



PEARL

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

Gill, Fenella J.; Leslie, Gavin D.; Grech, Carol; Boldy, Duncan; Latour, Jos M.

**Published in:**

The Journal of Continuing Education in Nursing

**DOI:**

[10.3928/00220124-20140620-02](https://doi.org/10.3928/00220124-20140620-02)

**Publication date:**

2014

**Link:**

[Link to publication in PEARL](#)

**Citation for published version (APA):**

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), 312-320. <https://doi.org/10.3928/00220124-20140620-02>

All content in PEARL is protected by copyright law. Author manuscripts are made available in accordance with publisher policies. Wherever possible please cite the published version using the details provided on the item record or document. In the absence of an open licence (e.g. Creative Commons), permissions for further reuse of content should be sought from the publisher or author.

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

Accepted: April 16, 2014; doi:10.3928/00220124-20140620-02

Journal of Continuing Education in Nursing, 2014;45(7):312-320.

**Fenella J. Gill** RN BN Paediatric Nursing Certificate MNurs (Research) Graduate Certificate  
Tertiary Teaching

PhD Candidate, Lecturer, School of Nursing and Midwifery, Faculty of Health Sciences, Curtin  
University, GPO Box U1987 Perth, Western Australia 6845

Senior Registered Nurse, Princess Margaret Hospital for Children, Child & Adolescent Health  
Services, Western Australia. Corresponding address: School of Nursing and Midwifery, Curtin  
University, GPO Box U1987, Perth WA 6845

Tel: +61 (0)402881604 ; Email: [f.gill@curtin.edu.au](mailto:f.gill@curtin.edu.au)

**Prof Gavin D. Leslie** RN IC Cert PhD BAppSc Post Grad Dip (ClinNurs) FACN

Professor Critical Care Nursing (Joint Appointment Royal Perth Hospital)

Director Research & Development, School of Nursing & Midwifery, Faculty of Health Sciences,  
Curtin University, GPO Box U1987 Perth, Western Australia 6845

Tel +61 8 9266 2070 ; Email: [g.leslie@curtin.edu.au](mailto:g.leslie@curtin.edu.au)

**Prof Carol Grech** RN BN Grad Dip Nsg (Crit Care) MN PhD

Head: School of Nursing & Midwifery, University of South Australia  
GPO Box 2471, Adelaide, South Australia 5001

Tel +61 8 83022754 ; Email: [carol.grech@unisa.edu.au](mailto:carol.grech@unisa.edu.au)

**Prof Duncan Boldy** PhD MSc BSc(Hons) CertEd FCHSE AAGF

Professor and Research Advisor, School of Nursing and Midwifery, Faculty of Health Sciences,  
Curtin University, GPO Box U1987 Perth, Western Australia 6845

Tel +61 8 9266 9667 ; Email: [d.boldy@curtin.edu.au](mailto:d.boldy@curtin.edu.au)

**Prof Jos M. Latour** RN PhD FEFCCNa

Professor in Clinical Nursing, School of Nursing and Midwifery, Faculty of Health, Education and  
Society, Plymouth University, 8 Portland Villas, Drake Circus, Plymouth, PL4 8AA, United  
Kingdom

Adjunct Research Fellow, School of Nursing and Midwifery, Faculty of Health Sciences, GPO  
Box U1987 Curtin University Perth, Western Australia 6845

Nurse Scientist, Department of Pediatrics, Intensive Care Neonatology

Erasmus MC – Sophia Children's Hospital, P.O. Box 2060, 3000CB Rotterdam, Netherlands

Tel: +31107037174 Email: [jos.latour@plymouth.ac.uk](mailto:jos.latour@plymouth.ac.uk)

## **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 under-taken 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 con-tent 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 defi nition for the expected practice level for graduates of a critical care education program.

**J Contin Educ Nurs. 2014;45(7):312-320.**

## **INTRODUCTION**

Internationally critical care is one of the largest nursing specialties. Registered Nurses (RNs) who choose to work in this specialty are often expected to undertake post-registration education. To date, no uniform expected practice outcomes for critical care nursing courses have been articulated and attempts to standardise these in a number of countries and regions have been variable. In Europe 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; European federation of Critical Care Nursing associations - EfCCNa, 2013). In the United States and Canada the approach used for a national standard is certification or credentialing (American Association of Critical Care Nurses, nd; Canadian Nurses Association, 2011). In Australia, the Australian College of Critical Care Nurses' position statement on the provision of critical care nurse education (Australian College of Critical Care Nurses, 2006) 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. These principles were also adopted by the New Zealand Nurses' Organisation Critical Care Nurses Section (Critical Care Nurses' Section, 2010).

The Australian competency standards have been used widely by critical care education providers, yet they articulate practice standards for the experienced or specialist level critical care nurse and do not adequately reflect graduate level practice expectations. Consequently, they have been adapted and interpreted inconsistently to reflect local expectations for graduate practice (Aitken, Currey, Marshall, & Elliott, 2006; Gill, Leslie, Grech, & Latour, 2013a). Additionally within some courses student practice is not assessed at all (Gill, Leslie, et al., 2013a).

Critical care nurse education curricula have been developed and programs are delivered by nurses. There has been varying input from other health disciplines and minimal, if any, input from health consumers (Gill, Leslie, et al., 2013a). In 2013, a national program for safety and quality standards in Australian hospitals

was introduced. One of the ten standards is directly related to the partnership with health care consumers (Australian Council on Healthcare Standards, 2012). This focus on consumer involvement is also recognized internationally. Reports such as the Mid-Staffordshire NHS Trust Public Inquiry (The Mid Staffordshire NHS 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 student clinical expertise to students developing clinical and psychosocial competence in supporting patients and their families (Gill, Leslie, Grech, & Latour, 2013b).

To address the need for defined graduate practice outcomes and for consumer input, we undertook a multi-phase 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 paper is the development and testing of a clinical assessment instrument, called the Standards of Practice and Evaluation of Critical-care-nursing Tool (SPECT).

## **METHODS**

### **Development of the SPECT**

The SPECT was developed using a multi-phase structured process (Fig. 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, although predominantly opinion based rather than evidenced-based. The five practice standards all build upon national registered nurse entry to practice standards and articulate specialist or experienced critical care nurse practice. No standards described the expected practice level for education program graduates. In addition, the lack of health consumer involvement in their development further justified a reconsideration of the process for the development of graduate practice standards.

The second phase consisted of an analysis of graduate critical care nurse education programs focusing on graduate practice outcomes and clinical assessment methods (Gill, Leslie, et al., 2013a). Data sources included course provider websites, 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 phase 4.

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, Leslie, et al., 2013b). Both physical patient care and socio-emotional support of patients/families were identified as important factors for the critical care nurse role. The components of socio-emotional support included communication, people skills, 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, individualising care and patient and family advocacy. The health consumers' views about the socio-emotional skills and behaviours to be demonstrated by course graduates were included in the draft of the practice standards in phase 4.

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 3-round eDelphi study (phase 4) to obtain the views of a national panel of critical care nurses (Gill, Leslie, Grech, Latour, & Boldy, 2013). 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 graduate practice. Additional suggestions and/or 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 were then further arranged

into a practical tool to measure graduate practice. This involved identification and elimination of some duplication and some re-grouping of some statements as elements of standards. The resultant SPECT (Electronic Supplementary Material Table 1.) consisted of 86 standards in total (with elements); 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. Whether the SPECT was a reliable and valid instrument, and an authentic assessment tool in practice, was an essential final and fifth phase, described in detail in this paper.

Figure 1. Here

The study (phase 5), reported here, 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). Then an expert panel (Panel 1) assessed the SPECT for content validity. Reliability and clinical feasibility were assessed by critical care clinical assessment tool users (Panel 2). All surveys were distributed using an electronic survey method (Fig. 2.). Ethics approval was obtained from the University Human Research Ethics Committee (SON&M 23-2011).

### **Study Participants**

Study participants were purposively recruited. The Pilot Panel was contacted and requested to pilot test the SPECT and assess face validity (Boynton, 2004; Presser et al., 2004). This involved the draft survey being sent to five critical care nurses (four experienced and one 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 geographically spread sample of critical care nurses with expertise in 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 requested 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 consisting of clinical assessment tool users was recruited for reliability, validity, and clinical feasibility testing (Fig. 2). Clinical assessment is most commonly undertaken by experienced critical care nurses working in education and/or clinical practice and student self-assessment (Gill, Leslie, 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 students (Clinical Assessors) and 2) nurses 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, South Australia) with a request to distribute email 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 email list. After agreeing to participate, panel members were sent an email containing an information sheet and a URL link to the online survey. For each round two follow up reminder emails were sent to non-responders. Data were collected between July and November 2013

### **Statistical Analysis**

Data were imported into SPSS version 21 (IBM Corp, 2012) and descriptive statistics including frequency distributions were computed. Mean scores and standard deviations were calculated where 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 with the level of significance being 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 four point Likert scale (4 = highly relevant, 3 = quite relevant, 2 = a little/somewhat relevant, 1= not relevant). Two types of content validity index (CVI) were computed; individual statement and overall 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 student they had recently assessed at the end of their critical care course. For each statement a five point Likert scale (-2 = Strongly disagree, -1 = Disagree, 0 = Neither agree or disagree, 1 = Agree, 2 = Strongly agree) was used to indicate the level of agreement as to whether the student achieved the practice standard. The Panel 2 Graduates were asked to use the same five 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 emailed to respondents three 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  $\alpha$  estimate of  $\geq 0.7$  considered acceptable for a new instrument (Beckstead, 2013; Nunnally & Bernstein, 1994). Test-retest or stability over time was assessed using Spearman's rank correlation for the same respondents completing the survey at two different moments in time. A correlation of  $\geq 0.7$  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 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; strongly disagree, disagree and neither agree or disagree = disagree or strongly agree and agree = agree. A Kappa statistic of  $\geq 0.41$  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 G  linas (2010). Panel 2 was asked to respond to each statement using a four point Likert scale (1 = Not at all, 2 = A little, 3 = Sufficiently, 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, of the 46 study participants who agreed to participate, 2 were excluded because they did not meet the inclusion criteria. Of the remaining 44 critical care nurses the majority worked in metropolitan hospitals in intensive care settings. Almost a third of Clinical Assessors held a Master level qualification. All Graduates had completed a critical care nursing Graduate Certificate or Graduate Diploma level course. Further details of the characteristics of the study participants of Panel 2 are given in Table 1. The response rate for Round I was 36/44 (82%). In Round II, 34/36 (94%) completed the test-retest survey.

Table 1. here

### **Validity**

The initial validity testing related to Panel 1, found a statement CVI range of 0.66 – 1.00. For 97/104 (93%) statements the CVI was 1.00, for six statements the CVI was 0.83 and one statement had a CVI of 0.66. At the domain level the

CVI range was satisfactory (Polit & Beck, 2006) between 0.95 – 1.00 (mean 0.98).

### **Reliability**

The Cronbach's  $\alpha$  of each domain in Round I ranged from 0.915 to 0.961. In Round II, they ranged between 0.865 and 0.972 (Table 2). The bivariate correlation (Spearman's Rank correlation) of each domain between the Round I and Round II surveys ranged between 0.772 - 0.887.

Table 2. Here

The intra-rater reliability between survey Round I and II for each rater (of the 34 who completed follow up ratings) was statistically significant ( $p < 0.005$ ) for 102/104 statements. In Table 3 the relative strength of agreement is presented 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 for 6.7% almost perfect agreement.

Table 3. Here

### **Clinical Feasibility**

For the SPECT clinical feasibility, the panel responses were positive with a median rating of 3, IQR 3-4 for seven statements and median 3, IQR 2-4 for one statement, namely "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.

Table 4. Here

### **Comments**

There were 12 responses to the open question and these were received from Clinical Assessors. There was one comment that the SPECT was more appropriate for the ICU context 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 students. 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 it 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, test-retest and intra-rater agreement. The SPECT also appears to have clinical feasibility, providing a clear definition for the expected practice level for a graduate of a critical care education program.

In considering the international value of these study findings, there are two key points. The multi-phase process reported in this study is the first to result in specialty practice standards that include health consumer input. Hadjibalassi et al. (2012) developed a new instrument to inform a future competency based curriculum and determine the competencies expected of postgraduate critical care nurses in Cyprus. The published items appear to describe broad holistic competencies (Hadjibalassi et al., 2012) and have similarity to the Australian specialist level competency standards (Australian College of Critical Care Nurses, 2002). They have not explicitly described 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 ICU nurses and pre-registration nursing students (Lakanmaa et al., 2013). The instrument appears promising for use in the context of beginning critical care practice, but

is not suitable to measure practice outcomes of critical care nurse education. Neither study described consumer input as a component of the research and this was acknowledged as a limitation by Hadjibalassi et al. (2012). The United Kingdom and the European critical care competency frameworks (Critical Care Networks-National Nurse Leads, 2013, European federation of Critical Care Nursing associations - EfCCNa, 2013) were developed to achieve greater consistency in critical care courses and graduate practice outcomes. The frameworks 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 we have identified is expected for Australian course graduate outcomes. There were no reports of consumer involvement in these projects.

The practice standards and the SPECT provide the opportunity to take a major step forward from the certification model of credentialing (American Association of Critical Care Nurses, nd; Canadian Nurses Association, 2011). The practice standards articulate practice outcomes and the SPECT is a tool to measure practice outcomes from critical care education programs. This contrasts to the North American examination model that is dependent on knowledge testing with no practice evaluation component.

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

Some limitations of the SPECT testing need to be addressed. The development of the SPECT involved Australian adult and paediatric critical care environments. The testing was undertaken with adult intensive care nurses. Further testing is required in other countries and critical care contexts such as cardiac care and paediatric critical care. Ideally a validation step involves the availability of a reasonable, reliable and valid criterion with which the measures on the target instrument 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 students. Larger scale use of the SPECT in clinical practice will also offer the opportunity to examine its clinical application further.

The challenge is now to integrate the practice standards and SPECT into graduate specialty education. From 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 practice outcome standards. Specialty graduate outcomes of education programs need to address clinical practice as well as academic aspects. Further, specialty education programs should prepare graduates to be able to provide both clinical patient care and support the socio-emotional needs of patients and families (Gill, Leslie, et al., 2013b).

In conclusion, the practice standards and associated SPECT that we have developed provide the opportunity for achieving 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 nurses 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(2), 46-52.
- American Association of Critical Care Nurses. (nd). [Internet]. 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 [Internet]. Retrieved from [http://www.acccn.com.au/images/stories/downloads/provision\\_CC\\_nursing\\_edu.pdf](http://www.acccn.com.au/images/stories/downloads/provision_CC_nursing_edu.pdf)
- Australian Council on Healthcare Standards. (2012). National Safety and Quality Health Service Standards Program [internet]. Retrieved from [http://www.achs.org.au/media/45523/achs\\_nsqhs\\_brochure.pdf](http://www.achs.org.au/media/45523/achs_nsqhs_brochure.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_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(7), 968-973. <http://dx.doi.org/http://dx.doi.org/10.1016/j.ijnurstu.2013.04.005>
- 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>
- 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/>.
- 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 for Critical Care Nursing Education [internet]. Retrieved from <http://www.nzno.org.nz/>.
- 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](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(2), 115-125. <http://dx.doi.org/http://dx.doi.org/10.1016/j.pmn.2009.05.002>
- 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. (2013a). An analysis of Australian graduate critical care nurse education *Collegian: The Australian Journal of Nursing Practice, Scholarship and Research*, accepted
- 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(2), 93-102. <http://dx.doi.org/10.1111/j.1478-5153.2012.00543.x>
- Gill, F., Leslie, G., Grech, C., Latour, J., & Boldy, D. (2013). Development of Australian clinical practice outcome standards for graduates of critical care nurse education *Manuscript submitted for publication*
- Gill, F., Leslie, G., & Southerland, K. (2006). Evaluation of a clinical performance assessment tool (CPAT) within a critical care context. *Australian Critical Care*, 19(3), 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*, Advance online publication <http://dx.doi.org/10.1111/j.1478-5153.2012.00503.x>
- IBM Corp. (2012). IBM SPSS Statistics for Windows, Version 21.0 (Version 19). Armonk, NY: IBM Corp. Retrieved from <http://www.spss.com>
- Lakanmaa, R.-L., Suominen, T., Perttilä, J., Ritmala-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*, n/a-n/a. <http://dx.doi.org/10.1111/jocn.12057>
- 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>
- 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)
- Nunnally, J., & Bernstein, I. (1994). *Psychometric Theory* (3rd ed.). New York: McGraw-Hill Inc.
- 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>
- 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. <http://dx.doi.org/10.1093/poq/nfh008>
- 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>
- Tertiary Education Quality and Standards Agency. (2011). Higher Education Standards Framework (Threshold Standards). Retrieved from <http://www.comlaw.gov.au/Details/F2012L00003/Download>
- 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](http://www.midstaffpublicinquiry.com/sites/default/files/report/Executive%20summary.pdf)

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>

Table 1.

*Characteristics of Panel 2 study participants*

		Clinical Assessors (n=23)		Graduates (n=13)		p
Age (mean, SD)		44.1	±9.8	40.0	±10.2	.039
Years of total nursing experience (mean, SD)		21.4	±9.3	8.3	±4.2	.002
Years of critical care nursing experience (mean, SD)		16.3	±8.4	4.8	±2.6	.000
		n	%	n	%	
Work environment	Metropolitan hospital	19	83	8(62)	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	QLD	2	9	1	8	
	NSW	2	9	3	23	
	ACT	0	0	1	8	
	VIC	7	30	3	23	
	SA	2	9	0	0	
	WA	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	
	PhD	1	4	0	0	

Qld = Queensland; NSW = New South Wales; ACT = Australian Capital Territory; VIC = Victoria; TAS = Tasmania; SA = South Australia; WA = Western Australia

Table 2. *Internal consistency and correlations between rounds*

Domain	Cronbach's $\alpha$		*Rho
	Round I	Round II	
A patient and family focused approach to care	.928	.890	.772
Quality of care and patient safety	.929	.919	.812
Resuscitation	.925	.920	.836
Assessment, monitoring and data interpretation	.915	.868	.783
Critical illness management	.961	.976	.887
Teamwork and leadership	.919	.865	.815

\*Note all correlation significant at the 0.01 level, 2-tailed

Table 3.

*Strength of agreement between surveys for each statement*

Kappa statistic	Strength of agreement	Number of statements	(%)
<.00	Poor	0	0
.00-.20	Slight	1	1.0
.21-.40	Fair	5	4.8
.41-.60	Moderate	51	49.0
.61-.80	Substantial	40	38.5
.81-1.00	Almost perfect	7	6.7

Table 4.

*Clinical feasibility responses*

Statement	Very N(%)	Sufficiently N(%)	A little N(%)	Not at all N(%)
The instructions about how to use the tool were clear and complete	11(30)	21(58)	3(.08)	1(.03)
The format and style of the tool is easy to understand	16(44)	17(47)	2(.05)	1(.03)
The tool is quick to use	17(47)	14(39)	5(1)	0
The tool is simple to understand	16(44)	16(44)	3(.08)	1(.03)
The length of time to go through the tool is appropriate for routine use	15(42)	16(44)	5(1)	0
The tool is appropriate for use in my clinical setting	11(30)	21(58)	2(.05)	2(.05)
I would recommend using the tool for critical care course students' clinical practice assessment	12(33)	12(33)	12(33)	0
The tool will be useful for assessment of critical care course students' clinical practice	12(33)	14(39)	10(36)	0

Figure 1. *Five phases to develop the SPECT*

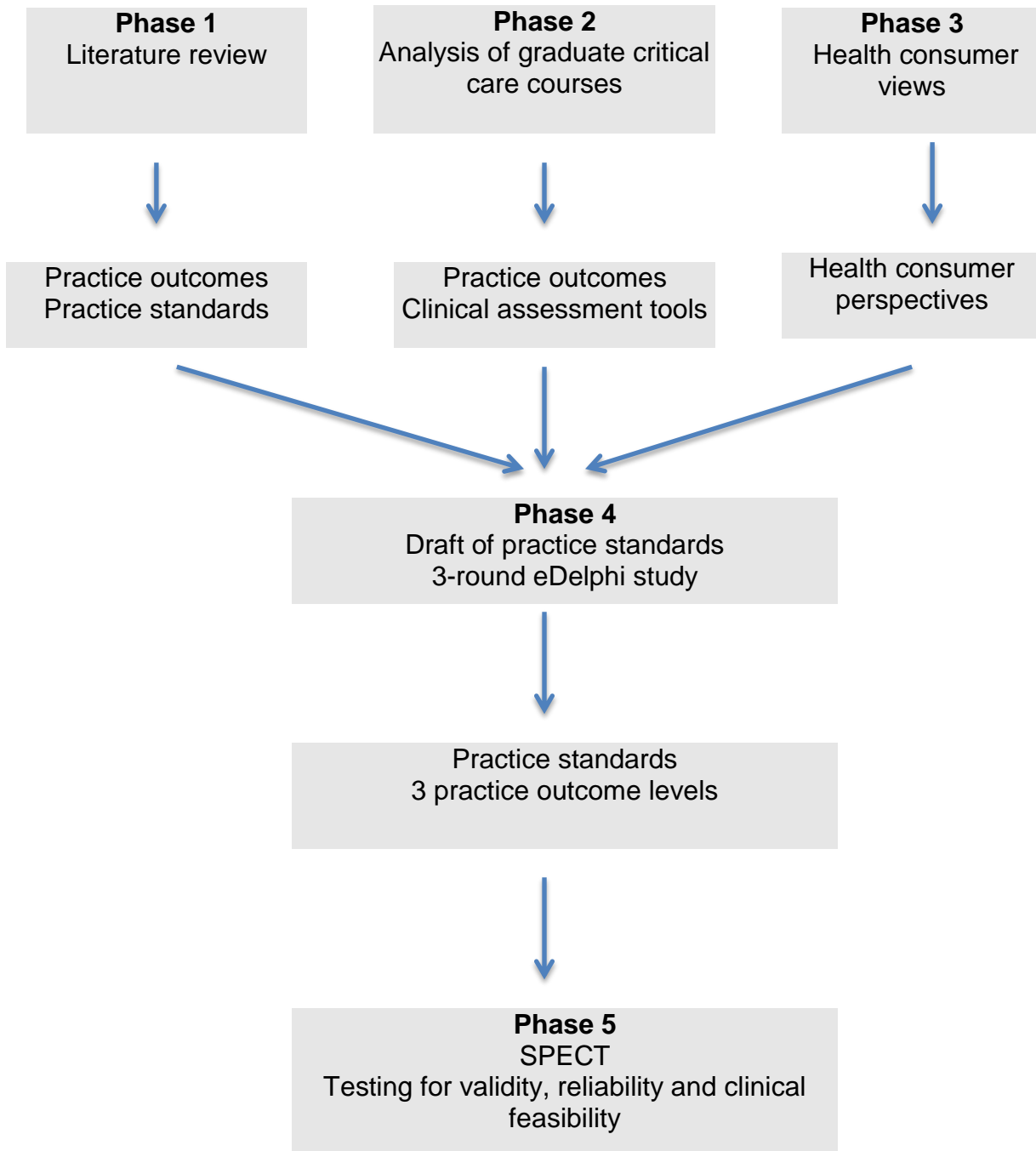
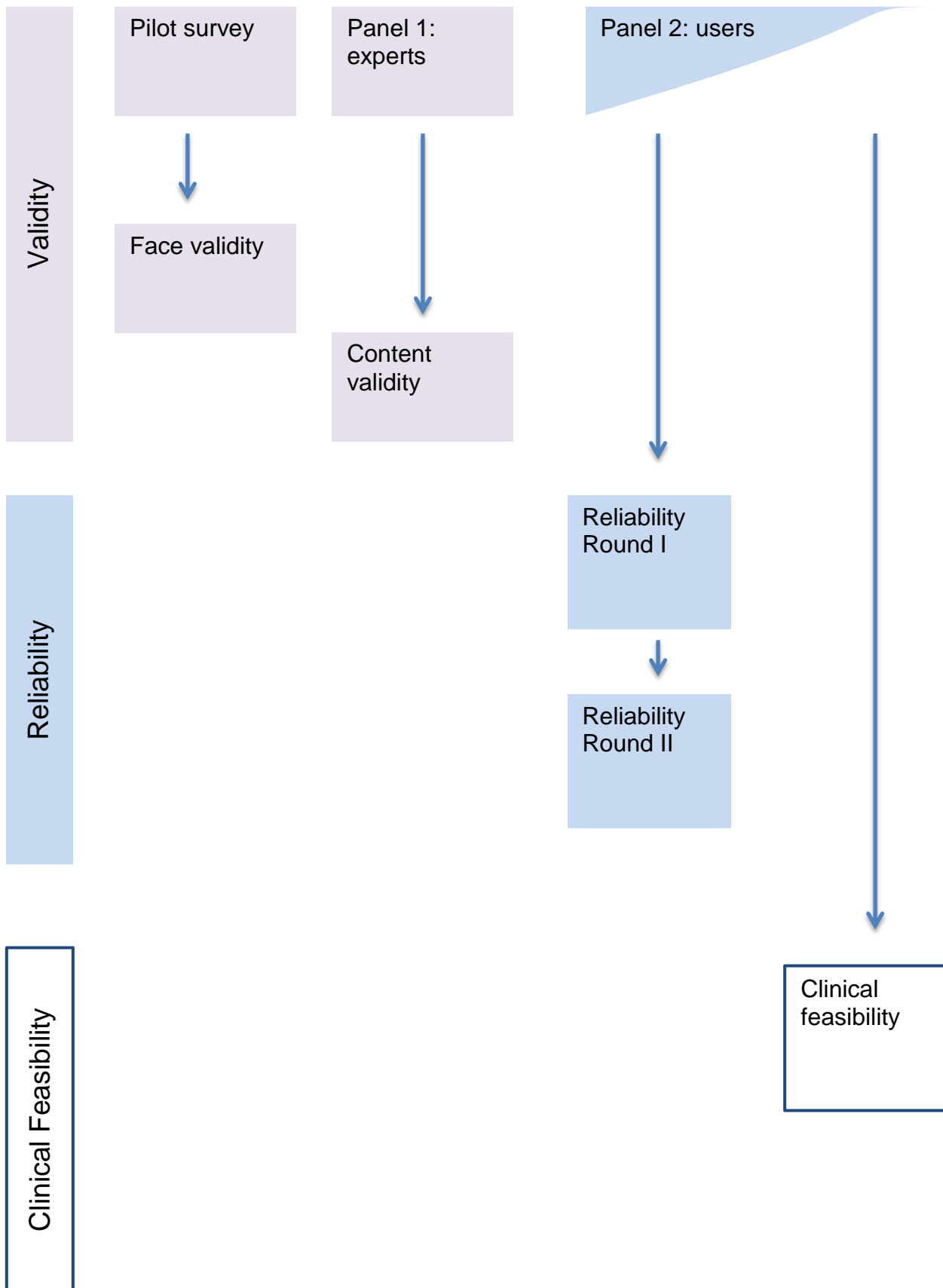


Figure 2  
*Study methods*



## ESM Table 1.

### *Standard of Practice and Evaluation of Critical-care-nursing Tool (SPECT)*

#### **A patient and family focused approach to care**

##### **The critical care course graduate can demonstrate independently**

Promotes a compassionate and therapeutic environment for the wellbeing 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 & 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

##### **The critical care course graduate can demonstrate under supervision**

Individualizes socio-emotional support for the patient and family  
Provides patient and family education  
Addresses patient and family ethical concerns

#### **Quality of care and patient safety**

##### **The critical care course graduate can demonstrate independently:**

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 / biomedical equipment

##### **The critical care course graduate can demonstrate under supervision:**

Incorporates research evidence into practice  
Ensures continuity of care from patient admission to discharge/ transfer  
Suggests changes to policy/protocols/guidelines  
Element: Demonstrates awareness of research findings

#### **Resuscitation**

##### **The critical care course graduate can demonstrate independently:**

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 cardio-pulmonary resuscitation  
Element: Regular recertification of resuscitation skills  
Effectively participates as a member of the resuscitation team  
Provides effective nursing management for the patient post-resuscitation  
Safely transports the critically ill patient  
Element: Intra-facility (between departments)  
Element: Inter-facility (between health services / hospitals)

##### **The critical care course graduate can demonstrate under supervision:**

Facilitates family presence during resuscitation

#### **Assessment, monitoring and data interpretation**

##### **The critical care course graduate can demonstrate independently:**

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

## Critical illness management

### **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

### **Respiratory Care:**

#### **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 /pleural drains
- With chronic respiratory failure and mechanical ventilation

### **Cardiac Care:**

#### **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

#### **The critical care course graduate can demonstrate under supervision care of the critically ill patient**

- Pre and/or post cardiac surgery

#### **The critical care course graduate has knowledge of or describes care of the critically ill patient**

- Requiring interventional cardiology
- With a Mechanical Assist Device

### **Shock and sepsis care:**

#### **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 multi-organ failure
- With altered haematological function
- Abnormal clotting

### **Renal and hepatic care:**

#### **The critical care course graduate can demonstrate independently care of the critically ill patient**

- With renal failure
- Requiring renal replacement therapy
- With liver failure

#### **The critical care course graduate has knowledge of or describes care of the critically ill patient**

- Post organ transplantation

### **Surgical and trauma care:**

#### **The critical care course graduate can demonstrate independently care of the critically ill patient**

- With altered level of consciousness
- With raised intracranial pressure
- With trauma
- With co-morbidities following complex surgery
- Who is a potential organ and tissue donor

#### **The critical care course graduate can demonstrate under supervision care of the critically ill patient with**

- Acute spinal cord injury
- Thermal injury

### **Care of special populations:**



**The critical care course graduate can demonstrate independently care of critically ill**

Culturally & linguistically diverse patients

**The critical care course graduate can demonstrate under supervision care of critically ill**

Bariatric patients

Mental health patients

**The critical care course graduate has knowledge of or describes care of critically ill**

Obstetric patients

For adult critical care nurses: Paediatric patients

Element: including developmentally appropriate care

---

### **Teamwork and leadership**

**The critical care course graduate can demonstrate independently**

Recognises own scope of practice

Element: Accepts responsibility for own actions

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

**The critical care course graduate can demonstrate under supervision**

Supports other staff to enable delivery of effective care

Effectively engages in bedside teaching

**The critical care course graduate has knowledge of or describes**

Performs in the ACCESS/ Admissions/Resource Nurse Role

Acts as Shift Coordinator/ Team Leader

Supervises, and delegates to others, the delivery of patient care

---