Australian, UK (Critical Care Networks-National Nurse Leads 2013) and European (European federation of Critical Care Nursing associations – EfCCNa 2013) sets of competencies or practice standards. All have built on the expected RN competencies and addressed core areas of critical care nursing practice. Care of the critically ill obstetric and mental health patients was not identified in the competencies expected of the critical care nurse in any of the standards. One statement in the graduate practice standards specifically identified that in Australia adult critical care

nurses were not expected to be able to independently care for critically ill paediatric patients. This was not articulated in either of the other standards. This was not surprising for the UK standards as they were explicitly developed for adult critical care nurses. There were similarities that existed across the three standards, which was expected given that the intensive care nurse practice contexts are similar in environment, patient mix, staffing and scope (Gill *et al.* 2012).

In the European and UK frameworks, the competency statements have been articulated in greater detail than the statements in this study. This difference in approach to describing the competencies in detail may be explained by the UK framework's focus on adult intensive care. In the UK, there is a separate set of standards for the care of critically ill children, including, in an appendix, recommendations for a nationally consistent paediatric intensive care education programme for nurses (The Paediatric Intensive Care Society 2010). The European framework focus also appears to be intensive care. In Europe, it appears that the terms 'critical care' and 'intensive care' have been used synonymously (European federation of Critical Care Nursing associations 2004, Benbenishty *et al.* 2005, Fulbrook 2010, Fulbrook *et al.* 2012). The Australian practice standards reflect expectations of graduates across a variety of critical care environments that include adult and paediatric intensive care, cardiac care, tertiary, secondary and regional critical care units.

In addition to descriptions of competencies to be demonstrated in practice, the UK framework also describes the associated knowledge to be demonstrated through discussion between assessor and student. Both the European competencies and the Australian practice standards describe practice outcomes only. Differences also appear to exist in the level of practice that has been articulated. The level of graduate practice identified in this study most closely matches the UK step 2 competencies. The European competencies and the UK step 3 competencies (articulating UK critical care education outcomes) describe a more advanced practice level, of the team leader, being a resource to others and supporting junior staff. In this study, we have identified that Australian graduate outcomes are expected to be for a practitioner who can independently care for most critically ill patients in a variety of contexts. In more advanced practice roles such as team leader and being a resource to others, the expected graduate level of practice was 'demonstrates under supervision' or 'has knowledge of or describes'. This reflects expectations for Australian graduate outcomes that are less advanced than in Europe. Possible explanations to account for these

differences include that it may be that Australian nurses undertake critical care courses earlier in their career than nurses in Europe. As the European standards were developed using a single method of reviewing expert feedback as opposed to the four-step approach adopted for this study, it is likely that there may be more variability to actual practice than we have found in the Australian standards. Identifying why these differences exist warrants further exploration.

Expectations around graduate scope of practice also differ. European and UK critical care education graduates are expected to demonstrate competency in some of the more specialised areas, such as managing critically ill patients following cardiac surgery, with burns and, in the UK competencies, patients requiring trauma rehabilitation. Competencies not described in the UK or European frameworks but included in the Australian results are the management of cardiac patients with heart failure or acute coronary syndrome. This is not surprising given the broader critical care context in Australia.

The practice standards identified in this research have defined the scope for Australian critical care nurse education graduate-level practice. Graduates are expected to be able to independently care for critically ill patients in the majority of contexts, with a number of contexts explicitly identified as being beyond the scope of practice for the graduate. These include the following: more highly developed skills in providing socio-emotional support to patients and families, incorporation of evidence to practice, specialist post-operative care, specialist cardiac nursing and care of patient groups such as mental health patients, obstetric patients and for adult critical care nurses, the care of paediatric patients. This is not to say graduates are not able to work within these environments but will require further experience and support to transition to the level of independent practice. In the area of teamwork and leadership, it is clear that while graduates should act as positive role models, participate in decision-making and manage the care of a small group of patients, it is not reasonable to expect new graduates to take on distinct team leader roles in the critical care environment. Having knowledge of or describing the skills involved in shift coordination, admissions roles and supervision of others is considered sufficient. Graduates will be able to build on that knowledge and gain experience to develop skills in these areas in subsequent months and years.

It was interesting that while there was feedback from some of the panel members that their expected graduate practice outcome may depend on the award level, in fact there was panel agreement about the level of graduate practice outcome for a critical care qualification. Such delineation

of graduate scope of practice is an important study finding. The practice outcomes identified through this study do align with graduate certificate or diploma level education (Australian Qualifications Framework Council 2013), which is where specialist nurse practice is most often offered throughout the world. While the focus in courses is producing clinically competent graduates who can manage a variety of critically ill patients, the outcomes do not reflect leaders in the critical care context. If graduate education qualifications are to be modelled on a master level qualification, it might be perceived that there is a gap in the preparation of critical care nurse leaders (Pirret 2007). Areas for further research include specific educational approaches for specialist level critical care practice development and further exploration of the profession's expectations of master level practice outcomes.

The study findings provide a definition for the Australian professional health workforce standards recommendations that at least 50% of nurses working in an intensive care unit should hold a critical care qualification (Australian College of Critical Care Nurses 2006, The Intensive Care Society 2007, Australian Council on Healthcare Standards 2011). Up until now, there have been varying interpretations of what comprises a 'critical care qualification', and these findings can now be used to provide a consistent interpretation. This may be achieved by communicating our findings to inform the workforce standards for intensive care units (Australian College of Critical Care Nurses 2003, College of Intensive Care Medicine of Australia & New Zealand 2010, Australian Council on Healthcare Standards 2011).

The graduate level of practice has been identified as independently caring for critically ill patients in most contexts, but not undertaking critical care nurse team leader roles. This differs from the Competency Standards for Specialist Critical Care Nurses (Australian College of Critical Care Nurses 2002), which have been widely used for critical care nurse education curricula development and as a basis for student clinical assessment (Aitken *et al.* 2006, Gill *et al.* 2013a). The Competency Standards articulate the standards for the specialist level or the experienced nurse leader in critical care practice and have been modified for use in clinical practice assessment (Gill *et al.* 2006, 2013a). With specific critical care nurse education graduate practice standards identified, course providers can use these standards to achieve a greater consistency in graduate practice outcomes.

The study has limitations that need to be addressed. Although the Australian critical care nurse education practice standards have been built on a strong methodological basis study, limitations include the researchers' use of subjective judgement for interpretation of the eDelphi data.

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For example, panel agreement cut points were selected at 75% and 50% to aid categorisation of data. The next step will be to interpret the identified standards into a clinical assessment tool to measure graduate practice standards.

The majority of panel members being from the adult intensive care practice setting might also be considered a limitation to the study design. While the panel membership reflected the overall Australian critical care nurse population (Australian Health Workforce Advisory Committee 2002), the views of other subspecialty groups, particularly from the paediatric intensive care setting, were less well represented. The paediatric setting was included in this study because some Australian critical care units cater for adult and paediatric patients. The one statistically significant difference found was not surprising given the family-centred philosophy embraced by paediatric nurses (Latour & Haines 2007). Although no other statistically significant differences were identified, further research may reveal other differences between adult and paediatric critical care graduate nurse practice standards.

Conclusion

An eDelphi technique was used to identify critical care nurse education graduate practice standards in Australia. The national panel members were critical care nurses who represented four key stakeholder groups. Over the three eDelphi survey rounds, the panel members identified three levels of graduate practice standards. Critical care nurse education graduates are expected to be able to independently care for critically ill patients in the majority of contexts, with a number of contexts explicitly identified as being beyond the graduate scope of practice. In particular, in this study we found it is beyond the scope of Australian graduates to take on distinct leadership roles in the critical care environment, which differs from the UK and European expectations of graduates. The Australian practice standards reflect the views of health consumers and critical care nursing stakeholders. Inclusion of health consumer views to inform the standards development distinguishes these critical care nurse education practice standards from the UK and European critical care competencies.

References

- Aitken L, Currey J, Marshall A & Elliott D (2006) The diversity of critical care nursing education in Australian universities. *Australian Critical Care* 19, 46–52.
- American Association of Critical Care Nurses (n.d.) Available at: <http://www.aacn.org/dm/mainpages/certificationhome.aspx> (accessed 10 October 2013).
- Australian College of Critical Care Nurses (2002) *Competency Standards for Specialist Critical Care Nurses*, 2nd edn. Cambridge Media, Perth, WA.

Relevance to clinical practice

The graduate practice standards provide a critical care qualification definition for professional health workforce standards. Course providers will be able to use the graduate clinical practice standards to achieve consistent graduate practice outcomes. Further work to develop a clinical practice assessment tool based on the practice standards will provide a valid and consistent approach to measuring graduate practice outcomes. This process offers a model that may be useful for other graduate specialty education programmes both within Australia and internationally.

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The authors have confirmed that all authors meet the ICMJE criteria for authorship credit (www.icmje.org/ethical_1author.html), as follows: (1) substantial contributions to conception and design of, or acquisition of, data or analysis and interpretation of data, (2) drafting the article or revising it critically for important intellectual content and (3) final approval of the version to be published.

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Supporting information

Additional Supporting information may be found in the online version of this article:

Table S1 Round three statements level of importance ranked by median within each domain.

Table S2 Categories of level of practice responses and percentages.

Original article

- Australian College of Critical Care Nurses (2003) *Position Statement on Intensive Care Nurse Staffing*. Available at: http://www.accn.com.au/images/stories/downloads/staffing_intensive_care_nursing.pdf (accessed 02 March 2011).
- Australian College of Critical Care Nurses (2006) *ACCCN Position Statement on the Provision of Critical Care Nurse Education*. Available at: http://www.accn.com.au/images/stories/downloads/provision_CC_nursing_edu.pdf (accessed 02 March 2011).
- Australian Council on Healthcare Standards (2011) *Intensive Care Clinical Indicators User Manual*. Available at: <http://www.achs.org.au/> (accessed 01 March 2011).
- Australian Council on Healthcare Standards (2012) *National Safety and Quality Health Service Standards Program*. Available at: <http://www.safetyandquality.gov.au/publications/national-safety-and-quality-health-service-standards/> (accessed 02 December 2013).
- Australian Health Workforce Advisory Committee (2002) *The Critical Care Nursing Workforce in Australia 2001–2011*. Available at: [http://www.ahwo.gov.au/documents/Publications/2002/The critical care nurse workforce in Australia.pdf](http://www.ahwo.gov.au/documents/Publications/2002/The%20critical%20care%20nurse%20workforce%20in%20Australia.pdf) (accessed 01 March 2011).
- Australian Qualifications Framework Council (2013) *Australian Qualifications Framework*, 2nd edn. Australian Qualifications Framework Council. Available at: <http://www.aqf.edu.au/Portals/0/Documents/2013%20docs/AQF%202nd%20Edition%20January%202013.pdf> (accessed 01 April 2013).
- Benbenishty J, DeKeyser Ganz F & Adam S (2005) Differences in European critical care nursing practice: a pilot study. *Intensive and Critical Care Nursing* 21, 172–178.
- Bray K, Wren I, Baldwin A, St. Ledger U, Gibson V, Goodman S & Walsh D (2010) Standards for nurse staffing in critical care units determined by: The British Association of Critical Care Nurses, The Critical Care Networks National Nurse Leads, Royal College of Nursing Critical Care and In-flight Forum. *Nursing in Critical Care* 15, 109–111.
- Canadian Association of Critical Care Nurses (2009) *Standards for Critical Care Nursing Practice*. Canadian Association of Critical Care Nurses, London, ON. Available at: <http://www.caccn.ca/> (accessed 01 March 2011).
- Canadian Nurses Association (2011) *2012 Certification by Exam How to Write the CNA Certification Exam General Application Guide for Certification by Exam*. Canadian Nurses Association. Available at: <http://www.cna-aic.ca/CNA/> (accessed 15 June 2011).
- Chaffin WW & Talley WK (1980) Individual stability in Delphi studies. *Technological Forecasting and Social Change* 16, 67–73.
- College of Intensive Care Medicine of Australia and New Zealand (2010) *Minimum Standards for Intensive Care Units*. Available at: [http://www.cicm.org.au/cmsfiles/IC-01 Minimum Standards For Intensive Care Units – Current September 2011.pdf](http://www.cicm.org.au/cmsfiles/IC-01%20Minimum%20Standards%20For%20Intensive%20Care%20Units%20-%20Current%20September%202011.pdf) (accessed 28 March 2011).
- Collins S & Hewer I (2014) The impact of the Bologna process on nursing higher education in Europe: a review. *International Journal of Nursing Studies* 51, 150–156.
- Creswell J (2009) *Research Design: Qualitative, Quantitative and Mixed Methods Approaches*, 3rd edn. Sage Publications Inc, Thousand Oaks, CA.
- Critical Care Networks-National Nurse Leads (2013) *National Competency Framework for Adult Critical Care Nurses*. Available at: <http://www.cc3n.org.uk/competency-framework/45779-77310> (accessed 01 April 2013).
- Critical Care Nurses' Section (2005) *Minimum Guidelines for Intensive Care Nurse Staffing in New Zealand*. New Zealand Nurses' Organisation, Wellington, New Zealand. Available at: <http://www.nzno.org.nz/> (accessed 01 March 2011).
- Delbecq A, Gustafson D & Van de Ven A (1986) *Group Techniques for Program Planning: A Guide to Nominal Group and Delphi Processes*. Green Briar Press, Middleton, WI.
- European federation of Critical Care Nursing associations (2004) *Position Statement on Post-registration Critical Care Nursing Education within Europe*. Available at: <http://www.efccna.org/> (accessed 15 June 2011).
- European federation of Critical Care Nursing associations (2007) *Position Statement on Workforce Requirements within European Critical Care Nursing*. European federation of Critical Care Nursing associations. Available at: <http://www.efccna.org/> (accessed 01 March 2011).
- European federation of Critical Care Nursing associations – EfCCNa (2013) *EfCCNa Competencies for European Critical Care Nurses*. Available at: http://www.efccna.org/images/stories/publication/competencies_cc.pdf (accessed 01 April 2013).
- Fulbrook P (2010) Critical care or intensive care? *Connect: The World of Critical Care Nursing* 7, 107.
- Fulbrook P, Albarrañ JW, Baktoft B & Sidebottom B (2012) A survey of European intensive care nurses' knowledge levels. *International Journal of Nursing Studies* 49, 191–200.
- Gill F, Leslie G & Southerland K (2006) Evaluation of a clinical performance assessment tool (CPAT) within a critical care context. *Australian Critical Care* 19, 105–113.
- Gill F, Leslie G, Grech C & Latour J (2012) A review of critical care nursing staffing, education and practice standards. *Australian Critical Care* 25, 224–237.
- Gill F, Leslie G, Grech C & Latour J (2013a) An analysis of Australian graduate critical care nurse education. *Collegian*. [Epub ahead of print].
- Gill F, Leslie G, Grech C & Latour J (2013b) Health consumers' experiences in Australian critical care units: postgraduate nurse education implications. *Nursing in Critical Care* 18, 93–102.
- Gill F, Leslie G, Grech C & Latour J (2013c) Using a web-based survey tool to undertake a Delphi study: application for nurse education research. *Nurse Education Today* 33, 1322–1328.
- Hadjilalasi M, Papastavrou E, Lambriinou E, Tsangari H, Athini E, Georgiou E, Nicolaou E & Merkouris A (2012) Development of an instrument to determine competencies of postgraduate ICU nurses in Cyprus. *Nursing in Critical Care* 17, 255–264.
- IBM Corp (2012) *IBM SPSS Statistics for Windows, Version 21.0*, 19th edn. IBM Corp., Armonk, NY.

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- Keeney S, McKenna H & Hasson F (2010) *The Delphi Technique in Nursing and Health Research*. Wiley, Chichester.
- Lakanmaa R-L, Suominen T, Perttilä J, Rittala-Castrén M, Vahlberg T & Leino-Kilpi H (2014a) Basic competence in intensive and critical care nursing: development and psychometric testing of a competence scale. *Journal of Clinical Nursing* 23, 799–810.
- Lakanmaa R-L, Suominen T, Perttilä J, Rittala-Castrén M, Vahlberg T & Leino-Kilpi H (2014b) Graduating nursing students' basic competence in intensive and critical care nursing. *Journal of Clinical Nursing* 23, 645–653.
- Latour JM & Haines C (2007) Families in the ICU: do we truly consider their needs, experiences and satisfaction? *Nursing in Critical Care* 12, 173–174.
- Liangputtong P (2010) *Research Methods in Health: Foundation for Evidence Based Practice*. Oxford University Press, South Melbourne, Vic.
- Lusk B, Russell RL, Rodgers J & Wilson-Barnett J (2001) Preregistration nursing education in Australia, New Zealand, the United Kingdom, and the United States of America. *Journal of Nursing Education* 40, 197–202.
- Millberg L, Berg L, Lindstrom I, Petzall K & Ohlen J (2011) Tensions related to implementation of postgraduate degree projects in specialist nursing education. *Nurse Education Today* 31, 283–288.
- Miller G (1990) The assessment of clinical skills/competence/performance. *Academic Medicine* 65, 863–867.
- Nursing and Midwifery Board of Australia (n.d.) Available at: <http://www.nursingmidwiferyboard.gov.au/> (accessed 06 May 2013).
- Okoli C & Pawlowski S (2004) The Delphi method as a research tool: an example, design considerations and applications. *Information & Management* 42, 15–29.
- Pirret A (2007) Master's level critical care nursing education: a time for review and debate. *Intensive and Critical Care Nursing* 23, 183–186.
- Presser S, Couper MP, Lessler JT, Martin E, Martin J, Rothgeb JM & Singer E (2004) Methods for testing and evaluating survey questions. *Public Opinion Quarterly* 68, 109–130.
- Price A (2013) National critical care competency framework. *Nursing in Critical Care* 18, 103–104.
- Tertiary Education Quality and Standards Agency (2011) *Higher Education Standards Framework (Threshold Standards)*. Available at: <http://www.com-law.gov.au/Details/F2012L00003/> Download (accessed 21 June 2013).
- The CoBaTrICE Collaboration (2006) Development of core competencies for an international training programme in intensive care medicine. *Intensive Care Medicine* 32, 1371–1383.
- The Intensive Care Society (2007) *Standards for Intensive Care Units*. The Intensive Care Society. Available at: <http://www.ics.ac.uk/> (accessed 02 March 2011).
- The Mid Staffordshire NHS Foundation Trust Public Inquiry (2013) *Report of the Mid Staffordshire NHS Foundation Trust Public Inquiry Executive Summary*, London. Available at: [http://www.midstaffpublicinquiry.com/sites/default/files/report/Executive summary.pdf](http://www.midstaffpublicinquiry.com/sites/default/files/report/Executive%20summary.pdf) (accessed 21 June 2013).
- The Paediatric Intensive Care Society (2010) *Standards for the Care of Critically Ill Children*. The Paediatric Intensive Care Society, London. Available at: <http://www.ukpics.org.uk/> (accessed 30 October 2011).

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Table 1 (Electronic Supplementary Material).

Round three statements level of importance ranked by median within each domain

Statement	Range 1-7 Median (IQR)
Patient and family centred care	
Communicates effectively with patient and family including with patients who are intubated/nonverbal	7 (7-7)
Protects patient and family privacy and confidentiality	7 (7-7)
Protects patient and family dignity	7 (7-7)
Promotes a compassionate and therapeutic environment for the wellbeing of patient and family	7 (6-7)
Provides effective nursing management for the patient and family requiring end of life care	7 (6-7)
Demonstrates respect of patient and family cultural and religious beliefs	7 (6-7)
Involves patients and family in decisions about care and treatment	7 (6-7)
Assists family to adapt to critical care environment	7 (6-7)
Facilitates and supports family presence at the patient bedside	7 (6-7)
Utilises a patient and family focused approach to care	7 (6-7)
Acts as patient & family advocate	7 (6-7)
Individualizes emotional and psychological support for the patient and family	6 (6-7)
Provides patient and family education	6 (6-7)
Addresses patient and family ethical concerns	6 (6-7)
Quality of care and patient safety	
Identifies and reports unsafe, inappropriate, incompetent practice	7 (7-7)
Provides safe and effective practice in the administration of drugs and therapeutic interventions	7 (7-7)
Provides effective handover of clinical information	7 (7-7)
Identifies and minimizes risk of critical incidents and adverse events including iatrogenic complications of critical illness	7 (7-7)
Complies with infection control measures	7 (7-7)
Communicates effectively in the multidisciplinary team	7 (6-7)
Identifies and reports environmental hazards and promotes safety for patients and staff	7 (6-7)
Demonstrates effective use and knowledge of technology / biomedical equipment	7 (6-7)
Participates in multidisciplinary ward round	7 (6-7)
Incorporates research evidence into practice	6 (6-7)
Ensures continuity of care from patient admission to discharge	6 (5-7)
Suggests changes to policy/protocols/guidelines based on awareness of research findings	6 (5-7)
Resuscitation	
Anticipates, identifies and responds effectively to clinical deterioration	7 (7-7)
Provides effective nursing management for the patient requiring airway management	7 (7-7)
Provides effective nursing management for the patient requiring cardio-pulmonary resuscitation	7 (7-7)
Provides effective nursing management for the patient post-resuscitation	7 (7-7)
Safely transports the critically ill patient	7 (7-7)
Effectively participates as a member of the resuscitation team	7 (7-7)
Facilitates family presence at resuscitation	6 (5-7)
Assessment, monitoring and data interpretation	
Effectively prioritises patient care needs	7 (7-7)
Anticipates, monitors, recognises and responds to trends in physiological variables	7 (7-7)
Provides effective nursing management of invasive patient monitoring	7 (7-7)
Gathers, analyses and integrates data from a variety of sources (technological and patient derived) to inform clinical decision making	7 (7-7)
Undertakes a comprehensive physical and psychological assessment at an advanced level	7 (6.5-7)
Critical illness management: respiratory care	
The patient requiring oxygen therapy	7 (7-7)
The patient requiring noninvasive mechanical ventilatory support	7 (7-7)
The patient requiring invasive mechanical ventilation	7 (7-7)
The patient requiring sedation	7 (7-7)
The patient requiring analgesia	7 (7-7)
The patient weaning from mechanical ventilation	7 (7-7)
The patient requiring tracheostomy management	7 (7-7)
The patient requiring intercostal catheters /pleural drains	7 (7-7)

The patient with chronic respiratory failure and mechanical ventilation	7 (7-7)
The patient with or at risk of delirium	7 (7-7)
Critical illness management: cardiac care	
The patient with arrhythmias	7 (7-7)
The patient requiring coronary or cardiac care	7 (7-7)
The patient with Acute Coronary Syndrome	7 (6-7)
The patient with heart failure	7 (6-7)
The patient requiring advanced haemodynamic monitoring	7 (6-7)
The patient requiring cardiac pacing	7 (6-7)
The patient pre and/or post cardiac surgery	6 (5-7)
The patient requiring interventional cardiology	6 (5-6)
The patient with a Mechanical Assist Device	5 (4-6)
Critical illness management: shock & sepsis care	
The safe administration of vasoactive drugs	7 (7-7)
The safe administration of blood products	7 (7-7)
The safe administration of intravenous fluids	7 (7-7)
The patient with sepsis	7 (7-7)
The patient with shock	7 (7-7)
The patient with electrolyte, glucose, acid-base and blood gas disturbances	7 (7-7)
The patient requiring enteral feeding	7 (7-7)
The patient requiring parenteral feeding	7 (7-7)
The patient at risk of or actual altered skin integument	7 (7-7)
The patient with multi-organ failure	7 (7-7)
The patient with gastrointestinal dysfunction	7 (7-7)
The patient with altered haematological function	7 (7-7)
Critical illness management: renal & hepatic care	
The patient with renal failure	7 (7-7)
The patient requiring renal replacement therapy	7 (6-7)
The patient with liver failure	7 (6-7)
The patient post organ transplantation	5 (4-6)
Critical illness management: surgical & trauma care	
The patient with altered level of consciousness	7 (7-7)
The patient with raised intracranial pressure	7 (7-7)
The patient with trauma	7 (6-7)
The patient with brain death & organ donation	7 (6-7)
The patient with acute spinal cord injury	6 (5-7)
The patient with thermal injury	6 (5-7)
Critical illness management: care of special populations	
Elderly patients	7 (6-7)
Culturally & linguistically diverse patients	7 (5-7)
Bariatric patients	6 (5-7)
Mental health patients	6 (5-7)
Obstetric patients	5 (4-6)
Paediatric patients (including developmentally appropriate care)	4 (4-6)
Neonates (including establishing & supporting breastfeeding)	4 (2-5)
Teamwork & leadership	
Recognises own scope of practice	7 (7-7)
Accepts responsibility for own actions	7 (7-7)
Communicates effectively with other team members	7 (7-7)
Takes a collaborative approach to decision making	7 (7-7)
Systematically communicates clinical/patient handover	7 (7-7)
Acts as a positive role model	7 (7-7)
Recognises and actively manages own stress and supports others	7 (6-7)
Effectively manages and coordinates the care of a variety of patients	7 (6-7)
Supports other staff to enable delivery of effective care	6 (5-7)
Effectively engages in bedside teaching	6 (5-7)
Performs in the ACCESS/ Admissions/Resource Nurse Role	6 (4-6)
Acts as shift coordinator/ team leader	5 (4-6)
Supervises, and delegates to others, the delivery of patient care	5 (4-7)

Table 2 (Electronic Supplementary Material).
Categories of level of practice responses and percentages

	No knowledge required	Has knowledge of or describes	Demonstrates under supervision	Demonstrates independently	Teaches or supervises others
Patient and family centred care					
Utilises a patient and family focused approach to care	0	0	4(5.5%)	52(71.2%)	17(23.3%)
Promotes a compassionate and therapeutic environment for the wellbeing of patient and family	0	0	3(4.1%)	49(67.1%)	21(28.8%)
Assists family to adapt to critical care environment	0	0	6(8.2%)	50(68.5%)	17(23.3%)
Individualizes emotional and psychological support for the patient and family	0	0	6(8.2%)	56(76.7%)	11(15.1%)
Facilitates and supports family presence at the patient bedside	0	0	6(8.2%)	47(64.4%)	20(27.4%)
Communicates effectively with patient and family including with patients who are intubated/nonverbal	0	0	1(1.4%)	38(52.1%)	34(46.6%)
Involves patients and family in decisions about care and treatment	0	2(2.7%)	13(17.8%)	41(56.2%)	17(23.3%)
Demonstrates respect of patient and family cultural and religious beliefs	0	0	6(8.2%)	47(64.4%)	20(27.4%)
Acts as patient and family advocate	0	2 (2.7%)	12(16.4%)	37(50.7%)	22(30.1%)
Provides patient and family education	0	1(1.4%)	10(13.7%)	42(57.5%)	20(27.4%)
Addresses patient and family ethical concerns	0	2 (2.7%)	18(24.7%)	42(57.5%)	11(15.1%)
Protects patient and family dignity	0	1(1.4%)	2(2.7%)	42(57.5%)	28(38.4%)
Protects patient and family privacy and confidentiality	0	0	1(1.4%)	35(47.9%)	37(50.7%)
Provides effective nursing management for the patient and family requiring end of life care	0	0	13(17.8%)	39(53.4%)	21(28.8%)
Quality of care and patient safety					
Communicates effectively in the multidisciplinary team	0	0	1(1.4%)	50(68.5%)	22(30.1%)
Identifies and reports environmental hazards and promotes safety for patients and staff	0	0	3(4.1%)	43(58.9%)	27(37%)
Participates in multidisciplinary ward round	0	0	8(11%)	51(69.9%)	14(19.2%)
Identifies and minimizes risk of critical incidents and adverse events including iatrogenic complications of critical illness	0	0	3(4.1%)	50(68.5%)	20(27.4%)
Incorporates research evidence into practice	0	4(5.5%)	13(17.8%)	44(60.3%)	12(16.4%)
Suggests changes to policy/protocols/guidelines based on awareness of research findings	0	6(8.2%)	16(21.9%)	43(58.9%)	8(11%)
Demonstrates effective use and knowledge of technology / biomedical equipment	0	0	6(8.2%)	44(60.3%)	23(31.5%)
Complies with infection control	0	0	0	33(45.2%)	40(54.8%)

measures					
Provides safe and effective practice in the administration of drugs and therapeutic interventions	0	0	1(1.4%)	36(49.3%)	36(49.3%)
Identifies and reports unsafe, inappropriate, incompetent practice	0	1(1.4%)	4(5.5%)	42(57.5%)	26(35.6%)
Resuscitation					
Anticipates, identifies and responds effectively to clinical deterioration	0	0	1(1.4%)	45(61.6%)	27(37.0%)
Provides effective nursing management for the patient requiring airway management	0	0	0	44(60.3%)	29(39.7%)
Provides effective nursing management for the patient requiring cardio-pulmonary resuscitation	0	0	1(1.4%)	51(69.9%)	21(28.8%)
Effectively participates as a member of the resuscitation team	0	1(1.4%)	4(5.5%)	52(71.2%)	16(21.9%)
Facilitates family presence at resuscitation	1(1.4%)	4(5.5%)	23(31.5%)	33(45.2%)	12(16.4%)
Provides effective nursing management for the patient post-resuscitation	0	0	3(4.1%)	48(65.8%)	22(30.1%)
Safely transports the critically ill patient	0	0	8(11.0%)	44(60.3%)	21(28.8%)
Assessment, monitoring and data interpretation					
Undertakes a comprehensive physical and psychological assessment at an advanced level	0	0	3(4.1%)	43(58.9%)	27(37%)
Anticipates, monitors, recognises and responds to trends in physiological variables	0	0	2(2.7%)	47(64.4%)	24(32.9%)
Gathers, analyses and integrates data from a variety of sources (technological and patient derived) to inform clinical decision making	0	0	4(5.5%)	52(71.2%)	17(23.3%)
Effectively prioritises patient care needs	0	0	3(4.1%)	40(54.8%)	30(41.1%)
Provides effective nursing management of invasive patient monitoring	0	0	2(2.7%)	41(56.2%)	30(41.1%)
Critical illness management: respiratory care					
The patient requiring oxygen therapy	0	0	0	22(31.4%)	48(68.6%)
The patient requiring noninvasive mechanical ventilatory support	0	0	1(1.4%)	38(54.3%)	31(44.3%)
The patient requiring invasive mechanical ventilation	0	0	3(4.3%)	44(62.9%)	23(32.9%)
The patient weaning from mechanical ventilation	0	0	4(5.7%)	44(62.9%)	22(31.4%)
The patient requiring intercostal catheters /pleural drains	0	0	1(1.4%)	36(51.4%)	33(47.1%)
The patient requiring tracheostomy management	0	0	0	42(60.0%)	28(40.0%)
The patient with or at risk of delirium	0	0	6(8.6%)	47(67.1%)	17(24.3%)
The patient requiring analgesia	0	0	0	35(50.7%)	34(49.3%)
The patient requiring sedation	0	0	0	39(55.7%)	31(44.3%)
The patient with chronic respiratory failure and mechanical ventilation	0	0	4(5.7%)	44(62.9%)	22(31.4%)
Critical illness management: cardiac care					

The patient requiring coronary or cardiac care	0	2(2.8%)	2(2.8%)	53(74.6%)	14(19.7%)
The patient with Acute Coronary Syndrome	1(1.4%)	0	4(5.6%)	54(76.1%)	12(16.9%)
The patient requiring interventional cardiology	0	13(18.3%)	21(29.6%)	29(40.8%)	8(11.3%)
The patient with arrhythmias	0	0	2(2.8%)	49(69.0%)	20(28.2%)
The patient requiring cardiac pacing	0	4(5.6%)	17(23.9%)	37(52.1%)	13(18.3%)
The patient with heart failure	0	0	1(1.4%)	52(73.2%)	18(25.4%)
The patient with a Mechanical Assist Device	2(2.8%)	23(32.4%)	27(38.0%)	13(18.3%)	6(8.5%)
The patient requiring advanced haemodynamic monitoring	0	1(1.4%)	5(7.0%)	45(63.4%)	20(28.2%)
The patient pre and/or post cardiac surgery	3(4.3%)	8(11.4%)	17(24.3%)	33(47.1%)	9(12.9%)
Critical illness management: shock & sepsis care					
The patient with shock	0	0	0	56(78.9%)	15(21.1%)
The safe administration of intravenous fluids	0	0	0	38(29.4%)	43(60.6%)
The safe administration of vasoactive drugs	0	0	0	35(49.3%)	36(50.7%)
The safe administration of blood products	0	0	0	29(40.8%)	42(59.2%)
The patient with sepsis	0	0	1(1.4%)	51(72.9%)	18(25.7%)
The patient with multi-organ failure	0	0	5(7.0%)	50(70.4%)	16(22.5%)
The patient with electrolyte, glucose, acid-base and blood gas disturbances	0	0	1(1.4%)	45(63.4%)	25(35.2%)
The patient with gastrointestinal dysfunction	0	0	0	47(66.2%)	24(33.8%)
The patient requiring enteral feeding	0	0	0	31(43.7%)	40(56.3%)
The patient requiring parenteral feeding	0	0	1(1.4%)	36(50.7%)	34(47.9%)
The patient at risk of or actual altered skin integument	0	0	2(2.8%)	28(39.4%)	41(57.7%)
The patient with altered haematological function	0	0	4(5.6%)	50(70.4%)	17(23.9%)
Critical illness management: renal and hepatic care					
The patient with liver failure	0	5(7.1%)	14(20.0%)	43(61.4%)	8(11.4%)
The patient post organ transplantation	2(2.9%)	23(32.9%)	22(31.4%)	19(27.1%)	4(5.7%)
The patient with renal failure	0	0	2(2.9%)	50(72.5%)	17(24.6%)
The patient requiring renal replacement therapy	0	3(4.3%)	12(17.1%)	38(54.3%)	17(24.3%)
Critical illness management: surgical and trauma care					
The patient with altered level of consciousness	0	0	0	42(59.2%)	29(40.8%)
The patient with raised intracranial pressure	0	1(1.4%)	14(19.7%)	39(54.9%)	17(23.9%)
The patient with trauma	0	2(2.8%)	18(25.4%)	37(52.1%)	14(19.7%)
The patient with acute spinal cord injury	0	8(11.3%)	22(31.0%)	30(42.3%)	11(15.5%)
The patient with thermal injury	0	10(14.1%)	26(36.6%)	27(38.0%)	8(11.3%)
The patient with brain death & organ donation	0	2(2.8%)	23(32.4%)	35(49.3%)	11(15.5%)
Critical illness management: care of special populations					
Culturally & linguistically diverse patients	0	5(7.0%)	9(12.7%)	43(60.6%)	14(19.7%)
Bariatric patients	0	1(1.4%)	10(14.1%)	46(64.8%)	14(19.7%)
Mental health patients	0	1(1.4%)	30(42.9%)	32(45.7%)	7(10.0%)
Paediatric patients (including	7(9.9%)	23(32.4%)	24(33.8%)	12(16.9%)	5(7.0%)

developmentally appropriate care)					
Neonates (including establishing & supporting breastfeeding)	16(22.5%)	23(32.4%)	18(25.4%)	10(14.1%)	4(5.6%)
Obstetric patients	7(9.9%)	20(28.2%)	23(32.4%)	17(23.9%)	4(5.6%)
Elderly patients	3(4.3%)	1(1.4%)	2(2.9%)	45(64.3%)	19(27.1%)
Teamwork and leadership					
Recognises own scope of practice	0	0	1(1.4%)	48(67.6%)	22(31.0%)
Accepts responsibility for own actions	0	0	0	46(64.8%)	25(35.2%)
Communicates effectively with other team members	0	0	1(1.4%)	43(60.6%)	27(38%)
Takes a collaborative approach to decision making	0	0	2(2.8%)	49(69.0%)	20(28.2%)
Acts as shift coordinator/ team leader	2(2.8%)	18(25.4%)	33(46.5%)	14(19.7%)	4(5.6%)
Effectively manages and coordinates the care of a variety of patients	0	7(9.9%)	14(19.7%)	41(57.7%)	9(12.7%)
Systematically communicates clinical/patient handover	0	0	1(1.4%)	48(67.6%)	22(31.0%)
Performs in the ACCESS/ Admissions/Resource Nurse Role	1(1.4%)	21(29.6%)	20(28.2%)	25(35.2%)	4(5.6%)
Supports other staff to enable delivery of effective care	0	2(2.8%)	15(21.1%)	43(60.6%)	11(15.5%)
Effectively engages in bedside teaching	2(2.8%)	2(2.8%)	18(25.4%)	35(49.3%)	14(19.7%)
Supervises, and delegates to others, the delivery of patient care	0	8(11.3%)	23(32.4%)	31(43.7%)	9(12.7%)
Recognises and actively manages own stress and supports others	0	1(1.4%)	8(11.3%)	52(73.2%)	10(14.1%)
Acts as a positive role model	0	0	0	48(67.6%)	23(32.4%)

Part 4: Testing

4.1 Developing and testing the clinical assessment tool

Gill F. J., Leslie G. D., Grech C., Boldy D., & Latour J. M. (2014a). Developing and testing the Standard of Practice and Evaluation of Critical-care-nursing Tool (SPECT) for critical care nursing practice. *Journal of Continuing Education in Nursing*, 45(7),312-320.

Developing and Testing the Standard of Practice and Evaluation of Critical-Care-Nursing Tool (SPECT) for Critical Care Nursing Practice

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abstract

Background: Nurses working in critical care often undertake specialty education. There are no uniform practice outcomes for critical care programs, and consumer input to practice standards has been lacking.

Methods: A structured multiphase project was undertaken to develop practice standards and an assessment tool informed by critical care nursing stakeholders as well as patients and families—the Standards of Practice and Evaluation of Critical-Care-Nursing Tool (SPECT).

Results: Testing of the SPECT revealed adequate content validity index (CVI), domain CVI (range, 0.772 to 0.887), and statement CVI (range, 0.66 to 1.00). Reliability was adequate in terms of internal consistency (Cronbach's $\alpha > 0.864$) and test-retest Spearman rank correlation (range, 0.772 to 0.887); intra-rater kappa agreement was significant for 102 of 104 statements with moderate agreement for 94.2% of statements.

Conclusion: The SPECT appears to have clinical feasibility, preliminary validity and reliability, and provides a clear definition for the expected practice level for graduates of a critical care education program.
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Internationally, critical care is one of the largest nursing specialties. Nurses who choose to work in this specialty often are expected to undertake postregistration education. To date, no uniform expected practice outcomes for critical care nursing courses have been articulated, and attempts to standardize these in a number of countries and regions have been variable. A number of position statements that provide broad principles and recommend content areas for education programs

have been developed by nursing organizations across the world (Australian College of Critical Care Nurses, 2006; Critical Care Nurses' Section, 2010; European federation of Critical Care Nursing associations [EfCCNa], 2004; World Federation of Critical Care Nurses, 2005).

In Europe, the Critical Care Nursing Curriculum (World Health Organization, 2003) and two critical care nurse education frameworks have been developed to achieve greater consistency in courses and graduate practice outcomes (Critical Care Networks-National Nurse Leads, 2013; EfCCNa, 2013). Other European

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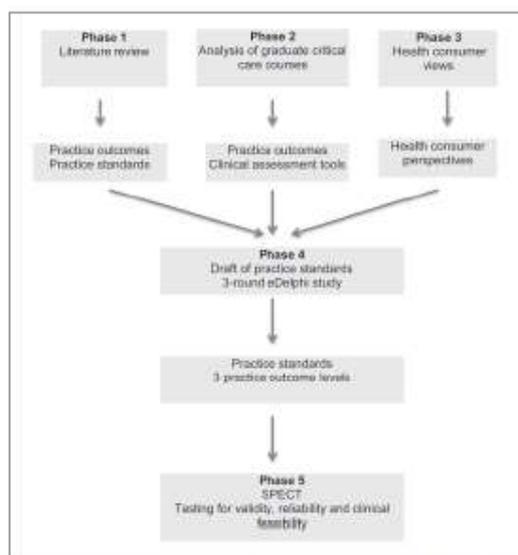


Figure 1. Flowchart showing the five phases used to develop the Standard of Practice and Evaluation of Critical-Care-Nursing Tool (SPECT).

competencies, such as the Cypriot postgraduate critical care nurse competencies, have been developed to inform a future competency-based curriculum and determine the competencies expected of postgraduate critical care nurses (Hadjibalassi et al., 2012). These describe broad holistic competencies rather than explicitly describing the minimum level and scope of practice required by course graduates.

Another instrument was developed for self-assessment of basic intensive care knowledge by Finnish intensive care unit nurses and preregistration nursing students (Lakanmaa et al., 2013). The tool appears promising for use in the context of beginning critical care practice but was not intended to measure practice outcomes of postgraduate education. In the United States and Canada, the approach used to achieve a national standard is by examination for certification or credentialing (American Association of Critical Care Nurses, n.d.; Canadian Nurses Association, 2014).

In Australia, the Australian College of Critical Care Nurses' (2006) position statement on the provision of critical care nurse education recommended that the *Competency Standards for Specialist Critical Care Nurses* (Australian College of Critical Care Nurses, 2002) be used to inform course curricula and as a basis of clinical assessment. The competency standards have

been used widely by critical care education providers, yet they articulate practice standards for experienced or specialist-level critical care nurses and do not adequately reflect practice expectations for graduates of critical care education. Consequently, they have been adapted and interpreted inconsistently to reflect local expectations (Aitken, Currey, Marshall, & Elliott, 2006; Gill, Leslie, Grech, & Latour, 2013a). In addition, within some courses, clinical practice is not assessed at all (Gill et al., 2013a).

Critical care nurse education curricula have been developed, and programs are delivered by RNs. There has been varying input from other health disciplines and minimal, if any, input from health consumers (Gill et al., 2013a). In 2013, a national program for safety and quality standards in Australian hospitals was introduced. One of the 10 standards is directly related to the partnership with health care consumers (Australian Commission on Safety and Quality in Health Care, 2012). This focus on consumer involvement also is recognized internationally. Reports such as the Mid Staffordshire NHS (National Health Service) Foundation Trust Public Inquiry (2013) underpin the importance of involving health consumers as key stakeholders in practice standard development. Consumer-focused quality health outcomes will require a shift in emphasis for critical care nurse education. This means moving from a focus on critical care nurses' clinical expertise to developing clinical and psychosocial competence in supporting patients and their families (Gill, Leslie, Grech, & Latour, 2013b).

To address the need for defined course graduate practice outcomes and for consumer input, the authors undertook a multiphase study to develop practice standards for graduates of critical care nurse education and a clinical assessment tool. The phase of the study reported in this article is the development and testing of a clinical assessment tool, called the Standards of Practice and Evaluation of Critical-Care-Nursing Tool (SPECT).

METHOD

Tool Development

The SPECT was developed using a multiphase structured process (Figure 1). The first phase was a literature review to explore and identify differences in critical care nurse staffing, education, and practice standards (Gill, Leslie, Grech, & Latour, 2012). It was identified that existing standards are similar internationally and that the standards are predominantly opinion-based rather than evidence-based. The five practice standards all build on national RN entry to practice standards and articulate specialist or experienced critical care nurse practice. No standards described the expected practice level for edu-

cation program graduates. In addition, the lack of health consumer involvement in the development of the standards further justified a reconsideration of the process for developing graduate practice standards.

The second phase consisted of an analysis of graduate-level critical care nurse education programs focusing on practice outcomes and clinical assessment methods for course graduates (Gill et al., 2013a). Data sources included course provider Web sites, course curricula, and telephone interviews with course coordinators. The deductive analytical process used to synthesize and interpret data revealed considerable variations in course delivery and graduate practice outcomes. Core graduate practice outcomes were identified and used for the draft of the practice standards in the fourth phase.

The third phase used a qualitative approach to obtain the perspectives of patients and families on the role of critical care nurses and what they considered to be important for critical care nurses' specialist educational preparation (Gill et al., 2013b). Both physical patient care and socioemotional support of patients and families were identified as important factors for the critical care nurse role. The components of socioemotional support included communication and people skills as well as facilitating family presence and advocacy. These components were reflected in participants' views about minimum practice standards for course graduates, namely: talking and listening skills, relating to and compassionately managing stressed people, individualizing care, and facilitating patient and family advocacy. The health consumers' views about the socioemotional skills and behaviors to be demonstrated by course graduates were included in the draft of the practice standards in phase four.

The first three phases collectively resulted in a draft of the practice standards including 84 statements organized within six domains. This draft was used in a three-round eDelphi study (phase four) to obtain the views of a national panel of critical care nurses (Gill, Leslie, Grech, Boldy, & Latour, 2014). The eDelphi panel represented four stakeholder groups within the critical care nursing profession: an advisory group, course stakeholders, practice stakeholders, and course graduates. The panel responded to two rating scales for each of the 84 statements: level of importance and level of expected course graduate practice. Additional suggestions and statements were invited from the panel. The final 98 identified and agreed practice standards (clear statements) were organized into three levels of graduate practice.

The standards then were further arranged into a practical tool to measure graduate level practice. This involved

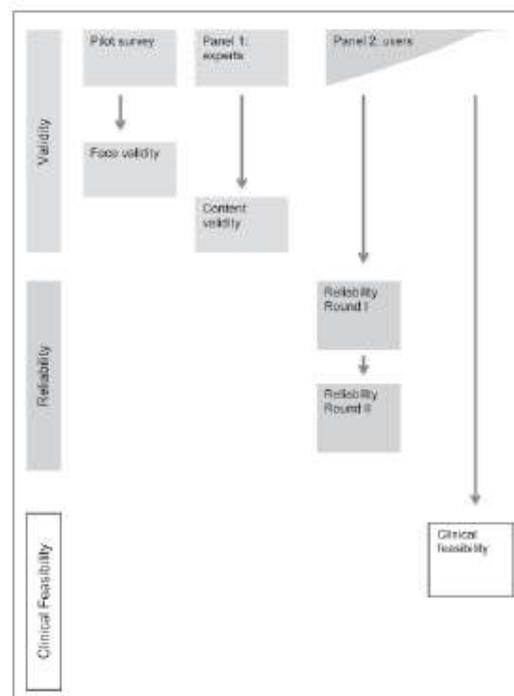


Figure 2. Flowchart showing the study methods.

identification and elimination of some duplication and some regrouping of statements as elements of standards. The resultant SPECT (Table A; available in the online version of this article.) consisted of 86 standards in total (with elements): 65 standards for which the course graduate was expected to demonstrate an independent level of practice, 14 standards for which the graduate was expected to demonstrate practice under supervision, and 7 standards for which the graduate was expected to have knowledge of or the ability to describe. Determining whether the SPECT was reliable, valid, and an authentic assessment tool in practice comprised the final and fifth phase, which is described in detail in this article.

The study (phase five) was designed to assess the validity, reliability, and clinical feasibility of the SPECT. The SPECT, in a survey format, was first pilot tested for face validity by a panel of five critical care nurses (Pilot Panel). An expert panel (Panel 1) then assessed the SPECT for content validity. Next, reliability and clinical feasibility were assessed by critical care clinical assessment tool users (Panel 2). All surveys were distributed using an electronic survey method (Figure 2). Ethics

approval was obtained from the university's human research ethics committee.

Study Participants

Study participants were purposively recruited. The Pilot Panel was contacted and requested to pilot test the SPECT and assess face validity (Boynnton, 2004; Presser et al., 2004). This involved the draft survey being sent to five critical care nurses (four experienced nurses and one nurse who had recently graduated from a course) who provided feedback and comments about the survey content, survey instructions, and ease of completing the survey. This resulted in minor wording changes and editing for clarity.

Panel 1 constituted a geographic sample of critical care nurses with expertise in course graduate practice outcomes. Six critical care course coordinators in four Australian states and one territory (Western Australia, Queensland, Victoria, New South Wales, and Australian Capital Territory) were asked to participate. The aim of this panel was to assess the SPECT on its face and content validity only. The panel was asked to rate the relevancy of each statement.

Panel 2 consisted of clinical assessment tool users who were recruited for reliability, validity, and clinical feasibility testing (Figure 2). Clinical assessment is most commonly undertaken by experienced critical care nurses working in education or clinical practice and course participant self-assessment (Gill et al., 2013a). Therefore, a sample of two groups of adult critical care nurses was recruited using the following inclusion criteria: 1) nurses experienced in performance assessment of critical care course participants (Clinical Assessors) and 2) RNs who had completed a critical care nursing course within 18 months (Graduates).

Recruitment strategies included contacting critical care course coordinators recruited from earlier phases of the study and critical care unit managers of three states (Western Australia, Victoria, and South Australia) with a request to distribute e-mail invitations to their associated clinical assessors and graduates. In addition, an invitation to participate was circulated via university educators' network meetings and a regional critical care e-mail list.

After agreeing to participate, panel members were sent an e-mail containing an information sheet and a Web link to the online survey. For each round, two follow-up reminder e-mails were sent to nonresponders. Data were collected between July and November 2013.

Statistical Analysis

Data were imported into SPSS® version 21, and descriptive statistics including frequency distributions

were computed. Mean scores and standard deviations were calculated when data were continuous and normally distributed, or median and interquartile ranges when data did not meet these assumptions. Student *t* tests were calculated for comparison of continuous variables; the level of significance was set at $p < 0.05$ for all tests.

The Pilot Panel data were qualitative, and no statistical analysis was performed. Panel 1 members were requested to indicate the relevancy of each statement for graduate practice using a 4-point Likert scale (1 = *not relevant*, 2 = *a little/somewhat relevant*, 3 = *quite relevant*, and 4 = *highly relevant*). Two types of content validity index (CVI), individual statement and overall, were computed for each domain. Individual statement CVI was computed as the proportion of content experts giving an item a relevancy rating of 3 (*quite relevant*) or 4 (*highly relevant*). A statement CVI of 0.78 was considered acceptable with six raters (Polit & Beck, 2006). The domain level CVI was computed as the average of the statement CVIs for all items in the domain. A domain CVI of 0.90 was considered acceptable (Polit & Beck, 2006).

For Panel 2, the first round of the reliability and clinical feasibility survey, the SPECT comprised the six domains: 86 practice standards and elements with the expected level of graduate practice. The Panel 2 Clinical Assessors were asked to consider a typical course participant they had recently assessed at the end of his or her critical care course. For each statement, Clinical Assessors were asked to indicate the level of agreement as to whether the course participant achieved the practice standard using a 5-point Likert scale (-2 = *strongly disagree*, -1 = *disagree*, 0 = *neither agree or disagree*, 1 = *Agree*, and 2 = *Strongly agree*). The Panel 2 Graduates were asked to use the same 5-point Likert scale to indicate their level of agreement as to whether they achieved each standard on completion of the critical care course. To assess reliability over time, the survey was e-mailed to respondents 3 weeks later (round II) to re-rate.

Internal consistency reliability measures were performed at the domain level for round I and round II surveys, with a Cronbach's α estimate of ≥ 0.7 considered acceptable for a new instrument (Beckstead, 2013; Nunnally & Bernstein, 1994). Test-retest or stability over time was assessed using Spearman rank correlation for the same respondents completing the survey at two different moments in time. A correlation of ≥ 0.7 was considered acceptable (Nunnally & Bernstein, 1994). The kappa statistic was calculated to determine the consistency of each panel member's response to the statements between survey rounds (intra-rater reliability). The use of kappa with more than two categories

TABLE 1
CHARACTERISTICS OF PANEL 2 STUDY PARTICIPANTS

	Clinical Assessors (n = 23) n	Graduates (n = 13) n	p
Age (y), mean (SD)	44.1 (±9.8)	40.0 (±10.2)	0.039
Nursing experience (y), mean (SD)	21.4 (±9.3)	8.3 (±4.2)	0.002
Critical care nursing experience (y), mean (SD)	16.3 (±8.4)	4.8 (±2.6)	0.000
Work environment			
Metropolitan hospital	19 (83%)	8 (62%)	
Regional health service	4 (17%)	3 (23%)	
Rural or remote health service	0 (0%)	3 (23%)	
Practice area			
Intensive care	21 (91%)	9 (69%)	
Coronary or cardiac care	2 (9%)	2 (15%)	
Combined critical care unit	1 (4%)	5 (38%)	
High dependency area	1 (4%)	1 (8%)	
State			
Queensland	2 (9%)	1 (8%)	
New South Wales	2 (9%)	3 (23%)	
Australian Capital Territory	0 (0%)	1 (8%)	
Victoria	7 (30%)	3 (23%)	
South Australia	2 (9%)	0 (0%)	
Western Australia	10 (43%)	5 (38%)	
Critical care qualification			
Hospital certificate	7 (17%)	0 (0%)	
Graduate certificate	6 (26%)	10 (77%)	
Graduate diploma	8 (35%)	4 (31%)	
Master	7 (30%)	0 (0%)	
Doctor of philosophy	1 (4%)	0 (0%)	

Note. Characteristics (e.g., practice area) are presented as reported by participants and may have been counted more than once.

is not recommended because it measures the frequency of exact agreement versus approximate agreement and its value is highly reliant on the definition of categories (Wynd, Schmidt, & Schaefer, 2003). Hence, responses were collapsed into dichotomous categories: disagree (consisting of *strongly disagree*, *disagree*, and *neither agree or disagree* responses) and agree (*strongly agree* and *agree* responses). A kappa statistic of ≥ 0.41 would reflect a moderate level of agreement (Landis & Koch, 1977).

The reliability and clinical feasibility survey also contained eight statements designed to evaluate the appropriateness or clinical feasibility of using the SPECT in

clinical practice. The statements were based on the dimensions of clinical utility developed by Smart (2006) and further refined by Gélinas (2010). Panel 2 was asked to respond to each statement using a 4-point Likert scale (1 = *not at all*, 2 = *a little*, 3 = *sufficiently*, and 4 = *very*). There was one open question for comments.

RESULTS

All invited study participants agreed to participate in the Pilot Panel ($n = 5$), Panel 1 ($n = 6$), and Panel 2 ($n = 44$). For Panel 2, the original number of participants who agreed to participate was 46; however, 2 were excluded because they did not meet the inclusion criteria, leav-

TABLE 2
INTERNAL CONSISTENCY AND CORRELATION
BETWEEN ROUNDS

Domain	Cronbach's α		Rho*
	Round I	Round II	
Patient- and family-focused approach to care	0.928	0.890	0.772
Quality of care and patient safety	0.929	0.919	0.812
Resuscitation	0.925	0.920	0.836
Assessment, monitoring, and data interpretation	0.915	0.868	0.783
Critical illness management	0.961	0.976	0.887
Teamwork and leadership	0.919	0.865	0.815

* $p < 0.01$ level, two-tailed.

ing 44 Panel 2 participants. Of the remaining 44 critical care nurses, the majority worked in tertiary or teaching hospitals in intensive care settings. Almost a third of the Clinical Assessors held a master's level qualification. All Graduates had completed a critical care nursing graduate certificate or graduate diploma level course. Table 1 lists demographics for Panel 2 participants. The response rate for round I was 36 of 44 (82%). In round II, 34 of 36 (94%) completed the test-retest survey.

Validity

The initial validity testing related to Panel 1 found a statement CVI range of 0.66 to 1.00. For 97 of 104 (93%) statements, the CVI = 1.00; for six statements, the CVI = 0.83, and for the remaining statement, the CVI = 0.66. At the domain level, the CVI range was satisfactory (Polit & Beck, 2006), ranging from 0.95 to 1.00 (mean, 0.98).

Reliability

Cronbach's α of each domain ranged from 0.915 to 0.961 in round I and from 0.865 to 0.976 in round II (Table 2). The bivariate correlation (Spearman rank correlation) of each domain between the round I and round II surveys ranged from 0.772 to 0.887.

The intra-rater reliability between survey rounds I and II for each rater (of the 34 who completed follow-up ratings) was statistically significant ($p < 0.005$) for 102 of 104 statements. Table 3 shows the relative strength of agreement using the ranges of kappa and corresponding labels assigned by Landis and Koch (1977). There was moderate or strong agreement for 87.5% of the rater responses and almost perfect agreement for 6.7%.

TABLE 3
STRENGTH OF AGREEMENT BETWEEN SURVEYS
FOR EACH STATEMENT

Kappa Statistic	Strength of Agreement	No. (%) of Statements
< 0.00	Poor	0 (0)
0.00 to 0.20	Slight	1 (1.0)
0.21 to 0.40	Fair	5 (4.8)
0.41 to 0.60	Moderate	51 (49.0)
0.61 to 0.80	Substantial	40 (38.5)
0.81 to 1.00	Almost perfect	7 (6.7)

Clinical Feasibility

For the SPECT clinical feasibility, the panel responses were positive with a median rating of 3 (interquartile range [IQR] = 3 to 4) for seven statements and a median rating of 3 (IQR = 2 to 4) for the statement, "I would recommend using the tool for assessment of critical care course student clinical practice." Table 4 presents the panel responses with 66% or more ranked as *very* or *sufficiently* clinically feasible.

Comments

There were 12 responses to the open-ended question, and these were received from Clinical Assessors. There was one comment that the SPECT was more appropriate for the intensive care unit setting rather than cardiology or cardiac settings. There were three suggestions about improving the formatting and one about clarity. There were two comments that the SPECT could be further contextualized for student assessment in specific settings, and there was one recommendation for further evaluation with actual course participants. There was one comment that the practice levels were "excellent." There were no suggestions for additions or changes to the practice standard statements, further supporting the tool's face and content validity.

DISCUSSION

The strength of this study lies in the rigorous and structured process used to develop a practice standard and clinical assessment tool in the critical care context. The SPECT that resulted reflects both the views of health consumers and critical care nursing stakeholders. Statistical and qualitative testing revealed that the SPECT is reliable, face and content valid, and appears to be a useful, authentic tool for assessing practice in this group. Content validity was examined, and both domain and statement level results were found to be adequate. Reliability was also adequate in terms of internal consistency.

TABLE 4
CLINICAL FEASIBILITY RESPONSES (N = 36)

Statement	No. (%) ^a			
	Very	Sufficiently	A Little	Not at All
Instructions about how to use the tool were clear and complete	11 (30)	21 (58)	3 (8)	1 (3)
Format and style of the tool is easy to understand	16 (44)	17 (47)	2 (5)	1 (3)
Tool is quick to use	17 (47)	14 (39)	5 (10)	0 (0)
Tool is simple to understand	16 (44)	16 (44)	3 (8)	1 (3)
Length of time to go through the tool is appropriate for routine use	15 (42)	16 (44)	5 (10)	0 (0)
Tool is appropriate for use in my clinical setting	11 (30)	21 (58)	2 (5)	2 (5)
I would recommend using the tool for critical care course students' clinical practice assessment	12 (33)	12 (33)	12 (33)	0 (0)
Tool will be useful for assessment of critical care course students' clinical practice	12 (33)	14 (39)	10 (36)	0 (0)

^a Percentages may not equal 100% due to rounding.

tency, test-retest, and intra-rater agreement. The SPECT also appears to have clinical feasibility, providing a clear definition for the expected practice level for graduates of a critical care education program.

In considering the international value of these study findings, there are two key points. The multiphase process reported in this study is the first to result in specialty practice standards that include health consumer input. No other critical care nursing competencies or practice standards have included consumer input as a component of their development, and this was acknowledged as a limitation by Hadjibalassi et al. (2012). The practice standards and the SPECT provide the opportunity to take a major step forward from the North American examination model of credentialing (American Association of Critical Care Nurses, n.d.; Canadian Nurses Association, 2014).

The practice standards articulate course graduate practice outcomes, and the SPECT is a tool to measure practice outcomes from Australian critical care education programs. The European critical care competency frameworks (Critical Care Networks-National Nurse Leads, 2013; EfCCNa, 2013) reflect a narrower focus of adult, tertiary level intensive care, rather than the Australian expectations of graduates across all critical care environments. The United Kingdom critical care competency framework also described a more advanced practice level (Critical Care Networks-National Nurse Leads, 2013) than what this study identified as expected for Australian course graduate outcomes. Further work will be required to explore the apparent international differences in practice expectations.

This work in developing the SPECT contributes to the broader nursing education professional field. In many critical care courses, course participant clinical assessment tools have been developed (Gill, Leslie, & Southerland, 2006), yet limited evidence is available about the tools being used, raising doubts about validity and reliability. The process used to develop the SPECT involved input from both critical care nursing stakeholders and health consumers. Instrument testing was undertaken. The rigorous process that was used could be applied to other postgraduate clinical specialist disciplines seeking to validate a clinical assessment tool to achieve uniform education practice outcomes.

Limitations

Some limitations of the SPECT testing need to be addressed. The development of the SPECT involved Australian adult and pediatric critical care environments. The testing was undertaken with adult intensive care nurses. The tool may not be appropriate to use for the assessment of practice for RNs who have been educated and work in other countries. Further testing is required in other countries and critical care contexts such as cardiac care and pediatric critical care. Ideally, a validation step involves the availability of a reasonable, reliable, and valid criterion with which the measures on the target tool can be compared. There was no criterion validity testing undertaken, as there was no available validated tool measuring the same concepts. Further validity testing of the SPECT should include factor analysis to confirm the dimensions of the domains and identify redundant statements using a large sample of course participants. Larger

key points

Developing and Testing the SPECT

Gill, F.J., Leslie, G.D., Grech, C., Boldy, D., & Latour, J.M. (2014). **Developing and Testing the Standard of Practice and Evaluation of Critical-Care-Nursing Tool (SPECT) for Critical Care Nursing Practice.** *The Journal of Continuing Education in Nursing, 45(7)*, xxx-xxx.

- 1 Critical care nursing practice standards and an assessment tool have been developed informed by critical care nursing stakeholders as well as patients and families.
- 2 The Standards of Practice and Evaluation of Critical-Care-Nursing Tool (SPECT) appears to have clinical feasibility, preliminary validity and reliability, and provides a clear definition for the expected practice level of critical care nurses after the completion of a critical care education program.
- 3 The SPECT provides the opportunity for achieving a uniform evaluation and interpretation of critical care nursing standards.
- 4 The practice standards and the SPECT can provide standardization for the adoption of minimum criteria for the critical care nursing qualification.

scale use of the SPECT in clinical practice also will offer the opportunity to examine its clinical application further. The rigorous process used in this study could be applied in Australia to other graduate-level clinical specialty disciplines seeking to validate a clinical assessment tool to achieve uniform education practice outcomes.

The challenge is now to integrate the practice standards and SPECT into graduate-level specialty education. Beginning in January 2015, in Australia, all specialty nursing course providers will be required to be compliant with academic outcome standards (Australian Qualifications Framework Council, 2013; Tertiary Education Quality and Standards Agency, 2011). The relevance of this is not limited to critical care nurse education in that what is currently lacking is a framework to regulate graduate-level practice outcome standards. Specialty graduate outcomes of education programs need to address clinical practice as well as academic aspects. In addition, specialty education programs should prepare graduates to be able to provide both clinical patient care and support the socioemotional needs of patients and families (Gill et al., 2013b).

CONCLUSION

The practice standards and associated SPECT developed by the authors provide the opportunity for achiev-

ing greater uniformity of graduate practice outcomes. In addition, this study provides a uniform interpretation for professional health workforce standards. Internationally, workforce standards have recommended that a minimum proportion of RNs working in intensive care settings should hold critical care qualifications, but prior to this study, varying interpretations of a "critical care qualification" have been used (Hadjibalassi et al., 2012; Leslie, 2006). The practice standards and the SPECT can provide standardization if they are adopted as minimum criteria for the critical care qualification.

REFERENCES

- Aitken, L., Currey, J., Marshall, A., & Elliott, D. (2006). The diversity of critical care nursing education in Australian universities. *Australian Critical Care, 19*, 46-52.
- American Association of Critical Care Nurses. (n.d.). *Certification*. Retrieved from <http://www.aacn.org/dm/mainpages/certificationhome.aspx>
- Australian College of Critical Care Nurses. (2002). *Competency standards for specialist critical care nurses (2nd ed.)*. Perth, Western Australia: Cambridge Media.
- Australian College of Critical Care Nurses. (2006). *ACCCN position statement on the provision of critical care nurse education*. Retrieved from http://www.acccn.com.au/images/stories/downloads/provision_CC_nursing_edu.pdf
- Australian Commission on Safety and Quality in Health Care. (2012). *National safety and quality health service standards*. Retrieved from <http://www.safetyandquality.gov.au/publications/national-safety-and-quality-health-service-standards/>
- Australian Qualifications Framework Council. (2013). *Australian qualifications framework*. Retrieved from <http://www.aqf.edu.au/wp-content/uploads/2013/05/AQF-2nd-Edition-January-2013.pdf>
- Beckstead, J.W. (2013). On measurements and their quality: Paper 1: Reliability—History, issues and procedures. *International Journal of Nursing Studies, 50*, 968-973. doi:10.1016/j.ijnurstu.2013.04.005
- Boynton, P. (2004). Administering, analysing and reporting your questionnaire. *BMJ, 328*, 1372-1375.
- Canadian Nurses Association. (2014). *CNA certification*. Retrieved from <http://www.nurseone.ca/Default.aspx?portlet=StaticHtmlViewer&portlet&stmd=False&plang=1&ptdi=153>
- Critical Care Networks-National Nurse Leads. (2013). *National competency framework for adult critical care nurses*. Retrieved from <http://www.cc3n.org.uk/competency-framework/4577977310>
- Critical Care Nurses' Section. (2010). *New Zealand standards in critical care nursing education*. Retrieved from <http://www.nzno.org.nz/Portals/0/Docs/Groups/Critical%20Care%20Nurses/NZ%20Standardsin%20Critical%20Care%20Nursing%20Education%204th%20Edition%202010.pdf>
- European federation of Critical Care Nursing associations. (2004). *Position statement on post-registration critical care nursing education within Europe*. Retrieved from <http://www.efccna.org/downloads/Position%20statement%20on%20education%20EfCCNa.pdf>
- European federation of Critical Care Nursing associations. (2013). *EfCCNa competencies for European critical care nurses*. Retrieved from http://www.efccna.org/images/stories/publication/competencies_cc.pdf
- Gélinas, C. (2010). Nurses' evaluations of the feasibility and the clinical utility of the Critical-Care Pain Observation Tool. *Pain Management Nursing, 11*, 115-125. doi:10.1016/j.pmn.2009.05.002

- Gill, F., Leslie, G., Grech, C., Boldy, D., & Latour, J. (2014). Development of Australian clinical practice outcome standards for graduates of critical care nurse education. *Journal of Clinical Nursing*. Advance online publication. doi:10.1111/jocn.12631
- Gill, F., Leslie, G., Grech, C., & Latour, J. (2012). A review of critical care nursing staffing, education and practice standards. *Australian Critical Care*, 25, 224-237. doi:10.1016/j.aucc.2011.12.056
- Gill, F., Leslie, G., Grech, C., & Latour, J. (2013a). An analysis of Australian graduate critical care nurse education. *Collegian*. Advance online publication. doi:10.1016/j.colegn.2013.11.006
- Gill, F., Leslie, G., Grech, C., & Latour, J. (2013b). Health consumers' experiences in Australian critical care Units: postgraduate nurse education implications. *Nursing in Critical Care*, 18, 93-102. doi:10.1111/j.1478-5153.2012.00543.x
- Gill, F., Leslie, G., & Southerland, K. (2006). Evaluation of a clinical performance assessment tool (CPAT) within a critical care context. *Australian Critical Care*, 19, 105-113.
- Hadjibalassi, M., Papastavrou, E., Lambrinou, E., Tsangari, H., Athini, E., Georgiou, E.,...Merkouris, A. (2012). Development of an instrument to determine competencies of postgraduate ICU nurses in Cyprus. *Nursing in Critical Care*, 17, 255-264. doi:10.1111/j.1478-5153.2012.00503.x
- Lakanmaa, R.-L., Suominen, T., Pertilä, J., Rittala-Castrén, M., Vahlberg, T., & Leino-Kilpi, H. (2013). Basic competence in intensive and critical care nursing: Development and psychometric testing of a competence scale. *Journal of Clinical Nursing*, 23, 799-810. doi:10.1111/jocn.12057
- Landis, J.R., & Koch, G.G. (1977). The measurement of observer agreement for categorical data. *Biometrics*, 33(1), 159-174. Retrieved from <http://www.jstor.org/stable/2529310>
- Leslie, G.D. (2006). Specialty preparation for critical care nursing. *Australian Critical Care*, 19(2), 43. doi:10.1016/s1036-7314(06)80007-x
- Mid Staffordshire NHS Foundation Trust Public Inquiry. (2013). *Report of the Mid Staffordshire NHS Foundation Trust Public Inquiry: Executive summary*. Retrieved from [http://www.midstaffpublicinquiry.com/sites/default/files/report/Executive summary.pdf](http://www.midstaffpublicinquiry.com/sites/default/files/report/Executive%20summary.pdf)
- Nunnally, J.C., & Bernstein, I.H. (1994). *Psychometric theory* (3rd ed.). New York, NY: McGraw-Hill.
- Polit, D.F., & Beck, C.T. (2006). The content validity index: Are you sure you know what's being reported? Critique and recommendations. *Research in Nursing and Health*, 29, 489-497. doi:10.1002/nur.20147
- Presser, S., Couper, M.P., Lessler, J.T., Martin, E., Martin, J., Rothgeb, J.M., & Singer, E. (2004). Methods for testing and evaluating survey questions. *Public Opinion Quarterly*, 68, 109-130. doi:10.1093/poq/nfh008
- Smart, A. (2006). A multi-dimensional model of clinical utility. *International Journal for Quality in Health Care*, 18, 377-382. doi:10.1093/intqhc/mzl034
- Tertiary Education Quality and Standards Agency. (2011). *Higher education standards framework (threshold standards)*. Retrieved from <http://www.comlaw.gov.au/Details/F2012L00003/Download>
- World Federation of Critical Care Nurses. (2005). *World Federation of Critical Care Nurses declaration of Madrid: Position statement on the provision of critical care nursing education*. Retrieved from <http://square.umin.ac.jp/jsicmnd/Declaration-%20Education.pdf>
- World Health Organization. (2003). *WHO Europe critical care nursing curriculum: WHO European strategy for continuing education for nurses and midwives*. Retrieved from http://www.euro.who.int/_data/assets/pdf_file/0017/102266/e81552.pdf
- Wynd, C.A., Schmidt, B., & Schaefer, M.A. (2003). Two quantitative approaches for estimating content validity. *Western Journal of Nursing Research*, 25, 508-518. doi:10.1177/0193945903252998

Table A
Standard of Practice and Evaluation of Critical-Care-Nursing Tool (SPECT)

Domain 1: Patient- and Family-Focused Approach to Care
Level of Practice: The critical care course graduate can demonstrate independently
<ul style="list-style-type: none"> • Promotes a compassionate and therapeutic environment for the well-being of the patient and family • Communicates effectively with the patient and family including with patients who are intubated/nonverbal • Involves patients and families in decisions about care and treatment • Assists families to adapt to the critical care environment • Acts as a patient and family advocate • Protects patient and family dignity • Protects patient and family privacy and confidentiality • Demonstrates respect of the patient and family's cultural and religious beliefs • Facilitates and supports family choices to be present at the patient's bedside • Provides effective nursing management for the patient and family requiring end of life care
Level of Practice: The critical care course graduate can demonstrate under supervision
<ul style="list-style-type: none"> • Individualizes socioemotional support for the patient and family • Provides patient and family education • Addresses patient and family ethical concerns
Domain 2: Quality of Care and Patient Safety
Level of Practice: The critical care course graduate can demonstrate independently
<ul style="list-style-type: none"> • Identifies and reports unsafe, inappropriate, incompetent practice • Provides safe and effective practice in the administration of drugs and therapeutic interventions • Identifies and minimizes risk of critical incidents and adverse events • Including measures to avoid iatrogenic injury/complications • Including measures to maintain skin integrity • Complies with infection control measures • Communicates effectively in the multidisciplinary team • Participates in multidisciplinary ward round • Uses a systematic approach to provide effective handover of clinical information • Identifies and reports environmental hazards and promotes safety for patients, families, and staff • Demonstrates effective use and knowledge of technology and biomedical equipment
Level of Practice: The critical care course graduate can demonstrate under supervision
<ul style="list-style-type: none"> • Incorporates research evidence into practice • Ensures continuity of care from patient admission to discharge or transfer • Suggests changes to policy, protocols, and guidelines <p style="margin-left: 40px;">Element: Demonstrates awareness of research findings</p>
Domain 3: Resuscitation
Level of Practice: The critical care course graduate can demonstrate independently
<ul style="list-style-type: none"> • Anticipates, identifies, and responds effectively to clinical deterioration • Provides effective nursing management for the patient requiring airway management • Provides effective nursing management for the patient requiring cardiopulmonary resuscitation <p style="margin-left: 40px;">Element: Regular recertification of resuscitation skills</p> <ul style="list-style-type: none"> • Effectively participates as a member of the resuscitation team • Provides effective nursing management for the patient postresuscitation • Safely transports the critically ill patient <p style="margin-left: 40px;">Element: Intra-facility (between departments)</p> <p style="margin-left: 40px;">Element: Inter-facility (between health services and hospitals)</p>
Level of Practice: The critical care course graduate can demonstrate under supervision
<ul style="list-style-type: none"> • Facilitates family presence during resuscitation
Domain 4: Assessment, Monitoring, and Data Interpretation

Level of Practice: The critical care course graduate can demonstrate independently

- Effectively prioritizes patient care needs
- Anticipates, monitors, recognizes, and responds to trends in physiological variables
- Provides effective nursing management of invasive patient monitoring
- Gathers, analyzes, and integrates data from a variety of sources (technological and patient-derived) to inform clinical decision making
- Undertakes a comprehensive physical, mental, and socioemotional patient assessment

Domain 5: Critical Illness Management

Subdomain 5.1: General Care

Level of Practice: The critical care course graduate can demonstrate independently care of the critically ill patient

- Requiring intravenous fluids
- Requiring vasoactive drugs
- Requiring blood products
- Requiring analgesia
- Requiring sedation
- With or at risk of delirium

Subdomain 5.2: Respiratory Care

Level of Practice: The critical care course graduate can demonstrate independently care of the critically ill patient

- Requiring oxygen therapy
Element: including commonly used oxygen delivery systems
- Requiring noninvasive mechanical ventilatory support
- Requiring invasive mechanical ventilation
Element: including airway patency and security
Element: including commonly used ventilatory modes
- Weaning from mechanical ventilation
- Requiring intercostal catheters and pleural drains
- With chronic respiratory failure and mechanical ventilation

Subdomain 5.3: Cardiac Care

Level of Practice: The critical care course graduate can demonstrate independently care of the critically ill patient

- With arrhythmias
- With acute coronary syndrome
- With heart failure
- Requiring cardiac pacing

Level of Practice: The critical care course graduate can demonstrate under supervision care of the critically ill patient

- Pre- and/or postcardiac surgery

Level of Practice: The critical care course graduate has knowledge of or describes care of the critically ill patient

- Requiring interventional cardiology
- With a mechanical assist device

Subdomain 5.4: Shock and Sepsis Care

Level of Practice: The critical care course graduate can demonstrate independently care of the critically ill patient

- With sepsis
 - With shock
 - With electrolyte, glucose, acid-base, and blood gas disturbances
 - With gastrointestinal dysfunction
Element: Requiring enteral feeding
Element: Requiring parenteral feeding
Element: Requiring bowel management
 - At risk of or actual altered skin integument
 - With multiorgan failure
 - With altered hematological function
-

<ul style="list-style-type: none"> Abnormal clotting
Subdomain 5.5: Renal and Hepatic Care
Level of Practice: The critical care course graduate can demonstrate independently care of the critically ill patient
<ul style="list-style-type: none"> With renal failure Requiring renal replacement therapy With liver failure
Level of Practice: The critical care course graduate has knowledge of or describes care of the critically ill patient
<ul style="list-style-type: none"> Postorgan transplantation
Subdomain 5.6: Surgical and Trauma Care
Level of Practice: The critical care course graduate can demonstrate independently care of the critically ill patient
<ul style="list-style-type: none"> With altered level of consciousness With raised intracranial pressure With trauma With comorbidities following complex surgery Who is a potential organ and tissue donor
Level of Practice: The critical care course graduate can demonstrate under supervision the care of the critically ill patient
<ul style="list-style-type: none"> With acute spinal cord injury With thermal injury
Subdomain 5.7: Care of Special Populations
Level of Practice: The critical care course graduate can demonstrate independently care of critically ill
<ul style="list-style-type: none"> Culturally and linguistically diverse patients
Level of Practice: The critical care course graduate can demonstrate under supervision care of critically ill
<ul style="list-style-type: none"> Bariatric patients Mental health patients
Level of Practice: The critical care course graduate has knowledge of or describes care of critically ill
<ul style="list-style-type: none"> Obstetric patients For adult critical care nurses: pediatric patients Element: including developmentally appropriate care
Domain 6: Teamwork and Leadership
Level of Practice: The critical care course graduate can demonstrate independently
<ul style="list-style-type: none"> Recognizes own scope of practice Element: accepts responsibility for own actions Acts as a positive role model Takes a collaborative approach to decision making Recognizes and actively manages own stress and supports others Effectively manages and coordinates the care of a variety of patients
Level of Practice: The critical care course graduate can demonstrate under supervision
<ul style="list-style-type: none"> Supports other staff to enable delivery of effective care Effectively engages in bedside teaching
Level of Practice: The critical care course graduate has knowledge of or describes
<ul style="list-style-type: none"> Performs in the ACCESS, admissions, and resource nurse role Acts as shift coordinator and team leader Supervises, and delegates to others, the delivery of patient care

Part 5: Reflecting

5.1 The study journey and discussion

The aim of the AuSDACE study was to develop practice standards and an assessment instrument to measure graduate practice outcomes from critical care nurse education programs. A unique aspect of this research was the inclusion of health consumer input. The study was undertaken using a rigorous and structured multi-phase process including quantitative and qualitative research methods to collect a wide range of data and engage stakeholders from the critical care nursing profession. The resultant graduate practice standards have been so named to reflect the intention to use them as outcome standards. The term competency has intentionally not been used in the standards title in order to prevent any confusion that continues to surround the concepts of competency and competence (Pijl-Zieber, Barton, Konkin, Awosoga, & Caine, 2014), as well as avoid the potential for the standards and assessment tool to be viewed as a checklist or list of skills to be demonstrated and “signed off” (Gill et al., 2006; Kubin, & Fogg, 2010).

In Part 2: *Exploring*, the review of published and grey literature highlighted the diversity of critical care nursing contexts internationally. A lack of comparable workforce data made it difficult to quantify similarities and differences between countries (Gill, Leslie, Grech, & Latour, 2012). There was a general consensus about optimal staffing in critical care by registered nurses with a proportion holding relevant post-registration qualifications. There was no clear definition for, or consistency in, the educational preparation for a critical care qualification. Practice standards for the US (American Association of Critical Care Nurses, 2008), Canada (Canadian Association of Critical Care Nurses, 2009), UK (Bench et al., 2003) and New Zealand (Critical Care Nurses' Section, 2002) were predominantly opinion based with only the Australian standards for the specialist critical care nurse by the ACCCN (Australian College of Critical Care Nurses, 2002) developed using a research based approach. All lacked health consumer input. Since the review was undertaken, in Europe there have been steps taken towards achieving greater consistency in critical care courses and graduate practice outcomes through the development of documents to articulate practice standards (Critical Care Networks-National Nurse Leads, 2013; European federation of Critical Care Nursing associations - EfCCNa, 2013). However, both the European and UK frameworks

continue to be largely opinion based in their development and do not include health consumer input.

Building on the earlier work of Aitken et al. (2006), our more extensive analysis of Australian graduate critical care nurse education programs provided greater insight into the preparation of qualified critical care nurses using a more rigorous methodology. It can now be stated with greater confidence that considerable variations in course delivery and graduate practice outcomes exist (Gill, Leslie, Grech, & Latour, 2013a). It is also worthwhile worth noting that in the intervening seven years since the Aitken et al. (2006) survey there has been no change in the profile and nature of the courses that were offered. This highlights the need to define graduate practice outcomes.

Consistent with previous work, our review reported that professional competency standards (predominantly the ACCCN Competency Standards) are used within course curricula and for clinical assessment. We identified that course outcomes and assessment tools are not aligned with the ACCCN Competency Standards although 21 of the 22 participating courses incorporated clinical assessment as a course outcome. For 15 courses the expected graduate practice outcome is 'a safe practitioner' with graduates not expected to practice at team leadership level. This finding further illustrates how inconsistency in the translation of the ACCCN Competency Standards (Australian College of Critical Care Nurses, 2002) may have occurred as they articulate specialist level not graduate level practice. None of the course specific literature in the area had identified consumer input or placed emphasis on developing supportive relationships with patients and families as a component of critical care nurse education. Interestingly, as McKinley and Elliott (2008) identified when evaluating the American guidelines for support of the family in patient-centred intensive care, the lack of focus on the consumer perspective remains a barrier to providing patient and family centred care in Australia.

An essential step for this study was to obtain critical care patients and families' input. The qualitative approach using focus groups and individual interviews explored the views of patients and families (Gill, Leslie, Grech, & Latour, 2013b). Importantly, participants reported they received an inconsistent level of socio-emotional support from nurses, which has clear implications for critical care nurse education. The same socio-emotional components were reflected in the consumer participants' concepts of minimum practice standards for critical care course

graduates. This research emphasised the need to explicitly describe socio-emotional skills and behaviours in course curricula and practice outcome standards and reflects common themes reported as patient and family needs in the critical care setting (Blom, Gustavsson, & Sundler, 2013; Hofhuis et al., 2008; Høghaug, Fagermoen, & Lerdal, 2011; Høye & Severinsson, 2010; Hunziker et al., 2012; Latour, van Goudoever, & Hazelzet, 2008).

In Part 3: **Developing** the web-based process and eDelphi technique to build the practice standards were reported in two articles (Gill, Leslie, Grech, & Latour, 2013c; Gill, Leslie, Grech, Latour, & Boldy, 2014b) and a series of newsletter updates (Appendix 6.1.1) and conference presentations (Appendix 6.1.2). A web-based survey tool was used to administer three eDelphi rounds of surveys to a national panel of critical care nurses. The online process proved to have numerous advantages over the traditional postal survey approach. It was also clear that ethical issues specific to using the internet to conduct research and external hosting of web-based software currently lacked formal guidance and governance. Specific critical care nursing engagement and feedback strategies to enhance recruitment and participation included a series of publications in the Australian College of Critical Care Nurses' newsletter: "Critical Times" (Appendix 6.1.1) circulated to all ACCCN members, conference presentations (Appendix 6.1.2) and email notification of the peer reviewed publications as they became available.

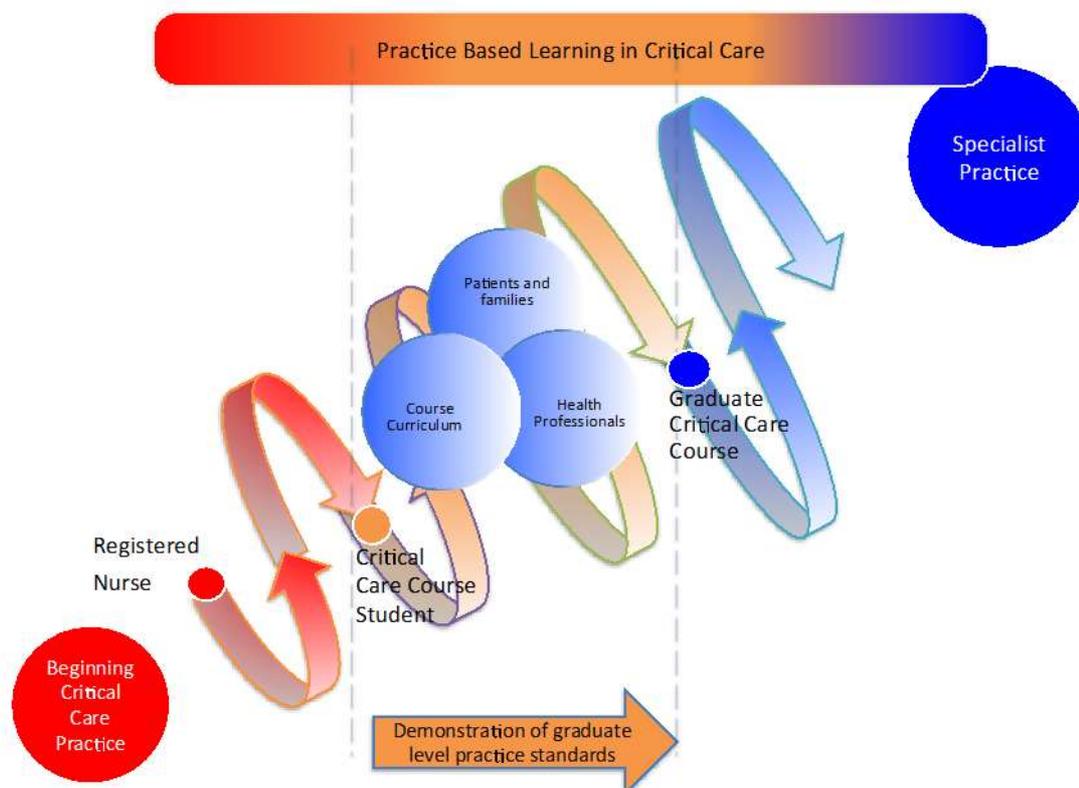
The practice standards for the eDelphi round I consisted of statements drawn from the literature review, course analysis and health consumers' input. The panel represented the perspectives of four critical care nursing stakeholder groups (Gill et al., 2014b). The result of the eDelphi study was that there was panel support for a graduate practice outcome level being able to independently provide nursing care for a variety of critically ill patients in most contexts, using a patient and family focused approach. It was identified that the team leadership role was not an expected graduate outcome level.

The lack of a standard for the critical care qualification was identified several years ago (Aitken et al., 2006; Leslie, 2006; Marshall et al., 2007). The findings from this study have finally provided a clear qualification definition for critical care nursing workforce standards. For the first time a logical methodological evidence informed set of standards have been described for graduates of critical care nurse education. For the graduate certificate level the graduate practice outcome has been

established at safe practice. The team leadership level was more of an expectation at graduate diploma and master level.

In order to achieve consistent graduate outcomes, the standards were interpreted into a tool to measure graduate practice. In Part 4: **Testing** an assessment instrument incorporating the standards was developed and tested (Gill, Leslie, Grech, Latour, & Boldy, 2014a). The instrument, titled the Standards of Practice and Evaluation of Critical-care-nursing Tool (SPECT), was developed as the final step in the AuSDACE Study process (Figure 2). In finalising the Delphi process the practice standards were refined in terms of identification and elimination of some duplication and re-grouping of some statements as elements of standards. This now adds a critical step in the conceptual framework (Section 1.2 Framework) where the typical pathway taken by the beginning registered nurse to specialist in critical care nursing is explained. In Figure 3, the demonstration of graduate level practice standards has been added (orange arrow at bottom of the figure) to show how the practice standards and SPECT can be used to inform and measure graduate clinical practice outcomes.

Figure 3: Demonstration of graduate level practice standards



The SPECT content validity assessed by an expert panel was strong. Reliability assessed by critical care clinical assessment tool users was also good in terms of internal consistency, test-retest and intra-rater agreement. The SPECT appeared to have clinical feasibility, so supporting the expected practice level for a graduate of a critical care education program and the clinical assessment tool. To our knowledge this is the only tool where these five steps of design development were combined, including objective preliminary validity testing. This sets the SPECT apart from other practice standards for critical care course graduates and offers a potential blueprint for adaption and further validation of the tool at an international level and for other specialist graduate nursing contexts.

It is interesting to note the similarities in our findings compared to Benner's (2004) influential work in which she articulated nine domains of nursing practice:

- Caring for patients' families
- Providing comfort measures for the critically ill
- Facing death: End-of-life care and decision making
- Preventing hazards in a technological environment
- Monitoring quality and managing breakdown
- The skilled know-how of managing a crisis
- Diagnosing and managing life-sustaining physiologic functions in unstable patients
- Communicating and negotiating multiple perspectives
- The skilled know-how of clinical leadership and the coaching and mentoring of others

The similarities between the domains and practice standards identified in this research and Benner's work are evident. Although Benner's original work was published three decades ago, this similarity is not that surprising given that 30% of critical care courses reported using Benner's framework and almost 80% reported using the ACCCN Competency Standards which incorporate Benner's framework (Gill et al., 2013a). In a more recent text reflecting contemporary critical care practice (Benner, Hooper Kyriakidis, & Stannard, 2011), the nine domains remain essentially unchanged other than the update resulting in an even closer alignment; the acutely ill patient has been included to reflect the development of nursing and the increased blurring of boundaries between acute and critical care, as well as

there is an increased emphasis on prevention and risk management in the monitoring quality and managing breakdown domain (Benner et al., 2011).

The development of the Australian critical care education graduate practice standards also needs to be considered from an international perspective. There are similarities in the domains, sub-domains and statements articulated by the Australian, UK (Critical Care Networks-National Nurse Leads, 2013), and European (European federation of Critical Care Nursing associations - EfCCNa, 2013) sets of practice standards. The certification model used in North America (American Association of Critical Care Nurses, no date; Canadian Nurses Association, 2011), which is dependent on knowledge testing with no practice evaluation, precludes any meaningful comparison to our findings.

It is noteworthy that the UK critical care competency framework (Critical Care Networks-National Nurse Leads, 2013) and the European competencies for critical care nurses (European federation of Critical Care Nursing associations - EfCCNa, 2013) have both described a more advanced practice expectation for graduates of critical care nurse education programs than identified for Australian course graduates. In particular, differences were in the area of the team leadership role. The Australian graduate is expected to be a safe practitioner who is able to independently provide nursing care to critically ill patients in most contexts, but is not expected to take on distinct leadership roles such as admission nurse or shift coordinator. This doesn't mean that some hospitals (or critical care units) don't allocate new course graduates (or indeed students participating on critical care courses) to these roles, but rather the identified course outcomes don't support this.

These more advanced roles do appear to be expectations of UK and European critical care education graduates. As the two sets of European standards were developed using expert opinion rather than the rigorous research based approach of this study it is likely there may be more variability to actual practice than we found. It also may be that Australian nurses undertake critical care courses earlier in their career than nurses in Europe. It remains to be seen how European course providers will implement and use the respective standards to achieve uniform outcomes especially given the current transitional state of European nursing to the Higher Education model.

The Bologna process (a reform system for coherent, cohesive and comparable higher education throughout Europe) has impacted on nursing education in Europe resulting in a shift from vocational training towards a graduate level outcome that is predicted to be complete in the UK by 2016 (Glasper, 2013) and throughout Europe by 2020 (Collins & Hewer, 2014). The RN4CAST Study recently reported that staffing hospitals with a higher ratio of nurses with bachelor degrees decreases patient mortality, providing strong support for the European decision to recognise professional nursing within Higher Education (Aitken et al., 2014). This process, involving many countries, is far more complex than in the Australian context, where the transition of undergraduate nurse preparation to the Higher Education sector was completed more than 20 years ago (Lusk, Russell, Rodgers, & Wilson-Barnett, 2001). Although the Australian nursing education transition process was relatively simple, at graduate level specialty education has remained unorganised. This is despite the work and recommendations made by numerous national review committees over the last 17 years (Australian Health Workforce Advisory Committee, 2002; Heath, 2002; National Nursing and Nursing Education Taskforce, 2006; Russell, Gething, & Convery, 1997).

In Europe there are reports of difficulties in specialist nursing education already being experienced, specifically in Sweden, as a consequence of the Bologna process (Millberg, Berg, Lindstrom, Petzall, & Ohlen, 2011). The Millberg et al. (2011) study, which included five universities, found difficulties or tensions surrounding the differing views of academic and specific professional objectives. This echoes the situation in the Australian context where academic outcome standards (Australian Qualifications Framework Council, 2013; Tertiary Education Quality and Standards Agency, 2011) are generic education outcomes and do not incorporate professional standards of practice. Expected graduates practice outcomes for critical care nursing were previously undetermined.

The framework in chapter 1.2 (Figure 1) explained the nurse's journey from beginning practice to specialist in critical care nursing by undertaking a critical care course. This beginning point is predicated on a national standard for the preparation of Australian registered nurses, a standard not yet achieved in Europe or North America. Factors that impacted on the graduate practice outcomes were presented. The gaps in the framework were that there was no agreed minimum practice standard to define a critical care nursing qualification and this was complicated by diverse stakeholders' expectations for graduate outcomes. The AuSDACE study

utilised a multi-step process to engage stakeholders and achieved agreement on expected graduate practice standards. As shown in Figure 3 the practice standards and the SPECT can now be used to identify expected graduate practice outcomes and measure graduate clinical practice.

5.2 Study limitations and strengths

Each of the six published papers included identification of individual study limitations. Some of these limitations warrant further consideration.

The strategy used to recruit health consumers was the first reported attempt to obtain patient and family input to graduate practice standards and health consumer organisations were used to facilitate participant recruitment. There were a small number of participants who, due to their involvement in consumers groups, may have held stronger views than if the sample was recruited directly from critical care units. It will be important to further engage with consumers to ensure that the developed practice standards and SPECT reflect consumers' expectations in a variety of critical care contexts.

Using the Delphi technique as a development step required a degree of subjective judgment to interpret the data although the development and testing of the SPECT resulted in further support for the data interpretation. The development of the practice standards and the SPECT involved adult and paediatric critical care environments, acknowledging the potential diversity in practice which was borne out in the standards identifying that adult critical care nurses were not expected to be able to care for paediatric patients, but only have knowledge of and be able to describe their care. The subsequent testing of the SPECT was undertaken, for pragmatic reasons, with adult intensive care nurses only. Further evaluation in a range of critical care setting will be important. An instrument validation step ideally involves the availability of a reasonable, reliable and valid criterion with which the measures on the target instrument can be compared (Scheider, Elliott, LoBiondo-Wood, & Haber, 2003). There was no criterion validity testing undertaken, as there was no available validated tool measuring the same concepts. Construct validity testing was not a feasible component of testing the assessment instrument. This will be an important step in establishing the SPECT's psychometric properties.

The strength of this study lies in the rigorous and structured process used to develop the practice standards and a clinical assessment instrument. The SPECT reflects both the views of critical care nursing stakeholders and health consumers. The high level of engagement by critical care nurses throughout the phases of the study reflect the interest and support held by members of the critical care nursing community for the development of graduate practice standards. The study was undertaken with the strong support of the ACCCN and it is expected that many courses will use the SPECT to inform expected graduate practice outcomes. Engagement with critical care nursing stakeholders included university and non-university course providers with a high participation rate (22/23 course providers). Over 100 critical care nurses representing four key stakeholder groups (an advisory group, course stakeholders, practice stakeholders and course graduates) participated in the eDelphi study with a high retention of panel members over the three survey rounds. Testing of the SPECT was with potential users of the clinical assessment tool; both assessors and recent graduates. The multi-step process to develop specialty practice standards was unique in including health consumer input. The qualitative component of the study permitted the inclusion of both patient and family perspectives on graduate practice standards.

5.3 Dissemination, impact and future research

The practice standards and associated SPECT provide the opportunity for achieving greater standardisation for graduate practice outcomes. The practice standards also provide a uniform interpretation for professional health workforce standards. Such standardisation can only be implemented if there is a genuine acceptance that national practice standards are needed and adopted as minimum criteria for the critical care nursing qualification. Integration into graduate education programs will require course providers to include the practice standards as graduate outcomes. The uniform interpretation for professional workforce standards can occur if driven by key groups; the ACCCN and the College of Intensive Care Medicine as well as the Australian Council on Healthcare Standards.

The mechanisms to enable these changes will be:

- To report findings to all stakeholders. These include ACCCN, its Board of Directors and members, all course providers, all critical care unit managers and critical care nurse educators and clinicians.

- Acceptance by industry and the higher education sector that minimum graduate practice standards be established. These practice standards and SPECT provide the opportunity for that to occur.
- Endorsement through the ACCCN publications. The practice standards and SPECT can be recommended in updates of the i) ACCCN Position Statement on Critical Care Nurse Education (Australian College of Critical Care Nurses, 2006); ii) ACCCN Position Statement on Intensive Care Nurse Staffing (Australian College of Critical Care Nurses, 2003); and iii) ACCCN input to the Intensive Care Clinical Indicators (Australian Council on Healthcare Standards, 2011).

In addition to dissemination of the study findings, there is more work to be undertaken in terms of testing the SPECT:

- Evaluation of the SPECT in clinical practice; using the instrument to measure graduate practice outcomes in real time.
- Further testing is required in a full range of critical care contexts such as mixed critical care units, cardiac care and paediatric critical care. Testing could also be undertaken in other countries. Larger scale use of the SPECT in clinical practice will also offer the opportunity to examine its further clinical applicability.
- Further testing of the SPECT should include an adequately powered study designed to measure construct validity, specifically factor analysis to confirm the dimensions of the domains and identify redundant statements using an adequate sample of students and assessors to permit this. It would be expected this would reduce the number of statements, enhancing the applicability of the tool.
- Exploring why apparent differences exist between the Australian graduate practice standards and the European standards. To enhance mobility and transferability of critical care nursing qualifications it will be important to identify if there are real international practice differences and expectations for critical care nursing qualifications.
- Further work under Standard 2 of the National Safety and Quality Health Standards (Australian Council on Healthcare Standards, 2012) to more widely engage health consumers about their view of the practice standards and the SPECT needs to occur. Experience from this study would suggest

health consumers have a view of nursing practice and will value the opportunity to provide further input.

- The approach used to develop critical care graduate practice standards can be used as a template for other nursing specialities to pursue standardisation.

This study has reported there is an international move to more closely define practice standards in areas such as critical care. This is important to ensure the highest levels of quality and safety care delivered to some of most vulnerable health consumers. Within the Australian context significant steps have been made in identifying nurse staffing standards in terms of numbers and level of specialty preparation. This study has found that the qualification level is graduate certificate (Australian Qualifications Framework Council, 2013) and has detailed through a rigorous process the practice outcomes expected of a graduate, including the views of health consumers. The multi-method design of the AuSDACE study could also serve as a model for other nursing specialties to identify practice expectations for graduates.

Part 6: Appendices

Appendices 6.1: Communication and engagement

Appendix 6.1.1: Peer reviewed abstract publications, conference presentations and non peer - reviewed publications

Peer reviewed abstract publication

Gill, F. J, Leslie, G. D., Grech, C., Boldy, D., Latour, J. M. (2014). Development Of Australian Clinical Practice Outcome Standards For Graduates Of Critical Care Nurse Education.

Australian Critical Care, 27(1), 44. <http://dx.doi.org/10.1016/j.aucc.2013.10.009>

Presented at the 38th Australian & New Zealand Annual Scientific Meeting on Intensive Care and the 19th Annual Paediatric and Neonatal Intensive Care Conference, Hobart, TAS, October 2013.

Introduction: Minimum practice standards for critical care nurse education are not currently identified in Australia resulting in considerable variation in graduate outcomes. Objectives: This research investigated the views of nursing stakeholders about the practice standards graduates should demonstrate having completed a graduate level critical care course. Methods: Following IHEC approval, an eDelphi technique was conducted. A national expert panel responded to three survey rounds. The panel consisted of four nursing stakeholder groups and responded to two rating scales; level of importance (7 point likert-type scale), level of practice (5 categories). Results: Of 105 experts who agreed to participate, 92(88%) completed round I, 85(92%) round II and 73(86%) round III. Of the 98 statements developed from earlier work, 75 were rated at a high level of importance -median 7(IQR 6-7), 14 were rated at a moderate level of importance (median 6, IQR 5-7) and nine were rated at a low level of importance (median 4–6, IQR 4-6). The panel rated the graduate level of practice as “demonstrates independently” or “teaches or supervises others” for 80 statements. For 18 statements there was no category selected by 50% or more of the panel. The resulting 88 practice standards describe a practice outcome level of a graduate who can independently provide nursing care for a variety of critically ill patients in most contexts. Conclusion: The practice outcome standards provide both a framework for critical care nurse education graduate clinical assessment and a nationally consistent set of expected course practice outcomes.

Peer reviewed presentations

Gill, F. J, Leslie, G. D., Grech, C., Latour, J. M. Health Consumers' Experiences in Australian Critical Care Units: Implications for Critical Care Nursing Course Curricula.

Presented at the 37th Australian & New Zealand Annual Scientific Meeting on Intensive Care and the 18th Annual Paediatric and Neonatal Intensive Care Conference, Adelaide, SA, October 2012.

Introduction: Considerable variation exists across critical care nurse education courses despite the use of professional competency standards to inform curricula, assess competency and articulate graduate outcomes. Notably, there is a lack of health consumer input into curricula. Objectives: To explore the views of former patients and families about their experiences with critical care nurses and seek their input into critical care nurses' educational preparation and practice standards. Methods: A qualitative design using focus groups and interviews. Patients and family members who had experienced critical care in an Intensive Care Unit (adult

or paediatric) or Coronary Care Unit were purposively selected. Thematic analysis was used to identify themes and subthemes of importance to participants. Results: There were 17 participants in three focus groups and five individual interviews which were guided by two preselected categories; a) the role of the critical care nurse and; b) minimum practice standards for critical care course graduates. For category a) physical patient care and socio-emotional support of patients and family were reported as important. Socio-emotional support included five subthemes; communication, people skills, facilitating family presence, advocacy and inconsistency. These components were reflected in category b); talking and listening skills, relating to and dealing with stressed people, individualizing care and, patient and family advocacy. Conclusion: The inconsistencies described in the provision of socio-emotional support reinforce the need for minimum practice standards for the preparation of qualified critical care nurses. Such standards informed by health consumers' views need to be explicitly described in curricula and instruments developed to assess core critical care competencies.

Gill, F. J, Leslie, G. D., Grech, C., Latour, J. M. Health Consumers' Experiences in Australian Critical Care Units: Implications for Critical Care Nursing Course Curricula.

Presented at the International Conference on Innovations in Nursing, Perth, WA, November 2012

Background: In Australia nearly 40,000 nurses are working in the adult critical care setting. Workforce standards recommend that at least 50% of nurses practicing in critical care should hold a critical care qualification. Many critical care nurse education program providers utilise professional competency standards to inform curricula, competency assessment and graduate outcomes. Yet considerable variations exist in duration, content and assessment across programs. Notably, there is a lack of health consumer input into critical care nurses' educational preparation. Aim: To explore the views of patients and families about their experiences with critical care nurses and seek their input into critical care nurses' educational preparation and practice outcomes. Method: Following IEC approval, purposive sampling was used to select patients and family members who had experienced critical care in either an intensive care unit (adult or paediatric) or coronary care unit. Seventeen former patients and family members agreed to participate in focus groups and individual interviews. Results: Using thematic analysis two main categories were developed; the role of the critical care nurse and; minimum practice standards for critical care course graduates. For the role of the critical care nurse, both physical patient care and socio-emotional support of patients and family were reported to be important. Components of socio-emotional support included communication, people skills, facilitating family presence and advocacy. These components were reflected in participants' priorities for critical care nurses' educational preparation and practice outcomes; talking and listening skills, relating to and dealing with stressed people, individualizing care and patient and family advocacy. Participants described inconsistencies in the provision of socio-emotional support, reinforcing the need for minimum practice standards including these components identified as important by health consumers.

Invited speaker presentation

Gill F. J. Paediatric Intensive Care Nurse Education: Is There Any Difference?
Presented at the 19th Annual Paediatric and Neonatal Intensive Care Conference, Hobart, TAS, October 2013

Critical care nursing is one of the largest nursing specialties, having been established more than half a century ago in countries like the United States, Europe and Australia. It is generally accepted that critical care is an encompassing term that applies to settings where patients with life threatening conditions or illness are nursed. These include adult and paediatric intensive care units.

In graduate level critical care nurse education there exist wide variations across Australian programs. For paediatric intensive care nurse education an additional variation is that course providers can regard paediatric intensive care nursing as either a sub-specialty of critical care nursing or of paediatric nursing to fit within their graduate level nurse education delivery framework. The standardization of critical care nurse education graduate practice outcomes will be desirable from the perspective of all stakeholders, especially patients and their families. Understanding the key differences and similarities between paediatric and adult intensive care nursing highlights the implications for educators.

Appendix 6.1.2: Non peer-reviewed publications

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NATIONAL NEWS

Australian Standards Development and Assessment in Critical-Care-Nurse Education (AuSDACE)

BY FENELLA GILL

I was recently awarded the annual WA Helen Bailey Fellowship by the WA Nursing and Midwifery Office for my research proposal to develop national practice standards for the qualified critical care nurse. The aim is to both articulate minimum standards of practice expected of the critical care course graduate and reflect contemporary Australian critical care nursing practice through the development of a validated assessment tool. I am enrolled as a PhD student at Curtin University and will be supervised by Prof Gavin Leslie (Curtin University), Assoc Prof Carol Grech (University of South Australia) and Dr Jos Latour (Erasmus Medical Centre, Rotterdam).



Fenella Gill (left) being awarded the Helen Bailey Fellowship by Catherine Stoddart.

The impetus for this study is explained in the following excerpt: "Critical care nursing is one of Australia's largest post-registration specialities. The Australian College of Critical Care Nurses has recommended that the Competency Standards for Specialist Level Critical Care Nurses form the basis of postgraduate course curricula, graduate outcomes and student clinical assessment. Whilst this recommendation was adopted by many course providers in Australia, the nature of the award level, course content, assessment and outcomes vary considerably across programs nationally. Australian standards for staffing in intensive care units have recommended that at least 50% of nurses hold a critical care 'qualification'; a stance supported by emerging evidence that patient outcomes are improved when cared for by appropriately experienced and educated critical care nurses. What have not been defined are the minimum practice standards for the preparation of a 'qualified' critical care nurse. There is a need for consistency in the preparation of and expected standard of practice to qualify

The Australian College of Critical Care Nurses has recommended that the Competency Standards for Specialist Level Critical Care Nurses form the basis of postgraduate course curricula, graduate outcomes and student clinical assessment. Whilst this recommendation was adopted by many course providers in Australia, the nature of the award level, course content, assessment and outcomes vary considerably across programs nationally.

critical care nurses, also taking patient and family expectations into consideration."

The AuSDACE study has been organised into four phases. Phase 1 will rely on the cooperation and participation by universities and hospitals providing critical care courses to enable a documentary analysis of Australian critical care nursing programs, outcomes and assessment criteria. Phase 2 will consist of a health consumer focus group followed by a three-round Delphi method to identify the expected standard of practice for a qualified critical care nurse and construct a measurement scale for assessment. This phase will include participation by critical care nurses. Phase 3 will be the development and psychometric testing of the assessment instrument and will require completion of a survey by ACCCN members. Phase 4 will be a pilot examination of the clinical validity and utility of the assessment instrument in two intensive care units in WA and SA.

To enable successful completion of the AuSDACE study I am hoping that the Australian critical care nursing community (including ACCCN members) will support the study by providing expertise and input during each phase. It is anticipated that the AuSDACE study will eventually inform university curricula and course graduate outcomes, critical care nursing students' clinical performance assessment and meet both health industry and consumer expectations in articulating the minimum practice standards for critical care course graduates. The development of a valid and reliable assessment tool will provide a consistent approach to measuring these outcomes. ●

If you have any comments or queries, please contact:

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AusDACE Study Progress

BY FENELLA GILL

The Australian Standards Development and Assessment in Critical-Care-Nurse Education (AusDACE) PhD study aim is to develop minimum practice standards (and a validated clinical assessment tool) for graduates of critical care nursing programs. The scope of the study includes courses covering critical care, ICU (adult and paediatric) and CCU/cardiac nursing. Thank you to everyone who has participated in the study so far. The following is a brief update on the study progress:

Phase 1: Documentary analysis of critical care nursing courses/ programs

Data collection is almost complete for this phase. Twenty-one course providers have participated by providing me with course information and I have interviewed course coordinators. A big thank

you to all of the course providers who agreed to participate. This is almost a 100% participation rate.

Phase 2 (part 1): Health consumers focus groups & interviews

Data collection is almost complete for this part of the study. I have interviewed former patients and family members about what they consider to be the role of the critical care nurse as well as what they think is important to include in minimum practice standards for program graduates.

Next phases are: 2012

For Phase 2 (part 2), I will be seeking input from interested critical care nurses to participate in a 3-round Delphi method to identify the expected standard of practice for a qualified critical care nurse and construct an assessment instrument. The surveys will be distributed electronically.

Phase 3 will be the development and psychometric testing of the assessment instrument and again will require participation by ACCCN members.

2013

Phase 4 will be a pilot examination of the clinical validity and utility of the assessment instrument in two intensive care units in West Australia and South Australia.

I am hoping that the Australian critical care nursing community (including ACCCN members) will continue to support the study by providing expertise and input during each of the above phases. Any comments, questions or queries about the study, please contact:

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AuSDACE Study Update

BY FENELLA GILL



Curtin University

This PhD study aims to develop minimum practice standards (and a validated clinical assessment tool) for graduates of critical care nursing programs. The scope of the study includes courses covering critical care, ICU (adult & paediatric) and CCU/cardiac nursing. Thank you to everyone who has participated in the study so far. The following is a brief update on the study progress to July 2012.

PHASE 1: Documentary analysis of critical care nursing courses

Twenty one course providers participated by providing me with course information and I have interviewed course coordinators. A big thank you to all of the course providers who agreed to participate. This is almost a 100% participation rate. The analysis included a review of clinical assessment tools enabling the development of draft one of the minimum practice standards for course graduates.

PHASE 2 (part 1): Health consumers focus groups & interviews

Seventeen former patients and family members were interviewed to identify their perspectives on the role of the critical care nurse as well as what they think is important to include in minimum practice standards for critical care nursing course graduates. Findings from this phase were included in draft two of the minimum practice standards for course graduates.

PHASE 2 (part 2): Delphi Survey

A three round Delphi survey is currently in progress to identify stakeholders' (advisory group, program coordinators, clinical stakeholders and course graduates) views about the expected minimum standard of practice for graduates of critical care courses and to construct a clinical assessment tool. Over 100 critical care nurses agreed to participate as panel members. The first survey was distributed in July, with panel members asked to provide comments on the draft standards and rate the level of importance for each practice standard. The second and third rounds will be distributed in the coming months.

What next?

Phase 3 will include the psychometric testing of the practice standards as a clinical assessment tool. Phase 4 will be a pilot examination of the clinical validity and utility of the assessment instrument in two intensive care units in Western Australia and South Australia.

As the study progresses a series of publications will be released. The background literature review is now available:

Gill, F.J., Leslie, G.D., Grech, C., Latour, J.M. (2012). A review of critical care nursing staffing, education and practice standards. *Australian Critical Care*. Advance online publication. DOI: 10.1016/j.succ.2011.12.056

I'm hoping that the Australian critical care nursing community will continue to support the study by providing expertise and input during each of the above phases. Any comments, questions or queries about the study please contact:

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Australian standards development and assessment in Critical Care Nurse Education (AuSDACE) Study – Update No 4

BY FENELLA GILL

Thank you to everyone who has participated in the AuSDACE study so far. The following is a brief update on the study progress to October 2012. The PhD study aim is to develop minimum practice standards (and a validated clinical assessment tool) for graduates of critical care nursing programs. The scope of the study includes courses covering critical care, ICU (adult and paediatric) and CCU/cardiac nursing.

Phase 1: Analysis of critical care nursing courses

A manuscript reporting the findings is currently being prepared. Thank you to those who participated by providing information. You will receive a copy of the article once it is accepted for publication.

Phase 2 (part 1): Health consumers' perspectives

Former patients and family members were interviewed to identify their views on the role of the critical care nurse as well as what they think is important to include in minimum practice standards for critical care nursing course graduates.

A manuscript has been accepted for publication and details will be available in the next update. Findings from this phase contributed to draft two of the minimum practice standards for course graduates.

Phase 2 (part 2): Delphi Survey

Data collection has just been completed for the three round Delphi survey to identify stakeholders' views about the expected minimum standard of practice for graduates of critical care courses. Over 100 critical care nurses initially agreed to participate as panel members, and the response rate across the three rounds has been very good (> 80%).

A manuscript reporting the experience of conducting a national Delphi study using a web-based survey tool has been submitted for publication. Details to follow in the next update.

2013

The next steps will be the development and testing of a clinical assessment tool.

As the study progresses a series of publications will be released. The background literature review is now available:

Gill, F.J., Leslie, G.D., Grech, C., Latour, J.M. (2012). A review of critical care nursing staffing, education and practice standards. Australian Critical Care. Advance online publication. DOI: 10.1016/j.aucc.2011.12.056

I'm hoping that the Australian critical care nursing community will continue to support the study by providing expertise and input during each of the study phases. Any comments, questions or queries about the study please contact:

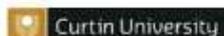
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AuSDACE Study enters final phase!

Australian Standards Development and Assessment in Critical-Care-Nurse Education (AuSDACE) Study

BY FENELLA GILL



The study aim is to develop minimum practice standards for graduates of critical care nursing programs. The final phase of the AuSDACE study will be the development and testing of a clinical assessment tool to measure practice standards. An online survey will be used and we are recruiting participants who will be users of the assessment tool: course graduates (inclusion criteria: within 12 months of completing course which involved clinical performance assessment) and assessors (inclusion criteria: have participating in the clinical performance assessment of a critical care course student within the last 12 months).

We hope that the Australian critical care nursing community will continue to support the study by providing expertise and input for the last phase. Thank you to everyone who has participated in the AuSDACE study so far which has consisted of:

The background literature review

Gill, F.J, Leslie, G. D., Grech, C., & Latour, J. M. (2012). A review of critical care nursing staffing, education and practice standards. *Australian Critical Care*, 25(4), 224-237. DOI:10.1016/j.aucc.2011.12.056

Analysis of 22 Australian critical care nursing courses

A manuscript reporting the findings has been submitted for publication and is under review.

Health consumers' perspectives

Former patients and family members were interviewed to identify their views on the role of the critical care nurse as well as what they think is important to include in minimum practice standards for critical care nursing course graduates.

Gill, F.J, Leslie, G.D., Grech, C., Latour, J.M. (2013). Health Consumers' Experiences in Australian Critical Care Units: Implications for Critical Care Nursing Course Curricula. *Nursing in Critical Care*, 18(2), 93-102. DOI: 10.1111/j.1478-5153.2012.00543.x

Findings from this phase contributed to draft minimum practice standards for course graduates.

Delphi Survey

A three round eDelphi technique was undertaken to identify stakeholders' views about the expected minimum standard of practice for graduates of critical care programs. Over 100 critical care nurses initially agreed to participate as panel members, and the response rate across the three rounds was excellent (> 80%). The results of this phase have formed the basis of the draft clinical assessment tool. A manuscript reporting this phase is being prepared for publication and the article below describes using SurveyMonkey to undertake the study.

Gill, F., J, Leslie, G., D, Grech, C., & Latour, J. (2013). Using a web-based survey tool to undertake a Delphi study: application for nurse education research. *Nurse Education Today* DOI: 10.1016/j.nedt.2013.02.016 (in press).

Any comments, questions or queries about the study please contact:

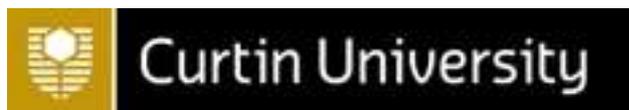


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Appendix 6.2: Participant Information Sheet and Consent Form



Study Title: Australian Standards Development and Assessment in Critical-Care-Nurse Education (AuSDACE)

Principal Investigator: Fenella Gill PhD Candidate, School of Nursing and Midwifery, Faculty Health Sciences, Curtin University, Perth, Western Australia

Principal Supervisor: Professor Gavin Leslie, School of Nursing and Midwifery, Faculty Health Sciences, Curtin University, Perth, Western Australia

Associate Supervisors:

A/Professor Carol Grech, University of South Australia

Dr Jos Latour, Erasmus University Medical Centre and Sophia Children's Hospital, Rotterdam, The Netherlands

Thank you for taking the time to read this information sheet. You are invited to participate in a research study to develop national minimum standards for qualified critical care nurses. The study will also result in an assessment tool to provide a consistent way to measure these standards.

What is an Information Sheet?

These pages tell you about the research study. It explains to you clearly and openly all the steps of the study. The information is to help you to decide whether or not you would like to take part in the research.

Please read this Information carefully. You can ask me questions about any part of the research. Participation in this research is voluntary. If you don't want to take part you don't have to. You can withdraw from the research at any time without explanation and without any negative consequences.

Once you have understood what this research is about and you are happy to participate, I will ask you to sign the attached Consent Form at the Focus Group Interview. You will be given a copy of this information and Consent Form to keep.

What is this research study about?

Critical care nursing is one of Australia's largest nursing specialties. Many universities provide courses beyond Registered Nurse level to prepare qualified nurses to be able to work in areas such as intensive care units, coronary care units and high dependency areas. These courses can vary greatly across programs nationally.

Australian standards for staffing in intensive care units recommend that at least 50% (preferably 75%) of nurses hold a critical care qualification, and research shows that patient outcomes are better when they are cared for by experienced and educated critical care nurses. What have not yet been clearly defined are the minimum

standards for the preparation of qualified critical care nurses. This has resulted in some variation on a national scale for the minimum standards for graduates of these specialist programs. This is particularly important now that Australia has taken on a national system for nurse registration. In addition patients' and their families' expectations of critical care nurses have not been specifically taken into consideration in some courses.

The study has the support of the Australian College of Critical Care Nurses and will be undertaken in four phases of data collection. You are invited to participate in Phase 2 that involves **a number of health consumer focus groups (in three different States) to be held with volunteers who have had experience of being a critical care patient, family member or support person.** This will make sure that health consumers' expectations of qualified critical care nurses are identified and included in the draft minimum standards. Later phases of the study involve a survey of critical care nurses and testing of the assessment tool.

The study will be able to inform university courses, critical care nurses' assessment and meet health consumer expectations in describing the minimum standards for critical care course graduates. The Curtin University Human Research Ethics Committee has approved this study (approval number SON&M 23-2011)

What is required of you?

Your participation in this study involves one interview that will be held either as an individual interview or as a focus group. This means that I will talk with you or to the group (of 8 – 10 people) about a number of issues related to your experiences of being a patient, family member or support person of a patient who was cared for in a critical care area such as an intensive care unit or coronary care unit. I want to find out what you considered to be important skills and abilities for experienced critical care nurses.

Before the interview I will ask for a few details about you and your signed consent. The interview will last no longer than 60 minutes. It will be audio recorded so that I can make sure I fully understood what was said. A number of participants will be sent the interview record and the findings to confirm that the interpretation was correct. All information will be confidential; no individual will be identifiable in the audio recording, transcript or resulting publications.

What are the possible benefits for you?

There are no direct benefits to you in participating in this study. You may feel a sense of satisfaction in helping to inform the minimum standards for future critical care nurses.

What are the benefits for other people in the future?

The information gained from the health consumer focus group interview will be used to inform the development of Australian minimum standards for qualified critical care nurses.

Are there any risks to you in participating in this study?

There are no predictable risks to you participating in this study. However as the interview will involve you thinking about your experiences in the critical care area, there is the possibility that this may be distressing for you. If this does occur, counseling services can be arranged through your State health consumer support group.

What will be done to make sure your information is confidential?

Other than obtaining your written consent, no other personal information will be collected from you. The focus group interview information will be collected confidentially and will be accessed by my PhD supervisors and myself only. The audio recording will be erased after being documented. The written record will be securely stored in line with the National Statement on Ethical Conduct in Human Research (2007). Any publication will report the focus group findings as a whole. Your identity will not be revealed in any published material.

Will you be informed of the results when the research study is finished?

At the end of the study you will be sent a letter with the main findings of the study. It is expected that the study will be completed by 2014.

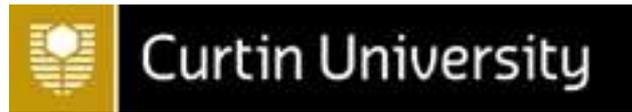
Who can you contact for more information about this study?

You can contact the investigators:

- Fenella Gill Tel 0402881604 Email f.gill@curtin.edu.au
- Professor Gavin Leslie (principal supervisor) Tel 9266 2070 Email g.leslie@curtin.edu.au

Who can you contact if you have any concerns about the organisation or running of this study?

If you have any concerns or complaints regarding this study you can contact the Curtin University Human Research Ethics Committee (Secretary) Tel 9266 2784, Email hrec@curtin.edu.au or in writing C/- Office of Research and Development, Curtin University, GPO Box U1987, Perth WA 6845.



Health Consumer Information Sheet and Consent Form

**Australian Standards Development and Assessment in Critical-Care-Nurse
Education (AuSDACE)**

Some details about you and your critical care experience:

1. Your age: _____

2. Are you male female

3. Was your experience in a) an intensive care unit (ICU) or b) a coronary care unit (CCU)

4. When was your ICU/CCU experience?

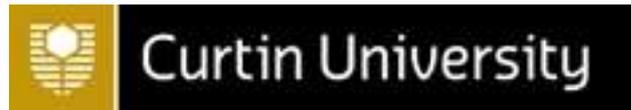
5. Were you a patient, family member or support person (please describe below)

6. What was the reason for the ICU/CCU admission?

7. How many days were spent in ICU or CCU?

8. How long was the overall hospital stay?

9. Your email or postal address to send the study report to:



Health Consumer Information Sheet and Consent Form

Australian Standards Development and Assessment in Critical-Care-Nurse Education (AuSDACE)

-
- I voluntarily consent to take part in this research study
 - I believe I understand the purpose, extent and possible effects of my involvement in this research
 - I have had the opportunity to ask questions and I am satisfied with the answers I have received
 - I understand I can withdraw at any time without prejudice
 - I understand that this study has been approved by the Curtin University Human Research Ethics Committee and will be carried out in line with the National Statement on Ethical Conduct in Human Research (2007).
 - I understand that I will receive a copy of this Information Sheet and Consent Form
-

I agree to participate in the study as outlined to me
 Full Name of participant

Signature of participant

Dated day of 201

Statement of person obtaining informed consent

I have fully explained the process involved in this study and have explained their purpose. I have asked whether or not any questions have arisen regarding the process and have answered those questions to the best of my ability.

Full name

Signature

Dated day of 201

Appendix 6.3: University Human Research Ethics Committee Approvals

To	Professor Gavin Leslie, Ms Fenella Gill, Professor Carol Grech, Dr Jos Latour
From	Professor Dianne Wynaden
Subject	Protocol Approval SON&M 23-2011
Date	18 th September 2011
Copy	

Office of Research and Development
 Human Research Ethics Committee
 Telephone 9266 2784
 Facsimile 9266 3793
 Email hrec@curtin.edu.au

Thank you for your "Form C Application for Approval of Research with Low Risk (Ethical Requirements)" for the project titled "**Australian Standards Development and Assessment in Critical-Care-Nurse Education (AuSDACE)**". On behalf of the Human Research Ethics Committee, I am authorised to inform you that the project is approved.

Approval of this project is for a period of twelve months from 18th September 2011 to 18th September 2012. The approval number for your project is **SON&M 23-2011**. *Please quote this number in any future correspondence.* If at any time during the twelve months changes/amendments occur, or if a serious or unexpected adverse event occurs, please advise me immediately.



Professor Dianne Wynaden
 Low Risk Coordinator/Ethics Advisor
 School of Nursing and Midwifery

Please Note: The following standard statement must be included in the information sheet to participants:
This study has been approved by the Curtin University Human Research Ethics Committee (Approval Number SON&M 23-2011). If needed, verification of approval can be obtained either by writing to the Curtin University Human Research Ethics Committee, c/- Office of Research and Development, Curtin University, GPO Box U1987, Perth, 6845 or by telephoning 9266 2784 or hrec@curtin.edu.au



Memorandum

To	Ms Fenella Gill/ Professor Gavin Leslie
From	Professor Dianne Wynaden
Subject	Protocol Approval SON&M 23-2011
Date	19 th September 2012
Copy	

Thank you for your "Form C renewal Application for Approval of Research with Low Risk (Ethical Requirements)" for the project titled "**Australian standards development and assessment in critical care nurse education (AuSDACE)**". On behalf of the Human Research Ethics Committee, I am authorised to inform you that the project is renewed.

Approval of this project is for a period of twelve months from 19th September 2012 to 19th September 2013.

The approval number for your project is **SON&M 23-2011**. *Please quote this number in any future correspondence.* If at any time during the twelve months changes/amendments occur, or if a serious or unexpected adverse event occurs, please advise me immediately.

Professor Dianne Wynaden
Low Risk Coordinator/Ethics Advisor
School of Nursing and Midwifery

Please Note: The following standard statement must be included in the information sheet to participants:
This study has been approved under Curtin University's process for lower-risk Studies (Approval Number SON&M 23-2011). This process complies with the National Statement on Ethical Conduct in Human Research (Chapter 5.1.7 and Chapters 5.1.18-5.1.21).
For further information on this study contact the researchers named above or the Curtin University Human Research Ethics Committee c/- Office of Research and Development, Curtin University, GPO Box U1987, Perth 6845 or by telephoning 9266 9223 or by emailing hrec@curtin.edu.au.

Appendix 6.4: Acceptance confirmation Manuscript 6

JCEN@slackinc.com

17 April 2014

RE: JCEN-2013-138 Version 2

Title: Developing and testing the Standard of Practice and Evaluation of Critical-care-nursing Tool (SPECT) for critical care nursing practice

I am pleased to inform you that the above-referenced revised article has been accepted for publication in The Journal of Continuing Education in Nursing.

We look forward to working with you during the remainder of the publication process. Thank you for your interest in The Journal of Continuing Education in Nursing.

Sincerely,

Jaime Harker, ELS
Managing Editor

Appendix 6.5: Bibliography

- Ahern, N. R. (2005). Using the internet to conduct research. *Nurse Researcher*, 13(2), 55-70. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=2009082870&site=ehost-live>
- Aitken, L., Currey, J., Marshall, A., & Elliott, D. (2006). The diversity of critical care nursing education in Australian universities. *Australian Critical Care*, 19(2), 46-52.
- Aitken, L., Currey, J., Marshall, A., & Elliott, D. (2008). Discrimination of educational outcomes between differing levels of critical care programmes by selected stakeholders in Australia: A mixed-method approach. *Intensive and Critical Care Nursing*, 24(2), 68-77. doi:10.1016/j.iccn.2007.09.001
- Aitken, L., Sloane, D., Bruyneel, L., Van den Heede, K., Griffiths, P., Busse, R., . . . Sermeus, W. (2014). Nurse staffing and education and hospital mortality in nine European countries: a retrospective observational study. *The Lancet*, Published online February 26 [http://dx.doi.org/10.1016/S0140-6736\(13\)62631-8](http://dx.doi.org/10.1016/S0140-6736(13)62631-8)
- American Association of Critical Care Nurses. (No date). Available: <http://www.aacn.org/dm/mainpages/certificationhome.aspx> [Accessed 2013 Oct 10].
- Allen, P. J., & Roberts, L. D. (2010). The Ethics of Outsourcing Online Survey Research. (IGI Global). Retrieved from <http://services.igi-global.com/resolvedoi/resolve.aspx?doi=10.4018/jte.2010070104>
- American Association of Critical Care Nurses. (2008). AACN Scope and standards for acute and critical care nursing practice [Internet]. Retrieved from <http://www.aacn.org/>
- American Association of Critical Care Nurses. (no date). [Internet]. Retrieved from <http://www.aacn.org/dm/mainpages/certificationhome.aspx>
- American Nurses Association. Code of ethics for nurses with interpretive statements [Internet]. Retrieved from <http://www.nursingworld.org/>
- Atkinson, B. L. (1990). Training nurses for intensive care. *Intensive Care Nursing*, 6(4), 172-178. [http://dx.doi.org/10.1016/0266-612x\(90\)90018-3](http://dx.doi.org/10.1016/0266-612x(90)90018-3)
- Australian College of Critical Care Nurses. (2006). ACCCN position statement on the provision of critical care nurse education [Online]. Available: http://www.acccn.com.au/images/stories/downloads/provision_CC_nursing_edu.pdf [Accessed 02 March 2011]
- Australian College of Critical Care Nurses. (no date). [Internet]. Retrieved from <http://www.acccn.com.au/>
- Australian College of Critical Care Nurses. (2002). *Competency Standards for Specialist Critical Care Nurses* (2nd ed.). Perth, Western Australia: Cambridge Media.

- Australian College of Critical Care Nurses. (2003). Position statement on intensive care nurse staffing [Internet]. Retrieved from http://www.acccn.com.au/images/stories/downloads/staffing_intensive_care_nursing.pdf
- Australian College of Critical Care Nurses. (2006). ACCCN position statement on the provision of critical care nurse education [Internet]. Retrieved from http://www.acccn.com.au/images/stories/downloads/provision_CC_nursing_edu.pdf
- Australian Commission on Safety and Quality in Health Care. (2010). *Patient-centred care: improving quality and safety by focusing care on patients and consumers*. Sydney: ACSQHC.
- Australian Council on Healthcare Standards. (2011). Intensive care clinical indicators user manual [internet]. Retrieved from <http://www.achs.org.au/>
- Australian Council on Healthcare Standards. (2012). National Safety and Quality Health Service Standards Program [internet]. Retrieved from <http://www.safetyandquality.gov.au/publications/national-safety-and-quality-health-service-standards/>
- Australian Health Workforce Advisory Committee. (2002). The critical care nursing workforce in Australia 2001-2011 [internet]. Retrieved from <http://www.ahwo.gov.au/documents/Publications/2002/> The critical care nurse workforce in Australia.pdf
- Australian Institute of Health and Welfare. (2010). Nursing and midwifery labour force 2008 (internet) Retrieved from <http://www.aihw.gov.au/>
- Australian Institute of Health and Welfare. (2011). Nursing and midwifery labour force 2009 [internet]. Retrieved from <http://www.aihw.gov.au/publication-detail/?id=10737419682>
- Australian Institute for Patient and Family Centred Care. (no date). [internet]. Retrieved from www.aipfcc.org.au/care.html
- Australian Nursing Council Inc. (1990). *ANCI national competency standards for the registered nurse* Retrieved from <http://trove.nla.gov.au/work/7163316>
- Australian Qualifications Framework Council. (2011). *Australian Qualifications Framework*. South Australia: Australian Qualifications Framework Council. Retrieved from http://www.aqf.edu.au/Portals/0/Documents/Handbook/AustQuals%20Frmwrk%20FirstEditionJuly2011_FINAL.pdf
- Australian Qualifications Framework Council. (2013). *Australian Qualifications Framework*. South Australia: Australian Qualifications Framework Council. Retrieved from [http://www.aqf.edu.au/Portals/0/Documents/2013_docs/AQF 2nd Edition January 2013.pdf](http://www.aqf.edu.au/Portals/0/Documents/2013_docs/AQF%202nd%20Edition%20January%202013.pdf)

- Bailey, J. J., Sabbagh, M., Loiselle, C. G., Boileau, J., & McVey, L. (2010). Supporting families in the ICU: A descriptive correlational study of informational support, anxiety, and satisfaction with care. *Intensive and Critical Care Nursing*, 26(2), 114-122. doi:10.1016/j.iccn.2009.12.006
- Baktoft, B., Drigo, E., & Hohl, M. (2003). A survey of critical care nursing education in Europe. *The World of Critical Care Nursing*, 2(3), 85-87.
- Ball, C., & McElligot, M. (2003). 'Realising the potential of critical care nurses': an exploratory study of the factors that affect and comprise the nursing contribution to the recovery of critically ill patients. *Intensive and Critical Care Nursing*, 19(4), 226-238. [http://dx.doi.org/10.1016/s0964-3397\(03\)00054-5](http://dx.doi.org/10.1016/s0964-3397(03)00054-5)
- Ball, C., Walker, G., Harper, P., Sanders, D., & McElligott, M. (2004). Moving on from 'patient dependency' and 'nursing workload' to managing risk in critical care. *Intensive and Critical Care Nursing*, 20(2), 62-68. <http://dx.doi.org/10.1016/j.iccn.2004.02.001>
- Barrett, H., & Bion, J. (2005). An international survey of training in adult intensive care medicine. *Intensive Care Medicine*, 31, 553-561. <http://dx.doi.org/10.1007/s00134-005-2583-7>
- Barrios, M., Villarroya, A., Borrego, Á., & Ollé, C. (2011). Response Rates and Data Quality in Web and Mail Surveys Administered to PhD Holders. *Social Science Computer Review*, 29(2), 208-220. <http://dx.doi.org/10.1177/0894439310368031>
- Baruch, Y., & Holtom, B. C. (2008). Survey response rate levels and trends in organizational research. *Human Relations*, 61(8), 1139-1160. <http://dx.doi.org/10.1177/0018726708094863>
- Bauer, P., Hoffmann, R. G., Bragg, D., & Scanlon, M. C. (2013). Perceptions of risk to patient safety in the pediatric ICU, a study of American pediatric intensivists. *Safety Science*, 53(0), 160-167. <http://dx.doi.org/10.1016/j.ssci.2012.09.009>
- Becker, D., Kaplow, R., Muenzen, P. M., & Hartigan, C. (2006). Activities performed by acute and critical care advanced practice nurses: American Association of Critical-Care Nurses study of practice. *American Journal of Critical Care*, 15(2), 130-148. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=2009129576&site=ehost-live>
- Beckman, U., Carless, R., Durie, M., Gill, F., & Morrison, A. (1999). Problems associated with nursing staff inexperience: an analysis of incident reports submitted to the AIMS-ICU Australian and New Zealand Intensive Care Society and Australian Patient Safety Foundation. *Australian Critical Care*, 12(2), 78-78. [http://dx.doi.org/10.1016/S1036-7314\(99\)70564-3](http://dx.doi.org/10.1016/S1036-7314(99)70564-3)
- Beckstead, J. W. (2013). On measurements and their quality: Paper 2: Random measurement error and the power of statistical tests. *International Journal of Nursing Studies*, 50(10), 1416-1422. <http://dx.doi.org/http://dx.doi.org/10.1016/j.ijnurstu.2013.04.010>

- Benbenishty, J., DeKeyser Ganz, F., & Adam, S. (2005). Differences in European critical care nursing practice: a pilot study. *Intensive and Critical Care Nursing*, 21(3), 172-178. <http://dx.doi.org/10.1016/j.iccn.2004.08.004>
- Bench, S., Crowe, D., Day, T., Jones, M., & Wilebore, S. (2003). Developing a competency framework for critical care to match patient need. *Intensive and Critical Care Nursing*, 19(3), 136-142. [http://dx.doi.org/10.1016/s0964-3397\(03\)00030-2](http://dx.doi.org/10.1016/s0964-3397(03)00030-2)
- Benner, P. (1984). *From novice to expert: Excellence and power in clinical nursing practice*. Menlo Park: Addison Wesley.
- Benner, P. (2004). Current controversies in critical care. Designing formal classification systems to better articulate knowledge, skills, and meanings in nursing practice. *American Journal of Critical Care*, 13(5), 426-430. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=2004189493&site=ehost-live>
- Benner, P., Hooper Kyriakidis, P., & Stannard, D. (2011). *Clinical wisdom and interventions in acute and critical care: a thinking-in-action approach* (2nd ed.). New York: Springer Publishing Company, LLC.
- Bijttebier, P. B., Vanoost, S. V., Delva, D. D., Ferdinande, P. F., & Frans, E. F. (2001). Needs of relatives of critical care patients: perceptions of relatives, physicians and nurses. *Intensive Care Medicine*, 27(1), 160-165. <http://dx.doi.org/10.1007/s001340000750>
- Blom, H., Gustavsson, C., & Sundler, A. J. (2013). Participation and support in intensive care as experienced by close relatives of patients—A phenomenological study. *Intensive and Critical Care Nursing*, 29(1), 1-8. <http://dx.doi.org/http://dx.doi.org/10.1016/j.iccn.2012.04.002>
- Bondy, K. (1983). Criterion-referenced definitions for rating scales in clinical evaluation. *Journal of Nursing Education*, 22(9), 376-382.
- Boulkedid, R., Abdoul, H., Loustau, M., Sibony, O., & Alberti, C. (2011). Using and Reporting the Delphi Method for Selecting Healthcare Quality Indicators: Systematic Review. *PLoS ONE*, 6(6), e20476. <http://dx.doi.org/10.1371/journal.pone.0020476>
- Boynton, P. (2004). Administering, analysing and reporting your questionnaire. *British Medical Journal*, 328, 1372-1375. Retrieved from <http://www.ncbi.nlm.nih.gov/dbgw.lis.curtin.edu.au/pmc/articles/PMC420299/pdf/bmj32801372.pdf>
- Brack, S., & Sandford, M. (2011). Partnerships in intensive care unit (ICU): A new model of nursing care delivery. *Australian Critical Care*, 24(2), 101-109. <http://dx.doi.org/10.1016/j.aucc.2010.12.001>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77-101. <http://dx.doi.org/10.1191/1478088706qp063oa>

- Bray, K., Wren, I., Baldwin, A., St. Ledger, U., Gibson, V., Goodman, S., Walsh, D. (2010). Standards for nurse staffing in critical care units determined by: The British Association of Critical Care Nurses, The Critical Care Networks National Nurse Leads, Royal College of Nursing Critical Care and In-flight Forum. *Nursing in Critical Care* 15 (3), 109-111 10.1111/j.1478-5153.2010.00392.x.
- British Association of Critical Care Nurses. (2010). Standards for Nurse Staffing in Critical Care [internet]. Retrieved from <http://www.baccn.org.uk/>
- Brown, J., & Sullivan, G. (1989). Effect on ICU mortality of a full time critical care specialist. *Chest*, 96(1), 127-129. <http://dx.doi.org/10.1378/chest.96.1.127>
- Buckley, P., & Andrews, T. (2011). Intensive care nurses' knowledge of critical care family needs. *Intensive and Critical Care Nursing*, 27(5), 263-272. <http://dx.doi.org/10.1016/j.iccn.2011.07.001>
- Burn, J. B. (1970). Design and staffing of an intensive care unit. *The Lancet*, 295(7655), 1040-1043. [http://dx.doi.org/10.1016/s0140-6736\(70\)91163-3](http://dx.doi.org/10.1016/s0140-6736(70)91163-3)
- Butler, M. P., Cassidy, I., Quillinan, B., Fahy, A., Bradshaw, C., Tuohy, D., . . . Tierney, C. (2011). Competency assessment methods – Tool and processes: A survey of nurse preceptors in Ireland. *Nurse Education in Practice*, 11(5), 298-303. <http://dx.doi.org/10.1016/j.nepr.2011.01.006>
- Canadian Association of Critical Care Nurses. [Internet]. Retrieved from <http://www.caccn.ca/>
- Canadian Association of Critical Care Nurses. (2009). Standards for critical care nursing practice [internet]. Retrieved from <http://www.caccn.ca/>
- Canadian Nurses Association. (2008). Workforce profiles of Registered Nurses in Canada [Internet]. Retrieved from <http://www.cna-aiic.ca>
- Canadian Nurses Association. (2010). Number of Valid CNA Certifications by Specialty/Area of Nursing Practice and Province/Territory [Internet]. Retrieved from <http://www.cna-aiic.ca/CNA/>
- Canadian Nurses Association. (2011). 2012 Certification by exam How to write the CNA certification exam General application guide for certification by exam [Internet]. Retrieved from <http://www.cna-aiic.ca/CNA/>
- Cantrell, M. A., & Lupinacci, P. (2007). Methodological issues in online data collection. *Journal of Advanced Nursing*, 60(5), 544-549. doi:10.1111/j.1365-2648.2007.04448.x
- Chaffin, W. W., & Talley, W. K. (1980). Individual stability in Delphi studies. *Technological Forecasting and Social Change*, 16(1), 67-73. [http://dx.doi.org/10.1016/0040-1625\(80\)90074-8](http://dx.doi.org/10.1016/0040-1625(80)90074-8)
- Chang, A., Gardner, G., Duffield, C., & Ramis, M. (2010). A Delphi study to validate an Advanced Practice Nursing tool. *Journal of Advanced Nursing*, 66(10), 2320-2330. <http://dx.doi.org/10.1111/j.1365-2648.2010.05367.x>

- Chaboyer, W., Dunn, S. V., Theobald, K., Aitken, L., & Perrott, J. (2001). Critical care education: an examination of students' perspectives. *Nurse Education Today*, 21(7), 526-533. <http://dx.doi.org/10.1054/nedt.2001.0586>
- Clarke, T., Mackinnon, E., England, K., Burr, G., Fowler, S., & Fairservice, L. (2000). A review of intensive care nurse staffing practices overseas: what lessons for Australia? *Intensive and Critical Care Nursing*, 16(4), 228-242. <http://dx.doi.org/10.1054/iccn.2000.1524>
- Cohen, R., & Swerdlik, M. (2010). *Psychological testing and assessment An introduction to tests and measurement* (7th ed.). Boston: McGraw-Hill Higher Education.
- College of Intensive Care Medicine of Australia and New Zealand. (2010). Minimum standards for intensive care units [internet]. Retrieved from <http://www.cicm.org.au/cmsfiles/IC-01> Minimum Standards For Intensive Care Units - Current September 2011.pdf
- College of Nurses of Ontario. (2002). Professional Standards. Retrieved from www.cno.org
- Creswell, J. (2009). *Research Design: Qualitative, quantitative and mixed methods approaches*. Sage Publications, Inc, Thousand Oaks, California.
- Collins, S., & Hewer, I. (2014). The impact of the Bologna process on nursing higher education in Europe: A review. *International Journal of Nursing Studies*, 51(1), 150-156. <http://dx.doi.org/http://dx.doi.org/10.1016/j.ijnurstu.2013.07.005>
- Committee on Quality Health Care in America Institute of Medicine. (2001). *Crossing the quality chasm: A new health system for the 21st century*. Washington DC: The National Academies Press.
- Confederation of Australian Critical Care Nurses Inc. (1996). *Competency Standards for Specialist Critical Care nurses*. Subiaco, Western Australia: Ink Press International.
- Cotterill-Walker, S. M. (2012). Where is the evidence that master's level nursing education makes a difference to patient care? A literature review. *Nurse Education Today*, 32(1), 57-64. <http://dx.doi.org/10.1016/j.nedt.2011.02.001>
- Cowman, S., Gethin, G., Clarke, E., Moore, Z., Craig, G., Jordan-O'Brien, J., . . . Strapp, H. (2012). An international eDelphi study identifying the research and education priorities in wound management and tissue repair. *Journal of Clinical Nursing*, 21(3-4), 344-353. doi:10.1111/j.1365-2702.2011.03950.x
- Creswell, J. (1998). *Qualitative inquiry and research design: Choosing among five traditions*. Thousand Oaks: Sage Publications.
- Creswell, J. (2009). *Research Design: Qualitative, quantitative and mixed methods approaches* (3rd ed.). Thousand Oaks, California: Sage Publications, Inc.
- Crisp, J., Pelletier, D., Duffield, C., Adams, A., & Nagy, S. (1997). The Delphi Method? *Nursing Research*, 46(2), 116-118.
- Critical Care Networks-National Nurse Leads. (2013). *National Competency Framework for Adult Critical Care Nurses* Retrieved from <http://www.cc3n.org.uk/competency-framework/4577977310>

- Critical Care Nurses' Section. (2002). Philosophy and standards for nursing practice in critical care [internet]. Retrieved from <http://www.nzno.org.nz/>
- Critical Care Nurses' Section. (2005). Minimum Guidelines for Intensive Care Nurse Staffing in New Zealand [internet]. Retrieved from <http://www.nzno.org.nz/>
- Critical Care Nurses' Section. (2010). New Zealand Standards for Critical Care Nursing Education [internet]. Retrieved from <http://www.nzno.org.nz/>
- Crookes, P., & Brown, R. (2010). *The development of a pre-registration nursing competencies assessment tool for use across Australian universities*. Strawberry Hills, NSW, Australia
- Curley, M. (1998). Patient-nurse synergy: Optimizing patients' outcomes. *American Journal of Critical Care*, 7(1), 64-72. Retrieved from In: ProQuest Nursing & Allied Health Source [database on the Internet]. Available from: <http://www.proquest.com.pklibresources.health.wa.gov.au/>; Document ID: 37936680
- Curtin University. (2011). Future Students: Glossary of terms [Internet]. Retrieved from <http://futurestudents.curtin.edu.au/postgraduates/glossary.cfm#P>
- Daly, W. M. (2003). Nursing roles and levels of practice: A framework for differentiating between elementary, specialist and advancing nursing practice. *Journal of Clinical Nursing*, 12, 158-167.
- Dang, D., Johantgen, M., Pronovost, P., Jenckes, M., & Bass, E. (2002). Postoperative complications: Does intensive care staff nursing make a difference? *Heart & Lung*, 31(3), 219-228. <http://dx.doi.org/10.1067/mhl.2002.122838>
- Davidson, J., Powers, K., Hedayat, K., Tieszen, M., Kon, A., Shepard, E., . . . Armstrong, D. (2007). Clinical practice guidelines for support of the family in the patient-centered intensive care unit: American College of Critical Care Medicine Task Force 2004-2005. *Critical Care Medicine*, 35(2), 605-622. <http://dx.doi.org/10.1097/01.CCM.0000254067.14607.EB>
- Davis, K., Schoen, C., & Stremkis, K. (2010). Mirror, mirror on the wall: How the Performance of the U.S. Health Care System Compares Internationally 2010 Update [Internet]. Retrieved from <http://www.commonwealthfund.org/>
- Dawes, J. (2008). Do data characteristics change according to the number of scale points used? *International Journal of Market Research*, 50(1), 61-77. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=27996447&site=ehost-live>
- Delbecq, A., Gustafson, D., & Van de Ven, A. (1986). *Group techniques for program planning : a guide to nominal group and delphi processes*. Middleton, Wis: Green Briar Press.
- Diaz-Guzman, E., Colbert, C. Y., Mannino, D. M., Davenport, D. L., & Arroliga, A. C. (2012). 24/7 In-house Intensivist Coverage and Fellowship Education. *Chest*, 141(4), 959-966. doi:10.1378/chest.11-2073

- Dreyfus, S. E. (2004). The Five-Stage Model of Adult Skill Acquisition. *Bulletin of Science, Technology & Society*, 24(3), 177-181.
<http://dx.doi.org/10.1177/0270467604264992>
- Duffield, C. (1993). The Delphi Technique: A comparison of results obtained using two expert panels. *International Journal of Nursing Studies*, 30(3), 227-237.
- Duffield, C., Diers, D., O'Brien-Pallas, L., Aisbett, C., Roche, M., King, M., & Aisbett, K. (2011). Nursing staffing, nursing workload, the work environment and patient outcomes. *Applied Nursing Research*, 24(4), 244-255.
<http://dx.doi.org/10.1016/j.apnr.2009.12.004>
- Duffy, M. E. (2002). Methodological issues in Web-based research. *Journal of Nursing Scholarship*, 34(1), 83-88. doi:10.1111/j.1547-5069.2002.00083.x
- Dunn, S. V., Lawson, D., Robertson, S., Underwood, M., Clark, R., Valentine, T., . . . Herewane, D. (2000). The development of competency standards for specialist critical care nurses. *Journal of Advanced Nursing*, 31(2), 339-346.
<http://dx.doi.org/10.1046/j.1365-2648.2000.01292.x>
- Edwards, P. J., Roberts, I., Clarke, M. J., DiGiuseppi, C., Wentz, R., Kwan, I., . . . Pratap, S. (2009). Methods to increase response to postal and electronic questionnaires. *Cochrane Database of Systematic Reviews*, (3), doi:10.1002/14651858.MR000008.pub4
- Endacott, R. (1996). Staffing intensive care units: a consideration of contemporary issues. *Intensive and Critical Care Nursing*, 12(4), 193-199.
[http://dx.doi.org/10.1016/s0964-3397\(96\)80022-x](http://dx.doi.org/10.1016/s0964-3397(96)80022-x)
- Elliott, D., Aitken, L., & Chaboyer, W. (2012). *ACCCN's Critical Care Nursing* (2nd ed.). NSW, Australia: Elsevier.
- European federation of Critical Care Nursing associations. (2004). Position statement on post-registration critical care nursing education within Europe [internet]. Retrieved from <http://www.efccna.org/>
- European federation of Critical Care Nursing associations. (2007). Position Statement on workforce requirements within European Critical Care Nursing [internet]. Retrieved from <http://www.efccna.org/>
- European federation of Critical Care Nursing associations - EfCCNa. (2013). *EfCCNa Competencies for European Critical Care Nurses* Retrieved from http://www.efccna.org/images/stories/publication/competencies_cc.pdf
- Fan, W., & Yan, Z. (2010). Factors affecting response rates of the web survey: A systematic review. *Computers in Human Behavior*, 26(2), 132-139. doi:10.1016/j.chb.2009.10.015
- Fletcher-Johnston, M., Marshall, S. K., & Straatman, L. (2011). Healthcare transitions for adolescents with chronic life-threatening conditions using a Delphi method to identify research priorities for clinicians and academics in Canada. *Child: Care, Health and Development*, 37(6), 875-882. doi:10.1111/j.1365-2214.2011.01318.x

- Frank, J. R., Snell, L. S., Cate, O. T., Holmboe, E. S., Carraccio, C., Swing, S. R., . . . Harris, K. A. (2010). Competency-based medical education: theory to practice. *Medical Teacher*, 32(8), 638-645. doi:10.3109/0142159X.2010.501190
- Fulbrook, P. (2010). Critical care or intensive care? *Connect: The world of critical care nursing*, 7(2), 107.
- Fulbrook, P., Albarran, J. W., Baktoft, B., & Sidebottom, B. (2012). A survey of European intensive care nurses' knowledge levels. *International Journal of Nursing Studies*, 49 (2), 191-200 doi:10.1016/j.ijnurstu.2011.06.001
- Funke, F., Reips, U.-D., & Thomas, R. K. (2011). Sliders for the Smart: Type of Rating Scale on the Web Interacts With Educational Level. *Social Science Computer Review*, 29(2), 221-231. doi:10.1177/0894439310376896
- Galley, J., & O'Riordan, B. (2003). Guidance for nurse staffing in critical care. *Intensive and Critical Care Nursing*, 19(5), 257-266. [http://dx.doi.org/10.1016/s0964-3397\(03\)00077-6](http://dx.doi.org/10.1016/s0964-3397(03)00077-6)
- Geist, M. R. (2010). Using the Delphi method to engage stakeholders: A comparison of two studies. *Evaluation and Program Planning*, 33(2), 147-154. doi:10.1016/j.evalprogplan.2009.06.006
- Gélinas, C. (2010). Nurses' Evaluations of the Feasibility and the Clinical Utility of the Critical-Care Pain Observation Tool. *Pain Management Nursing*, 11(2), 115-125. <http://dx.doi.org/http://dx.doi.org/10.1016/j.pmn.2009.05.002>
- Gill, F. J., Leslie, G. D., Grech, C., & Latour, J. M. (2012). A review of critical care nursing staffing, education and practice standards. *Australian Critical Care*, 25(4), 224-237. <http://dx.doi.org/10.1016/j.aucc.2011.12.056>
- Gill, F. J., Leslie, G. D., Grech, C., & Latour, J. M. (2013a). An analysis of Australian graduate critical care nurse education *Collegian, Advance online publication* <http://dx.doi.org/10.1016/j.colegn.2013.11.006>
- Gill, F. J., Leslie, G. D., Grech, C., & Latour, J. M. (2013b). Health consumers' experiences in Australian critical care Units: postgraduate nurse education implications. *Nursing in Critical Care*, 18(2), 93-102. <http://dx.doi.org/10.1111/j.1478-5153.2012.00543.x>
- Gill, F. J., Leslie, G. D., Grech, C., & Latour, J. M. (2013c). Using a web-based survey tool to undertake a Delphi study: Application for nurse education research. *Nurse Education Today*, 33, 1322-1328. <http://dx.doi.org/http://dx.doi.org/10.1016/j.nedt.2013.02.016>
- Gill F. J., Leslie G. D., Grech C., Boldy D., & Latour J. M. (2014a). Developing and testing the Standard of Practice and Evaluation of Critical-care-nursing Tool (SPECT) for critical care nursing practice. *Journal of Continuing Education in Nursing*, 45(7), 312-320. <http://dx.doi.org/10.3928/00220124-20140620-02>
- Gill F. J., Leslie G. D., Grech C., Boldy D., & Latour J. M. (2014b). Development of Australian clinical practice outcome standards for graduates of critical care nurse education *Journal of Clinical Nursing, Advance online publication* <http://dx.doi.org/10.1111/jocn.12631>

- Gill, F. J., Leslie, G. D., & Southerland, K. (2006). Evaluation of a clinical performance assessment tool (CPAT) within a critical care context. *Australian Critical Care*, 19(3), 105-113.
- Glasper, A. (2013). A look into the future of nursing education in the UK. *British Journal of Nursing*, 22(1), 58-59. Retrieved from <http://www.scopus.com/inward/record.url?eid=2-s2.0-84874469544&partnerID=40&md5=368171c0932501c44913c743ff3ed34b>
- Guest, G., Bunce, A., & Johnson, L. (2006). How Many Interviews Are Enough? *Field Methods*; 18: 59-82. doi:10.1177/1525822x05279903
- Hadjibalassi, M., Papastavrou, E., Lambrinou, E., Tsangari, H., Athini, E., Georgiou, E., . . . Merkouris, A. (2012). Development of an instrument to determine competencies of postgraduate ICU nurses in Cyprus. *Nursing in Critical Care*, 17(5), 255-264. <http://dx.doi.org/10.1111/j.1478-5153.2012.00503.x>
- Halpern, N., Pastores, S., & Greenstein, R. (2004). Critical care medicine in the United States 1985–2000: An analysis of bed numbers, use, and costs. *Critical Care Medicine*, 32(6), 1254-1259. <http://dx.doi.org/10.1097/01.CCM.0000128577.31689.4C>
- Hamilton, K., Redshaw, M. E., & Tarnow-Mordi, W. (2007). Nurse staffing in relation to risk-adjusted mortality in neonatal care. *Archives of Disease in Childhood - Fetal and Neonatal Edition*, 92(2), F99-F103. <http://dx.doi.org/10.1136/adc.2006.102988>
- Hanley, E., & Higgins, A. (2005). Assessment of practice in intensive care: students' perceptions of a clinical competence assessment tool. *Intensive and Critical Care Nursing*, 21(5), 276-283. <http://dx.doi.org/10.1016/j.iccn.2004.10.004>
- Hartigan, C. (2000). The synergy model in practice Establishing criteria for 1: 1 staffing ratios. *Critical Care Nurse*, 20(2), 112-116. Retrieved from <http://proquest.umi.com/dbgw.lis.curtin.edu.au/pqdlink?index=5&sid=1&srchm ode=3&vinst=PROD&fmt=6&startpage=-1&clientid=22212&vname=PQD&RQT=309&did=52134111&pmid=36633&scaling=FULL&ts=1307595655&vtype=PQD&fileinfoindex=%2Fshare4%2Fpqimage%2Fpqirs101v%2F201106090100%2F53122%2F4013%2Fout.pdf&source=%24source&rqt=309&TS=1307595837&clientId=22212>
- Hasson, F., Keeney, S., & McKenna, H. (2000). Research guidelines for the Delphi survey technique. *Journal of Advanced Nursing*, 32(4), 1008-1015. doi:10.1046/j.1365-2648.2000.t01-1-01567.x10.1046/j.1365-2648.2000.01567.x
- Heath, P. (2002). *Our duty of care: National review of nursing education*. Canberra: Commonwealth of Australia. Retrieved from http://www.google.com.au/url?sa=t&rct=j&q=heath p. our duty of care%3A national review of nursing education. canberra%3A departments of education%2C science and technology%2C and health and ageing%2C 2002.&source=web&cd=3&cad=rja&ved=0CDsQFjAC&url=http%3A%2F%2Fwww.voced.edu.au%2Fcontent%2Fngv16709&ei=kNYmUf7oO6PNmAWCwo CgDQ&usq=AFQjCNEHcKfS1cmC45Fv4o-4wBm2yXLdKg&sig2=hT8DPn_XjkyTbh5HIDyBA&bvm=bv.42768644,d.dGY

- Hickey, P., Gauvreau, K., Connor, J., Spring, E., & Jenkins, K. (2010). The relationship of nurse staffing, skill mix, and magnet® recognition to institutional volume and mortality for congenital heart surgery. *Journal of Nursing Administration*, 40(5), 226-232.
<http://dx.doi.org/10.1097/NNA.0b013e3181da3f71>
- Hinkle, J. L., & Fitzpatrick E. (2011). Needs of American relatives of intensive care patients: Perceptions of relatives, physicians and nurses. *Intensive and Critical Care Nursing*; 27: 218-225. doi:10.1016/j.iccn.2011.04.003
- Hofhuis, J. G. M., Spronk, P. E., van Stel, H. F., Schrijvers, A. J. P., Rommes, J. H., & Bakker, J. (2008). Experiences of critically ill patients in the ICU. *Intensive and Critical Care Nursing*, 24(5), 300-313.
<http://dx.doi.org/10.1016/j.iccn.2008.03.004>
- Høghaug, G., Fagermoen, M. S., & Lerdal, A. (2011). The visitor's regard of their need for support, comfort, information proximity and assurance in the intensive care unit. *Intensive and Critical Care Nursing*,(0)
<http://dx.doi.org/10.1016/j.iccn.2011.11.009>
- Holloway, N. (1979). *Nursing the Critically Ill Adult*. Menlo Park, California: Addison-Wesley Publishing Company.
- Høye, S., & Severinsson, E. (2010). Multicultural family members' experiences with nurses and the intensive care context: A hermeneutic study. *Intensive and Critical Care Nursing*, 26(1), 24-32.
<http://dx.doi.org/10.1016/j.iccn.2009.10.003>
- Hunziker, S., McHugh, W., Sarnoff-Lee, B., Cannistraro, S., Ngo, L., Marcantonio, E., & Howell, M. (2012). Predictors and correlates of dissatisfaction with intensive care*. *Critical Care Medicine*, 40(5), 1554-1561.
<http://dx.doi.org/10.1097/CCM.0b013e3182451c70>
- Hupcey, J. E. (1999). Looking out for the patient and ourselves - the process of family integration into the ICU. *Journal of Clinical Nursing*; 8: 253-262.
- Hynes, P. (2007). The standardization of critical care nursing education and training: Strategies for advancing clinical practice in Ontario's adult ICUs. *Dynamics*, 18(1), 23-27.
- IBM Corp. (2012). IBM SPSS Statistics for Windows, Version 21.0 (Version 19). Armonk,NY: IBM Corp. Retrieved from <http://www.spss.com>
- International Council of Nurses. (2013). Position statement on nursing regulation [Internet]. Retrieved from <http://www.icn.ch/pillarsprograms/professional-practice/>
- Institute for patient-and-family-centred care (no date), www.ipfcc.org/faq.html
Accessed 6 December 2011.
- lobst, W. F., Sherbino, J., Cate, O. T., Richardson, D. L., Dath, D., Swing, S. R., . . . Frank, J. R. (2010). Competency-based medical education in postgraduate medical education. *Medical Teacher*, 32(8), 651-656.
<http://dx.doi.org/10.3109/0142159X.2010.500709>

- Jancey, J., Meuleners, L., & Phillips, M. (2011). Health professional's perceptions of sexual assault management: A Delphi study. *Health Education Journal*, 70(3), 1-11. Retrieved from http://espace.library.curtin.edu.au/view/action/singleViewer.do?dvs=1339485669876~983&locale=en_US&VIEWER_URL=/view/action/singleViewer.do?&DELIVERY_RULE_ID=10&frameId=1&usePid1=true&usePid2=true
- Johnson, T., & Owens, L. (2003). Survey response rate reporting in the professional literature. *American Association for Public Opinion Research*
- Joinson, A. N., & Reips, U.-D. (2007). Personalized salutation, power of sender and response rates to Web-based surveys. *Computers in Human Behavior*, 23(3), 1372-1383. doi:10.1016/j.chb.2004.12.011
- Kaplowitz, M. D., Hadlock, T. D., & Levine, R. (2004). A Comparison of Web and Mail Survey Response Rates. *Public Opinion Quarterly*, 68(1), 94-101. doi:10.1093/poq/nfh006
- Kane, R., Shamliyan, T., Mueller, C., Duval, S., & Wilt, T. (2007). The association of registered nurse staffing levels and patient outcomes: Systematic review and meta-analysis. *Medical Care*, 45(12), 1195-1204. <http://dx.doi.org/10.1097/MLR.0b013e3181468ca>
- Karlsson, V., Bergbom, I., & Forsberg, A. (2012). The lived experiences of adult intensive care patients who were conscious during mechanical ventilation: A phenomenological-hermeneutic study. *Intensive and Critical Care Nursing*; 28: 6-15. doi:10.1016/j.iccn.2011.11.002
- Keeney, S., McKenna, H., & Hasson, F. (2010). *The Delphi Technique in Nursing and Health Research*. Chichester: Wiley.
- Knaus, W., Draper, E., Wagner, D., & Zimmerman, J. (1986). An evaluation of outcome from intensive care in major medical centers. *Annals of Internal Medicine*, 104, 410-418.
- Korsch, B., Gozzi, E., & Francis, V. (1968). Gaps in doctor-patient communication: 1 Doctor-patient interaction and patient satisfaction. *Pediatrics*, 42(855-871)
- Krueger, R. (1994). *Focus Groups: a practical guide for applied research*. Thousand Oaks, California: Sage Publication.
- Kubin, L., & Fogg, N. (2010). Back-to-Basics Boot Camp: An Innovative Approach to Competency Assessment. *Journal of Pediatric Nursing*, 25(1), 28-32. doi:10.1016/j.pedn.2008.07.004
- Lakanmaa, R.-L., Suominen, T., Perttilä, J., Ritmala-Castrén, M., Vahlberg, T., & Leino-Kilpi, H. (2014b). Basic competence in intensive and critical care nursing: development and psychometric testing of a competence scale. *Journal of Clinical Nursing*, 23(5-6), 799-810 <http://dx.doi.org/10.1111/jocn.12057>
- Lambert, S. D., & Loiselle, C. G. (2008). Combining individual interviews and focus groups to enhance data richness. *Journal of Advanced Nursing*; 62: 228-237. doi:10.1111/j.1365-2648.2007.04559.x

- Landis, J., & Koch, G. (1977). The measurement of observer agreement for categorical data. *Biometrics*, 33(1), 159-174. Retrieved from <http://www.jstor.org/stable/2529310>
- Latour, J., Hazelzet, J., Duivenvoorden, H., & van Goudoever, J. (2009). Construction of a parent satisfaction instrument: Perceptions of pediatric intensive care nurses and physicians. *Journal of Critical Care*, 24(2), 255-266. doi:10.1016/j.jcrc.2008.06.002
- Latour, J. M., Haines, C. (2007). Families in the ICU: do we truly consider their needs, experiences and satisfaction? *Nursing in Critical Care* 12 (4), 173-174 10.1111/j.1478-5153.2007.00234.x.
- Latour, J., van Goudoever, J., & Hazelzet, J. (2008). Parent satisfaction in the pediatric intensive care unit. *Pediatric Clinics of North America*, 55, 779-790. <http://dx.doi.org/10.1016/j.pcl.2008.02.013>
- Liamputtong, P. (2011). *Focus group methodology*. London: Sage Publications.
- Liamputtong, P. (2010). *Research methods in health: foundation for evidence based practice*. Oxford University Press, South Melbourne, Victoria.
- LeCuyer, E, DeSocio, J, Brody, M, Schlick, R, & Menkens, R. (2009). From Objectives to Competencies: Operationalizing the NONPF PMHNP Competencies for Use in a Graduate Curriculum. *Archives of Psychiatric Nursing*, 23(3), 185-199. doi:10.1016/j.apnu.2008.06.004
- Leslie, G. D. (2006). Specialty preparation for critical care nursing. *Australian Critical Care*, 19(2), 43-43. [http://dx.doi.org/10.1016/s1036-7314\(06\)80007-x](http://dx.doi.org/10.1016/s1036-7314(06)80007-x)
- Levett-Jones, T., Hoffman, K., Bourgeois, S., Kenny, R., Dempsey, J., Hickey, N., . . . Jeffrey, K. (2009). Clinical reasoning instructor resources. Newcastle, NSW: University of Newcastle. Retrieved from http://www.utas.edu.au/_data/assets/pdf_file/0003/263487/Clinical-Reasoning-Instructor-Resources.pdf
- Llenore, E., & Ogle, K. R. (1999). Nurse-patient communication in the intensive care unit: a review of the literature. *Australian Critical Care*; 12: 142-145.
- Lundgrén-Laine, H., & Suominen, T. (2007). Nursing intensity and patient classification at an adult intensive care unit (ICU). *Intensive and Critical Care Nursing*, 23(2), 97-103. <http://dx.doi.org/10.1016/j.iccn.2006.10.006>
- Lusk, B., Russell, R. L., Rodgers, J., & Wilson-Barnett, J. (2001). Preregistration nursing education in Australia, New Zealand, the United Kingdom, and the United States of America. *Journal of Nursing Education*, 40(5), 197-202. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=2001072451&site=ehost-live>
- Marcin, P. (2005). Nurse staffing and unplanned extubation in the pediatric intensive care unit. *Pediatric Critical Care Medicine*, 6(3), 254-257. <http://dx.doi.org/DOI:10.1097/01.PCC.0000160593.75409.6B>

- Marshall, A., Currey, J., Aitken, L., & Elliott, D. (2007). Key stakeholders' expectations of educational outcomes from Australian critical care nursing courses: A Delphi study. *Australian Critical Care*, 20(3), 89-99. <http://dx.doi.org/10.1016/j.aucc.2007.05.001>
- Martin, J., Hart, G., & Hicks, P. (2010). A unique snapshot of intensive care resources in Australia and New Zealand. *Anaesthesia and Intensive Care*, 38(1), 149-158. Retrieved from <http://www.proquest.com>
- McKenna, H. P. (1994). The Delphi technique: a worthwhile research approach for nursing? *Journal of Advanced Nursing*, 19(6), 1221-1225. doi:10.1111/j.1365-2648.1994.tb01207.x
- McKinley, S., & Elliott, R. (2008). Implications for Australian practice of North American guidelines for the support of the family in the patient-centred intensive care. *Collegian*, 15, 11-17. <http://dx.doi.org/10.1016/j.colegn.2007.11.001>
- McMullan, M., Endacott, R., Gray, M. A., Jasper, M., Miller, C. M. L., Scholes, J., & Webb, C. (2003). Portfolios and assessment of competence: a review of the literature. *Journal of Advanced Nursing*, 41(3), 283-294. <http://dx.doi.org/10.1046/j.1365-2648.2003.02528.x>
- Meretoja, R., Eriksson, E., & Leino-Kilpi, H. (2002). Indicators for competent nursing practice. *Journal of Nursing Management*, 10(2), 95-102. <http://dx.doi.org/10.1046/j.0966-0429.2001.00299.x>
- Millberg, L., Berg, L., Lindstrom, I., Petzall, K., & Ohlen, J. (2011). Tensions related to implementation of postgraduate degree projects in specialist nursing education. *Nurse Education Today*, 31, 283-288. <http://dx.doi.org/10.1016/j.nedt.2010.11.012>
- Miller, G. (1990). The assessment of clinical skills/ competence / performance. *Academic Medicine*, 65(9), s63-67. Retrieved from <http://graphics.tx.ovid.com.dbgw.lis.curtin.edu.au/ovftpdfs/FPDDNCIBNDDLLC00/fs046/ovft/live/gv023/00001888/00001888-199009000-00045.pdf>
- Molter, N. (1979). Needs of relatives of critically ill patients: A descriptive study. *Heart and Lung*, 8(8), 332-339.
- Morrison, A. L., Beckmann, U., Durie, M., Carless, R., & Gillies, D. M. (2001). The effects of nursing staff inexperience (NSI) on the occurrence of adverse patient experiences in ICUs. *Australian Critical Care*, 14(3), 116-121. [http://dx.doi.org/10.1016/s1036-7314\(01\)80028-x](http://dx.doi.org/10.1016/s1036-7314(01)80028-x)
- National Health and Medical Research Council. (2007). *National statement on ethical conduct of human research*. Retrieved from nhmrc.publications@nhmrc.gov.au
- National Nursing and Nursing Education Taskforce. (2006). *National Nursing and Nursing Education Taskforce Final Report*.

- Needleman, J., Buerhaus, P., Pankratz, V. S., Leibson, C. L., Stevens, S. R., & Harris, M. (2011). Nurse Staffing and Inpatient Hospital Mortality. *New England Journal of Medicine*, 364(11), 1037-1045. <http://dx.doi.org/doi:10.1056/NEJMsa1001025>
- Nichter, M. A. (2008). Medical Errors Affecting the Pediatric Intensive Care Patient: Incidence, Identification, and Practical Solutions. *Pediatric Clinics of North America*, 55(3), 757-777. <http://dx.doi.org/10.1016/j.pcl.2008.02.014>
- Numata, Y., Schulzer, M., Globerman, J., Semeniuk, P., Balka, E., & FitzGerald, J. M. (2006). Nurse staffing levels and hospital mortality in critical care settings: literature review and meta-analysis. *Journal of Advanced Nursing*, 55(4), 435-448. Retrieved from <http://search.ebscohost.com/>
- Nunnally, J., & Bernstein, I. (1994). *Psychometric Theory* (3rd ed.). New York: McGraw-Hill Inc.
- Nursing and Midwifery Board of Australia. (no date). [internet]. Retrieved from <http://www.nursingmidwiferyboard.gov.au/>
- Nursing and Midwifery Board of Australia. (2006). National competency standards for the registered nurse [Internet]. Retrieved from <http://www.nursingmidwiferyboard.gov.au/>
- Nursing Council of New Zealand. (2007). Competencies for registered nurses [internet]. Retrieved from <http://www.nursingcouncil.org.nz/>
- Ogle, K, Bethune, E, Nugent, P, & Walker, A. (2002). *Nursing Education and Graduates – Part 1; Profiles for 1999, and 2000, with projections for 2001*. Canberra: Commonwealth of Australia.
- Okoli, C., & Pawlowski, S. (2004). The Delphi method as a research tool: an example, design considerations and applications. *Information & Management*, 42, 15-29. doi:10.1016/j.im.2003.11.002
- Pijl-Zieber, EM, Barton, S, Konkin, J, Awosoga, O, & Caine, V. (2014). Competence and competency-based nursing education: Finding our way through the issues. *Nurse Education Today*, 34(5), 676-678. <http://dx.doi.org/10.1016/j.nedt.2013.09.007>
- Pirret, A. (2007). Master's level critical care nursing education: A time for review and debate. *Intensive and Critical Care Nursing* 23 (4), 183-186. doi:10.1016/j.iccn.2007.05.001.
- Plowright, C. (2007). Commentary: Numata Y, Schultzer M, et al. (2006). Nurse staffing levels and hospital mortality in critical care settings: literature review and meta-analysis. *Nursing in Critical Care*, 12(2), 105-106. Retrieved from <http://search.ebscohost.com/>
- Presser, S., Couper, M.P., Lessler, J.T., Martin, E., Martin, J., Rothgeb, J.M., Singer, E. (2004). Methods for Testing and Evaluating Survey Questions. *Public Opinion Quarterly* 68 (1), 109-130. doi:10.1093/poq/nfh008.
- Price, A. (2013). National Critical Care Competency Framework. *Nursing in Critical Care*, 18(2), 103-104. doi:10.1111/nicc.nicc12013_1

- Polit, D. F., & Beck, C. T. (2006). The content validity index: Are you sure you know what's being reported? Critique and recommendations. *Research in Nursing and Health*, 29, 489-497. <http://dx.doi.org/10.1002/nur>
- Pope, C., Ziebland, S., & Mays, N. (2000). Analysing qualitative data. *British Medical Journal*, 320(January 8), 114-116. Retrieved from http://edocs.library.curtin.edu.au/eres_display.cgi?url=dc60090915.pdf©right=1
- Powell, C. (2003). The Delphi Technique: myths and realities. *Journal of Advanced Nursing*, 41(4), 376-382.
- Presser, S., Couper, M. P., Lessler, J. T., Martin, E., Martin, J., Rothgeb, J. M., & Singer, E. (2004). Methods for Testing and Evaluating Survey Questions. *Public Opinion Quarterly*, 68(1), 109-130. doi:10.1093/poq/nfh008
- Provonost, P., Dang, D., & Dorman, T. (2001). Intensive care unit nurse staffing and the risk for complications after abdominal aortic surgery. *Effective Clinical Practice*, 4, 199-206.
- Rabiee, F. (2004). Focus-group interview and data analysis. *Proceedings of the Nutrition Society*; 63: 655-660. doi:10.1079/PNS2004399
- Radtke, J. V., Tate, J. A., & Happ, M. B. (2012). Nurses' perceptions of communication training in the ICU. *Intensive and Critical Care Nursing*; 28: 16-25. doi:10.1016/j.iccn.2011.11.005
- Ramelet, A. S., & Gill, F. (2012). A Delphi study on National PICU nursing research priorities in Australia and New Zealand. *Australian Critical Care*, 25(1), 41-57. doi:10.1016/j.aucc.2011.08.003
- Richards, L. (2009). *Handling Qualitative Data*. London: Sage Publications Ltd.
- Rischbieth, A. (2006). Matching nurse skill with patient acuity in the intensive care units: a risk management mandate. *Journal of Nursing Management*, 14(5), 397-404. Retrieved from <http://search.ebscohost.com/>
- Ritchie, J., & Lewis, J. (Eds.). (2003). *Qualitative research practice: A guide for social science students and researchers*. London: Sage Publications Ltd.
- Ritchie, J., & Spencer, L. (1994). Qualitative data analysis for applied policy research. In A. Bryman & R. Burgess (Eds.), *Analysing Qualitative Data*. London: Routledge.
- Robert, J., Fridkin, S. K., Blumberg, H. M., Betsy Anderson, White, N., Ray, S. M., . . . Jarvis, W. R. (2000). The Influence of the Composition of the Nursing Staff on Primary Bloodstream Infection Rates in a Surgical Intensive Care Unit *Infection Control and Hospital Epidemiology*, 21(1), 12-17. Retrieved from <http://www.jstor.org/stable/10.1086/501690>
- Rose, L., Goldsworthy, S., O'Brien-Pallas, L., & Nelson, S. (2008). Critical care nursing education and practice in Canada and Australia: A comparative review. *International Journal of Nursing Studies*, 45(7), 1103-1109. <http://dx.doi.org/10.1016/j.ijnurstu.2007.06.006>

- Rothschild, J. M., Bates, D. W., Franz, C., Soukup, J. R., & Kaushal, R. (2009). The costs and savings associated with prevention of adverse events by critical care nurses. *Journal of Critical Care*, 24(3), 471.e471-471.e477. <http://dx.doi.org/10.1016/j.jcrc.2007.12.021>
- Russell, L., Gething, L., & Convery, R. (1997). *National review of specialist nurse education*. Commonwealth of Australia.
- Scholes, J., & Endacott, R. (2002). *Evaluation of the effectiveness of educational preparation for critical care nursing*. London: English National Board for Nursing, Midwifery and Health Visiting.
- Scholes, J., & Endacott, R. (2003). The practice competency gap: challenges that impede the introduction of national core competencies. *Nursing in Critical Care*, 8(2), 68-77. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=2003120714&site=ehost-livex>
- Schou, L., Høstrup, H., Lyngsø, E. E., Larsen, S., & Poulsen, I. (2012). Validation of a new assessment tool for qualitative research articles. *Journal of Advanced Nursing*; 68: 2086–2094. doi:10.1111/j.1365-2648.2011.05898.x
- Smart, A. (2006). A multi-dimensional model of clinical utility. *International Journal for Quality in Health Care*, 18(5), 377-382. <http://dx.doi.org/10.1093/intqhc/mzl034>
- Smith, J., & Firth, J. (2011). Qualitative data analysis: the framework approach. *Nurse Researcher*, 18(2), 52-62. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=2010938895&site=ehost-live>
- Sneider, Z, Elliott, D, LoBiondo-Wood, G, & Haber, J. (2003). *Nursing research: Methods, critical appraisal and utilisation* (2nd ed.). NSW: Elsevier Australia.
- Spreen, A. E., & Schuurmans, M. J. (2011). Visiting policies in the adult intensive care units: A complete survey of Dutch ICUs. *Intensive and Critical Care Nursing*; 27: 27-30. doi:10.1016/j.iccn.2010.10.002
- Sowter, J., Cortis, J., & Clarke, D. J. (2011). The development of evidence based guidelines for clinical practice portfolios. *Nurse Education Today*, 31(8), 872-876. doi:10.1016/j.nedt.2010.12.027
- Staggers, N., Gassert, C., & Curran, C. (2002). A Delphi Study to Determine Informatics Competencies for Nurses at Four Levels of Practice. *Nursing Research*, 51(6), 383-390.
- SurveyMonkey. (2011). *SurveyMonkey User Manual*. SurveyMonkey. Retrieved from <http://help.surveymonkey.com/euf/assets/docs/pdf/UserManual.pdf?noIntercept/1>
- SurveyMonkey. (no date.). [Internet]. Retrieved from <http://www.surveymonkey.com>

- Takase, M. (2012). The relationship between the levels of nurses' competence and the length of their clinical experience: a tentative model for nursing competence development. *Journal of Clinical Nursing*, no-no. <http://dx.doi.org/10.1111/j.1365-2702.2012.04239.x>
- Tertiary Education Quality and Standards Agency. (2011). Higher Education Standards Framework (Threshold Standards) [Online]. Available: <http://www.comlaw.gov.au/Details/F2012L00003/Download> [Accessed 21 June 2013].
- The CoBaTrICE Collaboration. (2006). Development of core competencies for an international training programme in intensive care medicine. *Intensive Care Medicine*, 32(9), 1371-1383. doi:10.1007/s00134-006-0215-5
- The CoBaTrICE Collaboration. (2007). The views of patients and relatives of what makes a good intensivist: a European survey. *Intensive Care Medicine*; 33: 1913 - 20. doi:10.1007/s00134-007-0799-4
- The Intensive Care Society. (2007). Standards for intensive care units [Online]. The Intensive Care Society. Available: <http://www.ics.ac.uk/> [Accessed 02 March 2011].
- The Mid Staffordshire NHS Foundation Trust Public Inquiry. (2013). Report of the Mid Staffordshire NHS Foundation Trust Public Inquiry Executive summary. Retrieved from http://www.midstaffpublicinquiry.com/sites/default/files/report/Executive_summary.pdf
- The Netherlands Board of Hospital Education. [Internet]. Retrieved from <http://www.czo.nl/>.
- The Paediatric Intensive Care Society. (2010). Standards for the care of critically ill children. [internet]. 4th. Retrieved from www.ukpics.org.uk/
- Thomas, E., & Magilvy, J. K. (2011). Qualitative Rigor or Research Validity in Qualitative Research. *Journal for Specialists in Pediatric Nursing*; 16: 151-155 doi:10.1111/j.1744-6155.2011.00283.x
- Thorens, J., Kaelin, R., Jolliet, P., & Chevrolet, J. (1995). Influence of the quality of nursing on the duration of weaning from mechanical ventilation in patients with chronic obstructive pulmonary disease. *Critical Care Medicine*, 23(11), 1807-1815.
- Tolhurst, G, & Bonner, A. (2000). Development of Clinical Assessment Criteria for Postgraduate Nursing Students. *Collegian (Royal College of Nursing, Australia)*, 7(2), 20-25. Retrieved from <http://linkinghub.elsevier.com/retrieve/pii/S1322769608603613?showall=true>
- Tong, A., Sainsbury, P. & Craig, J. (2007). Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*; 19: 349-357. doi:10.1093/intqhc/mzm042

- Tourangeau, A., Giovannetti, P., Tu, J., & Wood, M. (2002). Nursing-Related Determinants of 30-Day Mortality for Hospitalized Patients. *Canadian Journal of Nursing Research*, 33(3), 71-88. Retrieved from http://digital.library.mcgill.ca/cjnr/pdfs/CJNR_Vol_33_Issue_04_Art_04.pdf
- Uphoff, E., Wennekes, L., Punt, C., Grol, R., Wollersheim, H., Hermens, R., & Ottevanger, P. (2012). Development of Generic Quality Indicators for Patient-Centered Cancer Care by Using a RAND Modified Delphi Method. *Cancer Nursing*, 35(1), 29-37. doi:10.1097/NCC.0b013e318210e3a2
- Van den Heede, K., Lesaffre, E., Diya, L., Vleugels, A., Clarke, S. P., Aiken, L. H., & Sermeus, W. (2009). The relationship between inpatient cardiac surgery mortality and nurse numbers and educational level: Analysis of administrative data. *International Journal of Nursing Studies*, 46(6), 796-803. <http://dx.doi.org/10.1016/j.ijnurstu.2008.12.018>
- Watson, R., McKenna, H., Cowman, S., & Keady, J. (2008). *Nursing research design and methods*. Philadelphia: Churchill Livingstone Elsevier.
- West, E., Mays, N., Rafferty, A. M., Rowan, K., & Sanderson, C. (2009). Nursing resources and patient outcomes in intensive care: A systematic review of the literature. *International Journal of Nursing Studies*, 46(7), 993-1011. <http://dx.doi.org/10.1016/j.ijnurstu.2007.07.011>
- Wiles, V., & Daffurn, K. (2002). *There's a Bird in My Hand and a Bear by the Bed – I Must Be in ICU*. Melbourne, Australia: Australian College of Critical Care Nurses.
- Williams, S., Ogle, K. R., & Leslie, G. (2001). ACCCN national nursing workforce survey of intensive care units. *Australian Critical Care*, 14(2), 50-54. [http://dx.doi.org/10.1016/s1036-7314\(01\)80004-7](http://dx.doi.org/10.1016/s1036-7314(01)80004-7)
- Wilson, S., Hauck, Y., Bremner, A., & Finn, J. (2012). Quality nursing care in Australian paediatric hospitals: a Delphi approach to identifying indicators. *Journal of Clinical Nursing*, 21(11-12), 1594-1605. doi:10.1111/j.1365-2702.2011.04004.x
- World Federation of Critical Care Nurses. [Internet]. Retrieved from <http://en.wfccn.org/>
- World Federation of Critical Care Nurses. (2005). Position statement on the provision of critical care nursing education - Declaration of Madrid [Internet]. Retrieved from http://en.wfccn.org/pub_education.php
- World Health Organisation. (2003). WHO Europe Critical Care Nursing Curriculum [internet]. Retrieved from <http://www.euro.who.int/>
- World Health Organisation. (2010). Survey on the situation of nursing and midwifery in the Member States of the European Region of the World Health Organization 2009 [internet]. Retrieved from <http://www.euro.who.int/x>
- Wunsch, H., Angus, D., Harrison, D., Collange, O., Fowler, R., Hoste, E., . . . Rowan, K. (2008). Variation in critical care services across North America and Western Europe. *Critical Care Medicine*, 36(10), 2787-2793. <http://dx.doi.org/10.1097/CCM.0b013e318186aec8>

Wynd, C. A., Schmidt, B., & Schaefer, M. A. (2003). Two Quantitative Approaches for Estimating Content Validity. *Western Journal of Nursing Research*, 25(5), 508-518. <http://dx.doi.org/10.1177/0193945903252998>

Yang, S., & Wagner, K. (2010). Evaluating and comparing discovery tools: how close are we towards next generation catalog? *Library Hi Tech*, 28(4), 690-709. <http://dx.doi.org/10.1108/07378831011096312>

Zolnierek, C., & Steckel, C. (2010). Negotiating safety when staffing falls short. *Critical Care Clinics of North America*, 22(2), 261-269. <http://dx.doi.org/10.1016/j.ccell.2010.03.014>

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