WORKFORCE STANDARDS
FOR
INTENSIVE CARE
NURSING 2016
Suggested Citation

Australian College of Critical Care Nurses (2016). Workforce Standards for Intensive Care Nursing. Melbourne, ACCCN Ltd
ISBN 9 780646 960739
Available at:
ACKNOWLEDGEMENTS

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On behalf of the Australian College of Critical Care Nurses (ACCCN) Board of Directors, it is my pleasure to present the ACCCN Workforce Standards for Intensive Care Nursing. The intensive and critical care nursing workforce plays an essential role in the achievement of healthcare outcomes. A growing body of evidence clearly demonstrates that inadequate nurse staffing leads to an increase in negative outcomes for patients, and ultimately a greater burden of cost to both the healthcare budget and society. Insufficient staffing and inadequate skill mix are potentially compromising nurses’ ability to maintain the safety of those in their care, and to provide a level of care that is likely to satisfy the nurses who provide the care and the patients who are the recipients of the care.

Unhealthy work environments contribute to medical errors, ineffective delivery of care, and conflict and stress amongst health professionals. The creation of healthy work environments is imperative to ensure patient safety, enhance staff recruitment and retention, and maintain an organisation’s financial viability.

The goal of the Standards is to ensure that quality care is provided in an environment that is safe and has a positive impact on patient and nursing outcomes. This document puts forth 10 essential standards for establishing and sustaining an intensive care nursing workforce as part of a healthy work environment that supports and fosters excellence in patient-centred care. These landmark standards represent an important step in fulfilling ACCCN’s commitment to its mission - to lead, represent, develop and support critical care nurses in Australia.

Diane Chamberlain RN, PhD
President, ACCCN
October 2016
The Australian College of Critical Care Nurses (ACCCN) is the peak professional nursing body representing critical care nurses in Australia. The ACCCN Workforce Standards for Intensive Care Nursing has been developed to safeguard the provision of an appropriate intensive and critical care nursing workforce, with the aim to ensure a safe and sustainable workforce that achieves the best outcomes for critically ill patients.

Since the publication of the Institute of Medicine’s report To Err Is Human¹, the relationship between hospital characteristics such as intensive and critical care nurse staffing and the quality of care has become central to issues of healthcare delivery, research and policy. In the acute hospital setting, there is a long-standing, consistent and robust evidence base that demonstrates the positive associations between the number of registered nurses (RNs) employed to care for patients, the quality of their education, and improved patient outcomes. Furthermore, in intensive care units (ICUs), there is evidence that higher ratios of RN staff to patients (specifically, 1:1 or 1:2) increase patient safety and improve patient outcomes.¹⁻⁶ Specifically, higher ratios of RNs providing direct patient care are associated with reduced length of stay in ICUs, reduced incidence of nosocomial infection, fewer adverse events and lower ICU mortality.

Although there are many factors that influence the safety and outcomes of critically ill patients, it is indisputable that patient-centred care provided by an appropriately qualified nursing workforce makes a significant difference.

In 2012, the Department of Health and Ageing commissioned a review of Australian government health workforce programs, with a focus on how to support the delivery of a high-quality, well-distributed, optimally utilised and responsive health workforce for Australia.⁶ The chair of the review stated, ‘it is critical that workforce innovation results in not only improved productivity, improved retention and job satisfaction but also that the safety and quality of care is not affected’ (p. 72). These concepts sit at the heart of the 2016 ACCCN Workforce Standards for Intensive Care Nursing.
STANDARDS IN SUMMARY

Standard One
The ICU patient case mix and unit design must determine the appropriate nursing service, knowledge and skills required for the nursing workforce and support staffing of each unit.
In addition to the minimum levels of staffing identified in Standards 2-10, each ICU must be evaluated objectively in terms of its unique patient case mix, design and environment to determine whether additional staffing is required to safely meet the needs of its patients.

Standard Two
A specified (formula/ratio based) number of nursing staff, with suitable knowledge and skills, must be employed to provide direct patient- and family-centred care to critically ill patients.

Standard Three
A specified (formula/ratio based) proportion of the nursing staff in an ICU must hold a specialist critical care nursing qualification.

Standard Four
The nursing management of the ICU must be provided by a specialist critical care RN who contributes to the planning of the intensive care service and collaborates actively with the hospital executive regarding all ICU matters.

Standard Five
A specified level of education and educational support must be provided within the ICU for all levels of its nursing staff. Nursing knowledge and skill must be maintained at an appropriate level to ensure high quality care for a complex case mix of critically ill patients.

Standard Six
A predetermined (formula/ratio based) number of ACCESS nurses (see Appendix A) must be rostered to maximise ICU bed utility and optimise safety.

Standard Seven
Life support equipment for specialised diagnostic or therapeutic procedures must be managed by a suitably skilled and qualified RN.

Standard Eight
A liaison nurse service must be provided to optimise the use of the ICU within the hospital.

Standard Nine
Intensive care nursing practice must be supported by a suitably skilled and qualified RN researcher.

Standard Ten
Non-nursing staff, such as administrative, clerical, cleaning and equipment support staff that are based in the ICU, must be provided to support service delivery and ensure that the nursing staff is able to focus on the delivery of patient-centred care for critically ill patients.

The ACCCN Workforce Standards for Intensive Care Nursing are presented and intended for application and interpretation as a full suite of standards.

Individual application of any standard in isolation is not supported in the evidence.
Context

Australia adopted intensive care nursing as a speciality in the 1970s. Since then the speciality has developed a reputable professional stance in the healthcare community. The peak critical care nursing body, ACCCN, has had a long and mutually respectful association with intensive care medical colleagues through the Australian and New Zealand Intensive Care Society (ANZICS). This respect and collaboration is evident from the collegial patient centred care at the bedside to the co-hosted national Annual Scientific Meeting on Intensive Care. This collaborative approach has helped to achieve excellent ICU patient outcomes in Australia, with reductions in mechanical ventilation hours, length of ICU stay and mortality compared to ICUs in equivalent developed nations. Importantly, these improved outcomes relate to patients with a similar severity of illness in specific conditions and in ICUs overall.

The clinical context of ICU nursing provision in Australia is quite different to most other nations in both the developed and developing world. It is related to the high quality of ICU nursing clinical practice, education and research. Specialist ICU nursing postgraduate education is well established in Australia. A postgraduate qualification provides advanced knowledge and skills for professional highly skilled, specialist work and further learning.

The professional work and scope of practice of intensive and critical care nurses in Australia is associated with improved patient outcomes that cannot be understated. Unlike many of their international counterparts, Australian ICU nurses routinely operate mechanical ventilators, independently adjust ventilator settings to patient needs, suction and maintain an airway. They manage highly technical devices such as extracorporeal therapy and intra-aortic balloon pumps, measure cardiac output from highly technical hemodynamic devices and titrate vasoactive drugs. They have not only technical skills but also knowledge, and can apply these skills and knowledge to patient-centred care.

It is usual that each specialist critical care nurse cares for and manages the multiple and complex needs of each critically ill ICU patient. Unlike some other countries, the intensive care workforce is not complemented by specialised allied health practitioners such as respiratory therapists or dialysis nurses. One appropriately qualified RN operates, manages and problem solves all of the technical equipment issues required to provide life support to a critically ill patient. All elements of patient care, including those that may seem basic and non technical such as washing and patient positioning, enable the ICU nurse to gather vital information about the patient. For instance, skin condition and venous return to dependent body parts, haemodynamic stability when re-positioned, purposefulness of patient interaction and movement when sedated are all evaluated during routine patient care activities.

The bedside nurse provides the constant surveillance and decision-making that is required to optimise outcomes and reduce complications in the critically ill patient. This unique Australian critical care clinical practice model provides less variation and more stability in critically ill patients' condition.

An ICU nurse providing direct patient-centred care is the conduit for information, effective communication and consultation from the many medical units and ICU specialists that have input into a patient's care. The ICU nurse is also a vital support person for family members of critically ill patients, providing information, guidance and support during the patients' stay in ICU. To subdivide elements of care between different care providers is not efficient. It would fragment care and reduce patient safety, especially as the critically ill are so vulnerable. An ICU nurse providing direct patient and family-centred care to a critically ill patient is a key strength of Australian intensive care provision, and this model of care should not be dismantled without good evidence that adverse outcomes will not occur as a result.

Patient Experience

Everyone who is seeking or receiving care in the Australian healthcare system has certain rights regarding the nature of that care. These are described in the Australian Charter of Healthcare Rights. The rights included in the Charter relate to access, safety, respect, communication, participation, privacy and comment. The critically ill patient is vulnerable and continually at risk of complications, and appropriate and timely care is required to optimise outcomes.
Risk. Critical care nurses are central to providing care that meets the healthcare rights of each patient. Caring for ICU patients demands the nurse’s constant and fully engaged presence and willingness to cooperate and interact with them in order to understand their dependence and vulnerability. ‘A patient’s endurance during mechanical ventilation seems to be facilitated by the presence of nurses that mediate hope and belief in recovery, strengthening the patient’s will to fight for recovery and survival’. ACCCN has published a position statement on Partnering with Families in Critical Care (2015) that underlines these values.

Background

In 2001 a Senate inquiry into the critical care workforce developed key statements that were later included in the ACCCN ICU Staffing Position Statement (2003) on Intensive Care Nursing Staffing. This position statement served the profession well until the cuts in healthcare spending that resulted from the recent global financial crisis, which led to reductions in the critical care nursing workforce and affected the quality of patient-centred care. Such decisions were based on simplistic assumptions about the numbers of nurses, rather than on evidence from research on critical care nurse staffing and workforce, such as their experience, qualifications, education and ‘fit for purpose’. While the 2003 position statement provided important national guidance on intensive care nursing staff levels, its effectiveness was limited because it did not establish specific standards for practice.

As nurses comprise the largest group of healthcare workers, they represent an easy target for cost savings. The reduced staff numbers and staff quality after the global financial crisis resulted in an increased number of health-related adverse events, poorer productivity and poorer outcomes for patients. It also had an impact on critical care workforce satisfaction and led to decreased retention of experienced senior critical care nurses.

The clinical context of critical care nursing in Australia is different to most other nations in both the developed and developing world. The professional work and scope of practice of intensive and critical care nurses in Australia is associated with improved patient outcomes that cannot be understated, and the outcomes of critically ill patients are among the best in the world. The high quality of care is related to the high quality of nursing clinical practice, education and research. Specialist critical care nursing postgraduate education, which provides advanced knowledge and skills, is also well established in Australia. ACCCN has published Practice Standards for Specialist Critical Care Nurses (2015) that outline this quality.

In the wake of the workforce issues described above, ACCCN received requests from the critical care nursing profession in all states for a more robust evidence-based position on the ICU nursing workforce so that the quality and safety of patient centred care of critically ill patients could be protected and maintained. In response, in 2012, the ACCCN Board of Directors established a working party that consisted of experts from each state and members of the ACCCN Workforce Advisory Panel. It was charged with reviewing the 2003 position statement and its evidence base. As a result of this initiative, the ACCCN Workforce Standards for Intensive Care Nursing (hereafter referred to as the Standards) was produced. These Standards will help to ensure the safety and quality of care for critically ill patients, which in turn will maintain and improve patient outcomes in Australian ICUs.

Funding

The majority of the work involved in this review was undertaken on an in-kind basis. ACCCN provided funding for Workforce Standards Development Group meetings and publication of the Standards.

Conflicts of Interest

No conflicts of interests were declared by any of the participants involved in the review and subsequent development of the Standards. Although the ACCCN Board sponsored and provided some funding for this review, it did not seek to influence its outcome in any way. Some current and past members of the ACCCN Board of Directors were involved in the development of the Standards (see Acknowledgements above).

Purpose

The purpose of the Standards is to define a safe and sustainable intensive care nursing workforce in order to ensure the best outcomes for critically ill patients in Australia.

Scope

The Standards apply to all adult, paediatric or mixed adult/ paediatric ICUs in Australia. ICUs are defined as those units providing level I-III treatment and care of critically ill patients (see Appendix A), regardless of the title of the unit.

Target Users

These Standards are intended for reference and use by intensive and critical care nurses; ICU managers, allied health and medical staff; hospital managers; health service district managers and executives; government health services administrators, managers and executives; hospital-based and university-based educators; and the public.

Methods

Several focus groups comprising members of the Workforce Standards Development Group were conducted. As a result, several themes and keywords were identified that formed the basis of a systematic search and critical review of the literature. The first tier of the literature review search commenced in 2012. This was a preliminary search of the Web of Science database. Themes sourced from this search validated the use of the 2003 ACCCN position statement as the basis for the review. Ten draft standards were derived, which guided the main literature search and systematic review as detailed below.

b Available at: www.acccn.com.au/documents/item/289

Available at: www.acccn.com.au/documents/item/292
**Search Strategy**

The second tier of the literature search was performed in 2014 and repeated in 2015. This was to accrue literature related to the standards in general, and then repeated specifically for each standard. The search encompassed electronic databases, reference lists from selected electronic articles, and Internet search engines. For the main search, two librarians and investigators searched the following electronic databases: Medline, CINAHL, Cochrane, Google Scholar, Embase, Scopus and Ovid. The search was limited to articles written in the English language that were published in the previous 10 years (January 2005 to May 2015).

**Search Terms**

The following terms and their combinations were used for the main search: ‘nurses’, ‘nursing staff, hospital’, ‘intensive or critical care’, ‘nursing standards’, ‘nursing administration research’, ‘personnel staffing and scheduling ’, ‘nursing education research’, ‘health care quality, access and evaluation’, ‘health services research’, ‘outcome assessment (health care)’, ‘personnel administration, hospital’, ‘patients’, ‘length of stay’ and ‘mortality’. Please refer to the Supplementary Online Appendices for MESH and keyword terms and combinations.

**Inclusion and Exclusion Criteria**

Articles were included in the review if they were: original research (quantitative and qualitative) that measured or described nurse staffing and workforce in association with patient outcomes. Descriptive reviews, systematic reviews, book chapters, editorials, dissertations and theses were also included. Grey literature was sourced from Internet searches and communication with other specialty organisations. The specific search criteria for each Standard are available within the Supplementary Online Appendices.

**Results**

A total of 381 articles was retrieved from the initial search in 2012, and the search was repeated again in 2014 and 2015, resulting in a total of 553 articles. The full text of each article was assessed independently by three researchers to determine its suitability for full review, resulting in the exclusion of 309 articles. The National Health and Medical Research Council (NHMRC) dimensions of evidence criteria were used to assess the included studies: strength of evidence (level, quality, statistical precision); effect size; and relevance of evidence (appropriateness of outcomes, relevance of study question). The NHMRC levels of evidence were used to categorise and assess the quality of each article. These were then summarised in terms of the body of evidence. Only three qualitative studies were found. These were assessed using the National Institute for Clinical Excellence qualitative appraisal checklist. ¹⁸

**Pragmatic Issues of Evidence**

The complex nature of the ICU, with variations in patient severity of illness, comorbidities, support structures, management styles and leadership makes the implementation of a randomised trial to test the implementation of an ICU workforce/staffing model very difficult. We know that the quality of the relationship within the multidisciplinary team e.g. respect, positive communication, autonomy, is important for nursing work and patient outcomes. Thus, it is virtually impossible to obtain Level A evidence according to the NHMRC criteria (systematic review of RCTs, several RCTs). Notwithstanding this, there is a building body of strong observational evidence that support these Standards. This evidence fulfils the other four requirements of the NHMRC matrix of evidence: it is consistent, demonstrates substantial clinical impact, is generalisable to the ICU patient population and is applicable to the Australian healthcare context.

**Body of Evidence**

**Assessment of Quality**

The body of evidence in relation to each draft standard was assessed. Consideration was given to:

- the quantity, level and quality of the evidence
- the consistency of the evidence across the included studies
- the clinical impact (relevance) of the evidence
- the generalisability of the results to the population (for whom the standard was intended)
- the applicability of the results to the Australian healthcare setting.

These five components were then rated according to the NHMRC body of evidence matrix (Appendix B, Table 2). The bodies of evidence in relation to each standard are shown in Appendix C.

**Strengths and Limitations of the Evidence**

The bodies of evidence in relation to each draft standard were assessed using the NHMRC grades of evidence for the development of guidelines. Most of the draft standards were found to be supported by grade C evidence, and the remainder by grade D evidence.

**Derivation of the Standards**

All ten draft standards were judged to be supported by bodies of evidence of grade c or above. The wording of each draft standard was subsequently reviewed and revised as necessary to ensure consistency with the evidence base.

**Review and Minor Revision of the Standards**

The final draft of the Standards was invited for final review and comment by a validation panel of representatives of professional end-users as follows:

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¹⁷ The Supplementary Online Appendices are available at: www.acccn.com.au/aboutus/position-statements-standards
The results were as follows:

- **Domain 1: Scope and purpose 112/144 = 78%**
- **Domain 2: Stakeholder involvement: 118/192 = 61%**
- **Domain 3: Rigour of development: 255.5/336 = 76%**
- **Domain 4: Clarity of presentation: 126/192 = 66%**
- **Domain 5: Applicability 65/144 = 45%**
- **Domain 6: Editorial independence 62/96 = 65%**

In terms of overall assessment, the Standards were scored 738.5 out of a possible total score of 1104 = 67%. This is equivalent to an overall rating of 5 on the AGREE II rating scale (1-7). The relatively low score achieved in the Applicability domain was felt to be related to the design of the AGREE II tool, which was designed to assess clinical practice guidelines. However, in the absence of a specific tool to appraise practice standards, the AGREE II tool was the best available. The results of the AGREE II appraisal were reviewed by ACCCN National Board and no further amendments to the Standards were deemed necessary.

Detailed results of the appraisal are presented within the Supplementary Online Appendices.

### Appraisal

As a final assessment of rigour, the Standards were subjected to appraisal, using the AGREE II instrument, by an independent group of assessors that was not involved in the development of the Standards. Appraisers from the Intensive Care Services Network, Agency for Clinical Innovation NSW participated in this phase. Eight reviewers (1 nurse manager, 2 nurse unit managers, 3 clinical nurse consultants, 2 clinical nurse educators) participated in the appraisal. The Standards were appraised within six domains, comprised of between two to eight questions, scored on a scale of 1 (strongly disagree) to 7 (strongly agree).

The maximum minus the minimum possible scores was divided by the sum of the reviewers’ scores minus the minimum possible scores for each domain to give a scaled domain percentage score for each domain. The results were as follows:

- **Domain 1: Scope and purpose 112/144 = 78%**
- **Domain 2: Stakeholder involvement: 118/192 = 61%**
- **Domain 3: Rigour of development: 255.5/336 = 76%**
- **Domain 4: Clarity of presentation: 126/192 = 66%**
- **Domain 5: Applicability 65/144 = 45%**
- **Domain 6: Editorial independence 62/96 = 65%**

### Ratification

The final version of the Standards was approved by the ACCCN Board of Directors in October 2016.

### Dissemination

The 2016 ACCCN Workforce Standards for Intensive Care Nursing is available in printed and electronic format.

To ensure widespread distribution and access to the Standards, the electronic version (pdf file) has been made available for download free-of-charge for members via the ACCCN website. It will also be e-mailed to all ACCCN members and associate members.

A complimentary print version of the Standards will be provided to:

- relevant consumer groups
- all Australian ICUs
- the senior nursing executive in all Australian hospitals
- relevant professional organisations (e.g. Royal College of Nursing of Australia, Nursing and Midwifery Board of Australia, ANZICS, CICM, CoNNO)
- all state and national chief nursing officers
- the Australian Minister and Shadow Minister for Health
- all state health ministers and state shadow health ministers.

The print version will also be made available for purchase, at a nominal cost, to any interested party.

### Implementation of the Standards

Not all ICUs will be able to conform to the Standards immediately. Current models of care as well as funding models will require review and revision. It is a reasonable expectation that ICUs implement the Standards within one year of their release.

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\[d\] The Supplementary Online Appendices are available at: www.accncn.com.au/aboutus/position-statements-standards

\[e\] This does not imply endorsement of the Standards by the Agency for Clinical Innovation NSW
There may be mitigating circumstances that prohibit some ICUs from meeting the Standards within a one year time-frame. These circumstances should be documented thoroughly, and a strategic plan should be implemented in relation to each standard, to ensure their implementation within a maximum two year period from their release.

**Review**

The Standards will be reviewed biennially by the ACCCN Advisory Panels. The purpose of this review is to ensure the Standards are up to date and consistent with:

- the current evidence base
- contemporary practice
- workload
- case mix variation.

At any time, on recommendation from the Advisory Panels, the ACCCN Board may initiate a full review of the Standards. Minimally, the Standards will be subjected to full review every five years.

**Audit**

Two years following the release of the Standards, ACCCN will undertake a national audit of ICUs to assess the level of compliance with the Standards. Aggregate results for each state will be reported and made publicly available.
1. The ICU patient case mix and unit design must determine the appropriate nursing service, knowledge and skills required for the nursing workforce and support staffing of each unit. In addition to the minimum levels of staffing identified in Standards 1-9, each ICU must be evaluated objectively in terms of its unique patient case mix, design and environment to determine whether additional staffing is required to safely meet the needs of its patients.

1.1 Paediatric Services: In ICUs that provide services for paediatric patients only, the critical care postgraduate qualification noted in each section of these standards refers to a paediatric specific speciality.

1.2 Mixed Adult/Paediatric: In ICUs that have a mixed adult/paediatric population, there should be a designated paediatric critical care nurse leader who holds a paediatric-specific critical care qualification.

1.3 Special Needs: For critically ill patients with special needs e.g. maternity, oncology or morbidly obese patients, due consideration must be given to the requirement for additional, appropriate staff support to ensure that the patient's needs are met.

1.4 Design and Layout: The design and layout of the ICU must be considered when determining nurse staffing and skill mix. In ICUs where there is a large number of single rooms, the nursing skill mix must be reviewed in order to ensure the safety and needs of the critically ill patient. [See also 6.3.]

Grade of Evidence Level B

- Inadequate specialist paediatric nursing staff increases the likelihood of adverse outcomes in a paediatric intensive care unit (PICU). [Level C]
- PICU nursing has a distinct knowledge base and skill set. [Level C]
- Higher levels of experience and education in the paediatric critical care nursing workforce are associated with fewer patient deaths. [Level B]
- Single rooms provide increasing flexibility to accommodate a range of patients, such as the provision of paediatric intensive care beds in an adult ICU rather than a stand-alone pod should bed requirements be low. [Level D]
- Single rooms will assist staff in managing patient care and reducing the risk of cross infection between patients. [Level C]
- Single rooms are superior to multi-bed rooms in terms of patient safety. [Level B]
- Single rooms require dedicated surveillance and staffing ratios to maintain safety. [Level D]
- When ICU patients are cared for in single rooms, the ability of staff to supervise and support less-experienced staff is reduced. When the staff is isolated, direct observation may be impaired, checking medication is more onerous, obtaining equipment can be time consuming, and emergency access to the patient may be compromised. [Level D]
2. A specified (formula/ratio-based) number of nursing staff, with suitable knowledge and skills, must be employed to provide direct patient- and family-centred care to critically ill patients.

2.1 Critically ill patients, as determined clinically, require at a minimum one RN to care for them in close proximity (less than 3 metres) at all times.

2.2 The minimum professional qualification requirement is that of an RN; to ensure accountability for direct patient and family-centred care for the needs of critically ill patients.

2.3 The RN-to-patient ratio must be at least:

2.3.1 One RN to one patient for ventilated patients and any other patient in the ICU that the nurse-in-charge deems to be clinically unstable or at risk;

2.3.2 One RN to two patients for patients requiring a high complexity level of care, (e.g. stable non-ventilated patients improving from their critically ill state). Deteriorating patients require a 1:1 ratio.

2.4 On occasions when a patient has very complex needs, more than one RN to one patient may be required, as deemed necessary by the nurse-in-charge or ICU specialist (e.g. a labouring obstetric patient or a patient with multiple extra-corporeal technology, major trauma or burns).

2.5 Non-RN staff [e.g. enrolled nurses (EN) and patient care assistants] are additional to the above ratios and should not replace an RN. They may only assist in the care of patients under the direct supervision of an RN.

1.6 The ratio applies to all adult, paediatric or mixed adult/paediatric ICUs in Australia.

Grade of Evidence Level B

- All critically ill patients require continuous observation and surveillance to halt the deleterious progression of deterioration related to critical illness and multi-organ failure. [Level A]
- Diluting the number of RN staff with non-RN staff in general hospitals increases the likelihood of hospital mortality, hospital-acquired infections and adverse events. [Level B]
- Higher levels of RN staffing per patient in ICU are associated with lower rates of nosocomial pneumonia, nosocomial sepsis and unplanned extubation. [Level B]
- The holistic patient and family-centred model of care in Australia, with one RN for one ICU patient, provides the world-best outcomes for ICU patients, including lower mortality, lower duration of mechanical ventilation and lower lengths of ICU stay. [Level B]
- Allocation of an ICU patient to an EN to provide direct patient care, even with the support of an RN caring for an ICU patient in an adjacent bed, results in increased adverse events and patient mortality. It is not a sustainable model of care in tertiary-level ICUs and major non-metropolitan ICUs. [Level D]
- There is professional support for the 1:1 RN-to-patient ratio for ICU patients in collegial ICU Standards (e.g. ANZICs, CICM, BACCN). [Level C]
- There is no shortage of critical care qualified nursing staff in ICUs that follow the Magnet Hospital framework. [Level D]
- Use of non-RN staff in ICU is a contributing factor to the attrition of critical care qualified nurses. [Level D]
3. A specified (formula/ratio-based) proportion of the nursing staff in an ICU must hold a specialist critical care nursing qualification.

3.1 A minimum of 50% of the RN staff that provide direct patient care in an ICU should hold a recognised postgraduate intensive care (critical care) nursing qualification.

3.2 The qualification will meet at a minimum an Australian Qualifications Framework level 8 and the Australian clinical practice outcome Standards for critical care nurse education.  

3.3 The optimal proportion of critical care specialist qualified RNs is 75%. The remaining 25% should be working towards a post graduate qualification. The ratio applies to all adult, paediatric or mixed adult/paediatric ICUs in Australia.

Grade of Evidence Level B

- The proportion of critical care qualified staff is related to patient safety, with less falls and medication errors when a higher proportion of critical care specialist RNs are employed on staff. [Level B]
- Inadequate knowledge, skills and competence of nursing staff contribute to adverse events in ICU. [Level C]
- There is variation in what constitutes a critical care qualification, both internationally and in Australia. [Level D]
- A staff skill mix with a high proportion of RNs without critical care qualifications is a stressor to critical care qualified staff and a contributing factor to the attrition of critical care qualified nurses. [Level D]
- There is a positive association between Australian critical care nursing qualifications and patient outcomes. [Level D]
- A staff skill mix with a high proportion of RNs with critical care qualifications is needed for the education and mentoring for new staff including new graduate and students [Level D]
- A critical care qualification will enable the RN to meet the ACCCN Practice Standards for Specialist Critical Care Nurses. [Level D]

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4. The nursing management of the ICU must be provided by a specialist critical care RN who contributes to the planning of the intensive care service and collaborates actively with the hospital executive regarding all ICU matters.

4.1 Every ICU must have a specialist critical care RN that is dedicated exclusively to a nursing manager role.

4.1.1 The ICU nurse manager should possess a postgraduate qualification in management or similar, and be prepared to Master's level in a recognised degree in either management, critical care or similar.

4.2 The ICU nurse manager must be supernumerary to the allocation needs of clinical patient care.

4.3 In larger units (i.e. units with more than 10 beds), a broader array of management support nurses may be required (e.g. more than one nurse manager, assistant nurse managers); each must be supernumerary to the RN requirement for direct patient care stated in 2.3.

4.4 In addition to the ICU nurse manager, a clinical coordinator is required. This role is responsible for appropriate clinical allocation and bed management. The clinical coordinator may also provide an element of clinical support.

4.4.1 The clinical coordinator must be a critical care qualified RN.

4.4.2 There should be at least one clinical coordinator who is supernumerary per shift (i.e. in addition to staff providing direct patient care).

4.4.3 In larger units (i.e. units with more than 10 beds), there may be a need for more than one clinical coordinator per shift. For example, there may be a need for one clinical coordinator per ‘pod’ (e.g. 8-12 beds).

Grade of Evidence Level C

- Nurse unit managers of large ICUs manage high numbers of staff (e.g. > 400 nurses) and large budgets (e.g. > $50 million per annum) and require a management team/structure within the ICU to support such a large enterprise. [Level B]
- The nurse unit manager of an ICU provides nursing leadership within the ICU and within the hospital. [Level C]
- Additional management /coordinating nursing staff are required to optimise the flow of patients in and out of the ICU. [Level C]
- It is beneficial for nurse unit managers to possess a critical care qualification and/or management qualification. [Level D]
5. A specified level of education and educational support must be provided within the ICU for all levels of its nursing staff. Nursing knowledge and skills must be maintained at an appropriate level to ensure high quality care for a complex case mix of critically ill patients.

5.1 One full-time equivalent (FTE) ICU nurse educator is required per 50 ICU nursing staff head count (not FTE).

5.2 The ICU nurse educator must be an ICU specialist RN with a critical care master's degree and an education qualification.

5.3 To optimise their contribution to ICU nursing practice, ICU nurse educators will be based in the ICU as part of its workforce, as opposed to a generic nurse education unit. The nurse educator should work in collaboration with the ICU nurse manager.

5.4 All new nursing staff will undergo an ICU specific orientation and induction program.

5.5 Different levels of education support will be provided depending on the size of the ICU, the complexity of patient care, the staff skill mix and the proportion of intensive care qualified staff.

5.5.1 ICU nurse education specialists will provide ICU orientation, induction and mandatory ICU competency programs.

5.5.2 ICU nurse education specialists will provide transition programs for novice RNs (e.g. in the first year following graduation) and educational support to RNs who are new to the ICU environment.

5.5.3 ICU nurse education specialists will provide support to RNs who are postgraduate intensive care or critical care nursing students. This will be in partnership with the relevant university. This role may also be termed a clinical facilitator.

5.5.4 ICU nurse education specialists will provide continuing educational opportunities in collaboration with senior experienced intensive care nurses.

Grade of Evidence Level C
- Inadequate supervision or education of inexperienced staff contributes to an increase in adverse events. [Level A]
- Continued experiential learning is essential for a safe and competent workforce. [Level A]
- The ICU educator is a specialist role. [Level B]
- ICU nurse educators are part of the ICU staff team. [Level C]
- Specialist ICU nursing knowledge is unique, complex and continuously changing under continuous quality improvement. [Level D]
- ICU nurse educators are integral to the clinical area as their knowledge of evidence based practice assists with the provision of optimal patient care. [Level D]

STANDARD FIVE

h Not to be interchanged with the term clinical facilitator; these are different roles. Refer to definitions on pages 30-31.

i A nurse education specialist is a clinical nurse specialist that has been allocated a specific education role by the ICU nurse educator or similar.
6. A pre-determined (formula-based) number of ACCESS nurses must be rostered to maximise ICU bed utility and optimise safety.

6.1 A predetermined number of ACCESS nurses should be rostered to provide ‘on-the-floor’ support to nurses so that ICU bed utility is maximised and safety is optimised.

6.2 ACCESS nurses are in addition to nurses providing direct patient care as defined in 2.3, and other staff identified in Standards 3-5.

6.3 The minimum requirement for ACCESS nurses is as follows:

6.3.1 In ICUs with less than 50% qualified ICU nurses and/or where 80% or more of the ICU beds are in single rooms, one ACCESS nurse is required per four patients per shift.

6.3.2 In ICUs with 50-75% qualified ICU nurses and less than 80% of the ICU beds are in single rooms, one ACCESS nurse is required per six patients per shift.

6.3.3 In ICUs with greater than 75% of qualified ICU nurses and less than 80% of the ICU beds are in single rooms, one ACCESS nurse is required per eight patients per shift.

6.4 Patients with very complex needs will require one ACCESS nurse to a smaller ratio of ICU beds compared to that which is stipulated in 6.3. HDU patients in an ICU bed will still require the minimum ACCESS nurse ratio as stipulated.

6.5 ACCESS nurse ratios will need re-evaluation in times that are contingent to unexpected late admissions, patient deterioration, or adjustments in ICU staffing.

Grade of Evidence Level C

- A predetermined formula of ACCESS nurses is associated with patient safety. [Level C]
- The average number of beds in ICUs is increasing, with pods of beds becoming more common, requiring additional non-clinical nursing staff for operational management and supervision. [Level C]
- The ACCESS nurse facilitates the optimal use of ICU beds. [Level D]
- The ACCESS nurse is an essential component of Medication Safety processes in the ICU. [Level D]

ACCESS = Assistance, Coordination, Contingency (for a late admission on the shift, or staff sick mid-shift), Education (of junior staff, relatives, and others), Supervision, and Support. ACCESS nurses hold a specialist critical care qualification.
7. Life support equipment for specialised diagnostic or therapeutic procedures is managed by a suitably skilled and qualified RN.

7.1 The ICU equipment nurse should be a critical care qualified RN that is an ICU equipment and technology specialist.

7.2 Larger units (i.e. greater than 10 beds) should have a dedicated equipment nurse to manage the complex array of equipment used in the intensive care environment (e.g. ventilators, renal replacement therapy equipment) and oversee an appropriate quality control program in regards to the equipment.

7.3 Smaller units may have the equipment nurse role as part of a senior portfolio.

7.4 The ICU equipment nurse works collaboratively with biomedical engineering expertise.

7.5 Equipment non-nurse technicians do not possess the expertise to provide patient centred care related to technical support and equipment (e.g. urgent bronchoscopy or problem solving patient mechanical ventilator interactions that are technically based).

Grade of Evidence Level C

- Patient-centred care involves synergistic support from technical equipment. Intensive care nurses possess the knowledge and skills to maintain this combined support. [Level C]
- Critical care nurses make up the largest number of staff in the technical support/equipment role in ICUs. [Level C]
- Critical care nurses, in an equipment nurse role, should work collaboratively with biomedical engineering and technician support staff. [Level D]
- Intensive care nurses routinely possess the knowledge and skills to assemble technical equipment, conduct quality checks on equipment, implement the use of life support equipment on patients and troubleshoot problems with equipment during application. [Level D]
8. A liaison nurse service must be provided to optimise the use of the ICU within the hospital.

8.1 A liaison nurse service will be managed by a suitably skilled and qualified RN to coordinate and facilitate the intensive care liaison team. ICU liaison nurses must possess a critical care qualification, an expert knowledge base, and skills to make complex decisions and must be clinically competent in expanded practice.

8.2 ICU liaison nurses are part of the ICU staff and on the ICU roster, but are additional to the ICU staffing needs articulated in Standards 2-7. This position is supernumerary to direct patient care and management roles.

8.3 One ICU liaison nurse must be provided per 10 ICU beds.

8.4 The ICU liaison nurse role includes clinical services delivery and consultancy with and between hospital wards. The role is inclusive of quality improvement activities, education, leadership and research in the liaison service. The role may include Rapid Response Team and/or Code Blue response.

Grade of Evidence Level B

- The ICU liaison nurse role has a beneficial effect on ICU mortality, hospital mortality, unplanned ICU admission, discharge delay and adverse events. [Level B]
- There is a significant burden on critical care services when no formal ICU liaison nurse role exists. [Level C]
- The ICU liaison nurse role improves formal and informal support and communication pathways between geographically defined critical and ICUs and acute care ward staff. [Level D]
- The best ICU liaison nurse service model to be implemented can vary according to the number of ICU liaison nurses, the hours the service covers, and the combination of services provided. [Level D]
- The ICU liaison nurse functions as a member of the multi-disciplinary team, managing patients with complex care needs across hospital departments, and facilitating the smooth transition for patients admitted to and discharged from the ICU. [Level D]
9. Intensive care nursing practice must be supported by a suitably skilled and qualified RN researcher.

9.1 In larger ICUs (i.e. greater than 10 beds), there will be a nominated lead nurse researcher who is a critical care specialist RN. The minimum qualification for this role is a research master’s degree, but possession of a PhD is preferable. Partnerships will be linked with a tertiary institution (e.g. via a joint appointment). The nurse researcher will initiate and coordinate nurse-oriented research and is considered part of the ICU nursing workforce. This position is supernumerary to direct patient care needs.

9.2 The RN researcher is a dedicated role to nursing research. It is not a support role to medical or pharmaceutical research and clinical trials.

9.3 Smaller units should consider a fractional appointment to support nursing research in the unit.

9.4 Smaller units should link with larger units to facilitate nursing research.

Grade of Evidence Level C

- Critical care research evidence is needed to guide practice and reduce unsafe clinical practice variation. Variation that is not related to patient need or preference, raises questions about quality and appropriateness of care, as well as quality, efficiency and equity. [Level C]
- Increasing numbers of critical care qualified RNs possess doctoral research qualifications, resulting in an increase in the critical examination of critical care nursing practices. [Level D]
- Embedding a research degree-qualified RN within a clinical unit enhances the focus on evidence based practice and improves research translation. [Level D]
- The presence of a PhD-qualified nurse to conduct and support nurse-initiated research increases nurse satisfaction, research on nursing care/ practices and dissemination of research findings. [Level D]
- There is a cost benefit of having research-qualified nurses as part of the ICU team. [Level D]
10. Non-nursing staff, such as administrative, clerical, cleaning and equipment support staff that are based in the ICU, must be provided to support service delivery and ensure that the nursing staff is able to focus on the delivery of patient-centred care for critically ill patients.

10.1 A dedicated ward clerk (or equivalent), whose role includes managing telephone enquiries, clerical duties and responding to visitors' requests to enter the ICU, will be rostered seven days per week between 08.00 to 20.00 hours or equivalent. Extra ward clerk support must be provided in ICUs where there are separate pods.

10.2 Dedicated non-nursing staff must be on hand to ensure that ICU cleanliness is maintained, bed areas are available for use for new patients, consumables are re-stocked, and samples etc. are collected and delivered as required in a timely manner.

10.3 The value and cost of using RNs for administrative or cleaning purposes is not justifiable unless the work requires specialised and professional knowledge or skills.

Grade of Evidence Level C

- Interruption of nursing practices, such as answering the telephone etc., increases the likelihood of adverse events (e.g. medication errors). [Level C]
- Intensive care nurses performing support services have a reduced capacity to provide direct patient care. [Level D]
- The ideal number and composition of support staff are calculated according to unit needs. [Level D]
- The provision of support staff impact on nurse retention and patient outcomes. [Level D]
REFERENCES


10. Wiles V, Daffurn K (2002). There’s a bird in my hand and a bear by the bed – I must be in ICU: The pivotal years of Australian critical care nursing. Carlton, Vic, Australian College of Critical Care Nurses.


**APPENDIX A**

**DEFINITIONS**

ACCESS Nurse
The ACCESS Nurse is an RN who provides ‘on-the-floor’ Assistance, Coordination, Contingency (for a late admission on the shift, or staff sick mid-shift), Education (of less-experienced staff, relatives and others), Supervision and Support (for RNs providing direct patient care). A clinical nurse specialist with a critical care specialty post graduate qualification.

Associate Nurse Unit Manager (ANUM)
The ANUM/Clinical Nurse is a senior critical care qualified nurse who is an integral member of the unit management team, assisting the Nurse Unit Manager in the coordination of clinical practice within the unit. The ANUM is responsible for the coordination of the unit in the absence of the Nurse Unit Manager.

Clinical Facilitator
A Clinical Facilitator is a critical care qualified RN who provides teaching and learning guidance and supervision to nurses, predominantly postgraduate and undergraduate nurses in addition to nurses in the ICU, under the direction of an ICU educator or a University academic.

Clinical Nurse Consultant (CNC)
The role of CNC differs between states; it ranges from unit management to provision of a global critical care resource. The role may provide education and leadership to specific units, hospital- and area-wide services and the tertiary education sector.

Clinical Nurse Specialist in the ICU
A clinical nurse specialist in the ICU is a critical care qualified RN who applies and demonstrates a high level of clinical nursing knowledge, experience and skills in providing complex nursing with minimum direct supervision.

Clinical Support Nurse; Clinical Nurse Educator; Clinical Facilitator
The Clinical Support Nurse is a critical care qualified nurse assigned to the ICU to support orientation of staff to the unit and the development, assessment and maintenance of clinical competence within the unit. The Clinical Support Nurse may also assist the Nurse Educator with the management of postgraduate education courses within the unit.

Code Blue Team
The Code Blue Team is responsible for responding to an individual requiring cardiopulmonary resuscitation.

Critically Ill Patient
Critically ill refers to a unstable clinical state of a patient who requires an intensive level of care (monitoring and treatment for organ support). Examples include: intubated, mechanically ventilated patients; patients receiving continuous infusions of inotropes and/or sedation, renal replacement therapy; patients with unstable conditions who are at risk of deterioration.

Direct Patient Care Nurse
The Direct Patient Care Nurse is an RN whose role is to provide direct bedside care and treatment of an intensive care patient and provide patient-centred care.

High Dependency Unit (HDU)
An HDU is a specially staffed and equipped section of an intensive care complex that provides a level of care that is intermediate between intensive care and general ward care.

Hospital: Levels
The level of complexity of clinical activities undertaken by a hospital ranges from Level 1 (least complex) to Level 6 (most complex). Intensive care services are primarily delivered in hospitals with a Level 4-6 role delineation.

Level 4
A Level 4 hospital is capable of providing mechanical ventilation and simple invasive cardiovascular monitoring for several hours. It has a separate and self-contained facility capable of providing basic, multi-system life support usually for less than 24 hours, and a medical director (1) with training and experience in intensive care. In addition to attending specialist(s), the unit must have at least one RMO (1) on site or available to the unit at all times. Equivalent to level I# of FICANZCA Guidelines.

Level 5
As Level 4, plus mechanical ventilation, extra corporeal renal support services and invasive cardiovascular monitoring for a period of several days. A Level 5 hospital has a separate and self contained facility (unit) capable of providing complex multi-system life support, and a medical director (1) accredited intensive care specialist or consultant physician in intensive care. It must have
at least one specialist accredited with appropriate experience in intensive care, one RMO (1) who is on site, predominantly present in the unit and exclusively rostered to the unit at all times, and an NUM (1) with post-registration qualifications in intensive care or the clinical specialty of the unit. The nurse in charge of the shift is a permanent staff member and appropriately qualified. All nursing staff of the unit responsible for direct patient care are RNs. The majority of nursing staff has post-registration qualifications in intensive care or the clinical specialty of the unit. 1:1 care for ventilated or equivalently critically ill patients. Capacity to provide greater than 1:1 care if required. There must be at least two RNs (2) in the unit if there is a patient in the unit. Active medical and nursing education programs. Access to CNE (1). 24-hour access to pharmacy, pathology, operating suite and imaging. Appropriate access to physiotherapist, social worker, dieticians, pastoral care and other allied health services. Equivalent to level II# of FICANZCA Guidelines.

Level 6
As Level 5, plus mechanical ventilation, extracorporeal renal support services and invasive cardiovascular monitoring for an indefinite period. A Level 6 hospital has a separate and self-contained facility (unit) capable of providing complex, multi-system life support for an indefinite period, and a referral centre for intensive care patients. It must have a medical director (1) accredited intensive care specialist or consultant physician in intensive care, one RMO (1) who is in the hospital, predominantly present in the unit and exclusively rostered to the unit at all times, an NUM (1) with post-registration qualifications in intensive care or the clinical specialty of the unit. The nurse in charge of the shift is a permanent staff member and appropriately qualified. RNs providing direct patient care must be RNs. The majority of the nursing staff have post-registration qualifications in intensive care or the clinical specialty of the Unit. 1:1 care for ventilated or equivalent critically ill patients, greater than 1:1 for selected patients. More than two RNs (2) must be present in the unit if there is a patient in the unit. CNE (1) and formal nursing educational program. Physiotherapy services are accessible. Appropriate access to other allied health services. Active research. Designated social worker. Biomedical engineering services on site. Equivalent to level III# of FICANZCA Guidelines.

Intensive Care Unit (ICU)
ICUs are defined as those units providing Level 1-111 treatment and care of critically ill patients (see below), regardless of the title of the unit.

ICU Levels

Level 1
A Level I ICU should be capable of providing immediate resuscitation and short-term cardio respiratory support for critically ill patients. It will also have a major role in the monitoring and prevention of complications in ‘at-risk’ medical and surgical patients. It must be capable of providing mechanical ventilation and simple invasive cardiovascular monitoring for at least several hours.

Level II
A Level II ICU should be capable of providing a high standard of general intensive care, including complex multi-system life support, which supports the hospital’s delineated responsibilities. It should be capable of providing mechanical ventilation, renal replacement therapy and invasive cardiovascular monitoring for an indefinite period, providing appropriate specialty support is available within the hospital. If appropriate specialty support (e.g. neurosurgery, cardiothoracic surgery) is not available within the hospital, there should be an arrangement with a designated tertiary hospital so that patients referred can be accepted for specialty management (including ICU management). Some training and experience in managing critically ill children, preferably with APLS provider status or equivalent, is desirable for medical and nursing staff in rural ICUs. All patients admitted to the unit must be referred for management to the attending intensive care specialist.

Level III
A Level III ICU is a tertiary referral unit for intensive care patients and should be capable of providing comprehensive critical care including complex multi-system life support for an indefinite period. Level III units should have a demonstrated commitment to academic education and research. All patients admitted to the unit must be referred for management to the attending intensive care specialist.

Liaison Nurse
The intensive care liaison nurse is a member of the multi-disciplinary team. The purpose of the role is to assist in the transition of patients from the ICU to the ward, respond to a deteriorating patient in an appropriate and timely manner, and in some instances act as an integral member of medical emergency teams (METs). The liaison nurse will be a senior critical care qualified nurse.

Medical Emergency Team (MET)
Also known as a Rapid Response Team (RRT), the MET is a team of healthcare professionals who bring critical care expertise to an individual.

Nurse Educator
A Nurse Educator is a critical care qualified RN who is accountable at an advanced practice level for the design, implementation and assessment of intensive care nursing education programs, managing educational resources and providing nursing expertise relating to educational issues in intensive care nursing practice.

Nurse Manager
The Nurse Manager (or Nurse Unit Manager/Clinical Nurse Consultant) is a critical care qualified RN who is accountable at an advanced practice level for the coordination of clinical practice and the provision of human and material resources within the ICU.

Patient-centred Care
Patient-centred care refers to the recognition of the patient or designee as the source of control and full partner in providing compassionate and coordinated care based on respect for patient’s preferences, values and needs.
### Table 1. NHMRC levels of evidence

<table>
<thead>
<tr>
<th>Level</th>
<th>Intervention</th>
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</thead>
<tbody>
<tr>
<td>I</td>
<td>A systematic review of level II studies</td>
</tr>
<tr>
<td>II</td>
<td>A randomised controlled trial</td>
</tr>
<tr>
<td>III-1</td>
<td>A pseudorandomised controlled trial (i.e. alternate allocation or some other method)</td>
</tr>
<tr>
<td>III-2</td>
<td>A comparative study with concurrent controls: non-randomised experimental trial; cohort study; case-control study; interrupted time series with a control group</td>
</tr>
<tr>
<td>III-3</td>
<td>A comparative study without concurrent controls: historical control study; two or more single arm studies; interrupted time series without a parallel control group</td>
</tr>
<tr>
<td>IV</td>
<td>Case series with either post-test or pre-test/post-test outcomes</td>
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### Table 2. NHMRC body of evidence matrix

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<tr>
<th>Component</th>
<th>A Excellent</th>
<th>B Good</th>
<th>C Satisfactory</th>
<th>D Poor</th>
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<tr>
<td>Evidence base</td>
<td>Several Level I or II studies with low risk of bias</td>
<td>One or two Level II studies with low risk of bias or a systematic review/multiple Level III studies with low risk of bias</td>
<td>Level III studies with low risk of bias, or Level I or II studies with moderate risk of bias</td>
<td>Level IV studies, or Level I to III studies with high risk of bias</td>
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<tr>
<td>Consistency</td>
<td>All studies consistent</td>
<td>Most studies consistent and inconsistency may be explained</td>
<td>Some inconsistency reflecting genuine uncertainty around clinical question</td>
<td>Evidence is inconsistent</td>
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<tr>
<td>Clinical impact</td>
<td>Very large</td>
<td>Substantial</td>
<td>Moderate</td>
<td>Slight or restricted</td>
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<td>Generalisability</td>
<td>Population(s) studied in the body of evidence are the same as the target population for the guideline</td>
<td>Population(s) studied in the body of evidence are similar to the target population for the guideline</td>
<td>Population(s) studied in the body of evidence differ to the target population for the guideline, and it is clinically sensible to apply this evidence to the target population</td>
<td>Population(s) studied in the body of evidence differ to the target population for the guideline, and it is hard to judge whether it is sensible to generalise to the target population</td>
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<tr>
<td>Applicability</td>
<td>Directly applicable to Australian healthcare context</td>
<td>Applicable to Australian healthcare context with few caveats</td>
<td>Probably applicable to Australian healthcare context with some caveats</td>
<td>Not applicable to Australian healthcare context</td>
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Table 3. NHMRC grades of recommendations

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<tbody>
<tr>
<td>A</td>
<td>Body of evidence can be trusted to guide practice</td>
</tr>
<tr>
<td>B</td>
<td>Body of evidence can be trusted to guide practice in most situations</td>
</tr>
<tr>
<td>C</td>
<td>Body of evidence provides some support for recommendation(s), but care should be taken in its application</td>
</tr>
<tr>
<td>D</td>
<td>Body of evidence is weak, and recommendation must be applied with caution</td>
</tr>
<tr>
<td>E</td>
<td>A comparative study without concurrent controls: historical control study; two or more single arm studies; interrupted time series without a parallel control group</td>
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## APPENDIX C

### BODY OF EVIDENCE

<table>
<thead>
<tr>
<th>Standard</th>
<th>Search Terms</th>
<th>References</th>
<th>NHMRC Levels of Evidence</th>
<th>Consistency</th>
<th>Clinical Impact</th>
<th>Generalisability</th>
<th>Applicability</th>
<th>Grade of Recommendation</th>
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<td>Standard 1</td>
<td><em>Nursing</em> <em>Intensive care</em> <em>Critical care</em> <em>Paediatric</em> <em>Staffing</em> <em>Unit design</em> <em>Pods</em> <em>Single room</em> <em>Infection</em> <em>Patient outcome</em> <em>Patient safety</em></td>
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<td>Good</td>
<td>One or more Level II studies with a low risk of bias or several Level II studies with a low risk of bias</td>
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<td>Most studies consistent and inconsistency may be explained</td>
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<td>Good</td>
<td>One or more Level II studies with a low risk of bias or several Level II studies with a low risk of bias</td>
<td>Reviews 3 Systematic reviews 4 Cohort studies 37 Surveys 7 Qualitative studies 3 Expert opinion 2 Editorials 6 Clinical standards 8 Book chapters 2</td>
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<td>Most studies consistent and inconsistency may be explained</td>
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APPENDIX C

BODY OF EVIDENCE
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<td>Generalisability</td>
<td>Applicability</td>
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<td>*Nursing  *Intensive care *Critical care  *Staffing  *Nurse patient ratio  *Patient outcome  *Patient safety  (64 records, 31 removed)</td>
<td>4, 7, 19, 22, 35, 38, 43, 46-48, 53, 59, 60, 63, 75, 90, 104, 106-108, 140, 150, 164, 177, 193, 194, 197, 203, 206, 211, 212, 218, 226</td>
<td>Good One or more Level II studies with a low risk of bias or SR/ several Level III studies with a low risk of bias Reviews 9 Systematic reviews 3 Cohort studies 4 Surveys 4 Qualitative studies 3 Expert opinion 1 Editorials 4 Clinical standards 5</td>
<td>Good Most studies consistent and inconsistency may be explained</td>
<td>Good Substantial</td>
<td>Good Population(s) studied in body of evidence are similar to the target population for the standard</td>
<td>Good Evidence applicable to Australian healthcare context with few caveats</td>
<td>Grade C Body of evidence can be trusted to guide practice in most situations</td>
</tr>
<tr>
<td>Standard 7</td>
<td>*Nursing  *Intensive care *Critical care  *Defibrillator  *Advanced life support  *Technology  *Technica l Equipment  *Tracheostomy  (38 records, 11 removed)</td>
<td>4, 9, 19, 28, 33, 35, 47, 51, 53, 57, 64, 66, 76, 77, 79, 87, 119, 124, 132, 140, 184, 197, 213, 226, 228, 231, 234</td>
<td>Good One or more Level II studies with a low risk of bias or SR/ several Level III studies with a low risk of bias Reviews 7 Systematic reviews 3 Cohort 11 Survey 2 Qualitative studies 1 Book chapters 1 Clinical standards 2</td>
<td>Good Most studies consistent and inconsistency may be explained</td>
<td>Good Substantial</td>
<td>Satisfactory Evidence not directly generalisable to the target population but could be sensibly applied</td>
<td>Good Evidence applicable to Australian healthcare context with few caveats</td>
<td>Grade C Body of evidence can be trusted to guide practice in most situations</td>
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<td>Standard 8</td>
<td>*Nursing  *Intensive care *Critical care  *Staffing  *Liaison  *Outreach  (51 records, 18 removed)</td>
<td>4, 30, 31, 40, 44, 51, 53, 59, 63, 66, 75, 77, 91-93, 122, 139, 161, 163, 164, 175, 185, 186, 190, 193, 204, 207, 218, 220, 222, 228, 231, 233</td>
<td>Good One or more Level II studies with a low risk of bias or several Level III studies with a low risk of bias Reviews 7 Systematic reviews 3 Cohort studies 13 Surveys 4 Qualitative studies 2 Clinical standards 2 Book chapters 2</td>
<td>Good Most consistent and inconsistency may be explained</td>
<td>Good Substantial</td>
<td>Excellent Population(s) studied in body of evidence are the same as the target population for the standard</td>
<td>Excellent Directly applicable to Australian healthcare context</td>
<td>Grade B Body of evidence can be trusted to guide practice</td>
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<tr>
<td>Standard</td>
<td>Search Terms</td>
<td>References</td>
<td>NHMRC Levels of Evidence</td>
<td>Consistency</td>
<td>Clinical Impact</td>
<td>Generalisability</td>
<td>Applicability</td>
<td>Grade of Recommendation</td>
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<td>Standard 9</td>
<td>*Nursing *Intensive care *Critical care *Staffing *Research *Priorities (81 records, 60 removed)</td>
<td>4, 24, 30, 31, 40, 43, 46, 51, 52, 55, 63, 78, 87, 106, 127, 145, 190, 220, 227, 240, 242</td>
<td>Good</td>
<td>One or more Level II studies with a low risk of bias or SR/ several Level III studies with a low risk of bias</td>
<td>Reviews 4, Systematic reviews 1, Expert opinion 1, Cohort studies 8, Qualitative studies 3, Clinical standards 2, Book chapters 1</td>
<td>Good</td>
<td>Substantial</td>
<td>Good</td>
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<td>Standard 10</td>
<td>*Nursing *Intensive care *Critical care *Staffing *Non nursing work *Non direct care *Patient outcome *Patient safety (30 records, 7 removed)</td>
<td>2, 4, 5, 22, 37, 48, 49, 54, 61, 62, 99, 117, 128, 130, 138, 148, 170, 182, 192, 226, 235, 239, 244</td>
<td>Good</td>
<td>One or more Level II studies with a low risk of bias or several Level II studies with a low risk of bias</td>
<td>Reviews 6, Systematic reviews 1, Cohort studies 11, Surveys 1, Clinical standards 3, Book chapters 1</td>
<td>Good</td>
<td>Substantial</td>
<td>Good</td>
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