

**British Association of Critical
Care Nurses**

**Position Statement On Nurse-Patient
Ratios In Critical Care**

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Summary

- The one to one nurse patient ratio has been the gold standard for intensive care since it was first advocated in 1967
- Intensive care is expensive and nursing costs account for a significant proportion of the total health care budget
- Critical care staff are seeking support to validate the quality and quantity of the resources required to provide safe standards of care
- This paper aim of this paper is to present the position statement on nurse patient ratios for critical care, and address some of the key owkr which was used to inform the development of the statement

Key Words;

Critical Care, Nurse-Patient Ratios, Research evidence

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BACCN Position

- Every patient must be cared for in an environment which best meets their individual needs.
- It is the right of every patient in a critical care unit to be cared for by a registered nurse.
- Every critically ill patient should have immediate access to a registered nurse with a post registration qualification in their specific speciality.
- There should be a congruence between the needs of the patient and the skills and knowledge of the registered nurse delivering that care.
- Unconscious, ventilated patients should have a minimum of one nurse to one patient.
- The nurse-patient ratio within any critical care area should not go below 1 nurse to 2 patients.
- Severity of illness scores, dependency scores, and nursing workload measurements should not be used solely for the purpose of determining nurse patient ratios.
- Flexible strategies should be employed to ensure that the fluctuating demands of the patient are met.

Background

Intensive care has largely developed in response to the developments and advancement of medical technology and interventions. This is most graphically demonstrated through historical analysis of the polio epidemic in Denmark in the 1950's, where there were too few iron lungs available. A technique used in the operating theatre was transferred to manage these patients in specific environments with constant monitoring by medical and nursing personnel, with dramatic reductions in mortality rates (Audit Commission

1999). Hind et al (2000) have observed that since this time, there have been major advances in the technological aspects of patient care, which has resulted in the ability within specialised units to support or replace temporarily the failing vital functions of organs. These advancements have simultaneously necessitated the development of a specialised nursing workforce, who are responsible for the care and management of patients within these specialised environments (Rapin 1987, Hind et al 2000).

The one nurse to one patient ratio in intensive care has been the gold standard since it was first advocated by the British Medical Association working party (BMA 1967). Subsequent publications have continued to endorse this view (Mackinnon *et al* 1998, Intensive Care Society 1997, Department of Health 1996, Royal College of Anaesthetists 1996). However, intensive care is expensive (Beattie and Caplin-Davies 1999), and nursing costs account for a significant proportion of the total health care budget (Metcalf and McPherson 1994). The high cost, coupled with the continued shortage of intensive care trained nurses, has led to a national review of patient care practices (Audit Commission 1999). Managers of health care resources are seeking evidence to justify and support the one to one nurse patient ratios, and manpower managers are looking for alternative ways to manage the complexities of critical care patient workloads (Hind *et al* 2000, Pratt 1999).

Many critical care service providers are being asked to address nurse patient ratios, and care practices, to find alternative solutions. This has recently been endorsed in work undertaken by the Audit Commission's (1999), and the critical care national expert group (DoH 2000). Both of these policy documents stipulated the need for more flexible working practices to meet the current and future demands of critical care. In some cases critical care practice frontiers are being expanded, with innovative and workable solutions (Pratt 1999). However, increasingly BACCN membership have been voicing their concerns about the pressure of working with less than desirable nurse-patient ratios, and their subsequent inability to cope with the multiple demands of the critically ill.

Critical care staff are seeking support to validate the quantity and quality of the resources required to continue to provide safe standards of care, and maintain acceptable outcomes for the patients and their families. The BACCN, as one of the main

national organisations for critical care nurses in the United Kingdom, representing over three thousand members, perceive that it is their responsibility to provide support to the membership through the formulation of this position statement.

Literature Overview

A wide range of available databases was searched in order to gather evidence to facilitate the development of an informed perspective in the evolution and development of this position statement. These included; Medline, CINAHL, Cochrane database, Department of Health database, the ENB database and the National Research Register. The search of all these databases did not reveal any empirical evidence which could be directly used to demonstrate the most appropriate nurse to patient ratios for both intensive and critical care units. Therefore, the available literature was critically evaluated in order to inform the development of the BACCN Position Statement.

Nurse-Patient Ratios

In seeking to understand the relationship between discrete aspects of critical care practices, and nurse patient ratios, there are a number of research studies available which can be used to inform the debates surrounding this area. Managing and supporting the transition of patients from mechanical ventilation is perceived to be one of the pivotal roles of the critical care nurse (Endacott 1996). Thorens *et al* (1995) investigated the impact of reducing nurse patient ratios, and time taken to wean patients from mechanical ventilation in patients with chronic obstructive airways disease. Although this study was not based explicitly on a one to one nurse-patient ratio, its outcomes revealed that when the nurse patient ratio was reduced, there was a dramatic increase in the time taken to wean patients. A reduction in nurse-patient ratios has also been demonstrated to have an adverse effect on nosocomial infection rates (Archibald *et al* 1997), patient re-admission rates, complications, medication errors, wound infections, patient injuries and patient deaths, when there was a reduction in registered nurses providing direct patient care (Agency for Health Care Policy Research 1999). Similarly, Kovner and Gergen (1999) found that patients who have surgery in hospitals with fewer registered nurses per patient run a greater risk of developing avoidable complications such as, urinary tract infections, pneumonia, thrombosis, and other pulmonary complications.

Some exponents of a reduced nurse to patient ratio in intensive care have used the argument that sophisticated monitoring equipment enables such a reduction. Monitor alarms may be seen as a replacement rather than an adjunct to expert nursing surveillance. However, in a study undertaken in Australia, the investigators found that the majority of incidents (83%) were detected by personnel visually checking the equipment, patient, or chart. Monitor detection accounted for only 8% of critical incident reports (Beckman *et al* 1996). Similarly, in a study undertaken in Hong Kong ICU's, it was found that 51% of incidents were detected by direct observation, versus 27% by monitor detection (Buckley *et al* 1997). This led the investigators to conclude that despite the advances in technological expertise, there was still no substitute for the properly trained professional providing direct patient care (Buckley *et al* 1997, Mackinnon *et al* 1998)

The need for constant observation of vulnerable critically ill patient was highlighted in the case of Adomako ([1993] 4 all ER 935, cited in Langslow 1996). This case centred on a patient becoming disconnected from the ventilator, whilst under anaesthetic, for eye surgery. The subsequent debate provided a platform for the discussion of safe practices for the anaesthetised patient, and it was agreed that it would be a gross breach of duty for an anaesthetist to leave a patient unattended during an operation. (Langslow 1996). From this case inferences have been drawn regarding the level of monitoring and observation required for patients who are intubated and mechanically ventilated (Langslow 1996, Mckinley 1997, Mackinnon *et al* 1998). Mackinnon *et al* (1998) argue that as it is common practice to have one registered nurse per patient per shift in both United Kingdom and Australian ICU's, as a basis for patient safety. To deviate from this standard, could potentially put the patient at risk from respiratory and cardiac arrest if accidental extubation or disconnection from mechanical ventilation occurred. In these cases, as a deviation from common practice had occurred, then a strong case could be made for legal redress.

The ramifications of inadvertent disconnection of patients from mechanical ventilation was highlighted in the Von Stentina case in the United States (Oddi and Huerta 1990). Von Stentina suffered severe brain damage whilst a patient in Intensive Care Unit, due to ventilator malfunction or disconnection. At the time of the incident the ICU had a nurse patient ratio of 1:4 for 12 patients. This decrease in nurse patient ratio was due to the

admission of five additional patients during the course of one shift. During this shift Von Stentina became disconnected from mechanical ventilation, which resulted in hypoxic brain damage. The hospital was subsequently found guilty of negligence, and Von Stentina awarded in excess of \$12 473 250 in damages. In this case there was no attempt to prove that the nurses callously or even negligently ignored the patient as they were able to prove that every available nurse was actively involved in the delivery of necessary care to patients (Mackinnon *et al* 1998). Nevertheless, it highlights the very real dangers for patients of a reduction in nurse-patient ratios, and the potential financial penalties that may be placed upon Trusts if nurse-patient ratios are compromised.

Dependency Scoring Systems

In analysing the appropriateness of identifying optimal nurse to patient ratios, the use of dependency or severity of illness scoring systems may provide the means to facilitate this process. However, there are a number of deficits in using these tools as it is widely accepted that they do not reflect the totality of the nursing workload within critical care environments (Large *et al* 1991, Arthur 1994, RCN 1995, Campbell *et al* 1995, Dickie *et al* 1998). Although there have been a considerable amount of work undertaken within this area, evaluation and development of appropriate tools for the measurement of nursing workload is very much within its embryonic stage, and aimed at an individual unit level.

In the UK, the latest development is the System of Patient Related Activities (SOPRA), which shifts the focus from interventions to activities related to the patient and their family (Intensive Care National Audit and Research Centre 1999). The system was developed through professional consensus and offers a tool which begins to meet the challenges of measuring nursing workload appropriately, but has yet to be validated through empirical study.

Of further interest in the analysis of research surrounding the utilisation of patient dependency scoring systems, is the findings of a study by Garfield *et al* (2000), who investigated the use of TISS 28 (Miranda *et al* 1998), within the high dependency environment. The aim of the study, conducted within the Norfolk and Norwich Hospital was to investigate whether the recommended nurse-patient ratio for High Dependency Units (HDU's), of one nurse to two patients was accurately reflected in the workload.

Study data, including age, sex, type of admission, source of admission, APACHE II (Knaus *et al* 1985) diagnostic category, length of stay, and TISS 28 (Miranda *et al* 1996) score was recorded on a total of 407 admissions over a seven month period. Interpretation of the data led the investigators to the conclusion that a nurse-patient ratio of two nurses to three patients, was a more accurate reflection of the workload generated within this study.

European and International Comparisons

In seeking to address appropriate levels of nurse-patient ratios in critical care in this country, comparison with countries in Europe and America is often undertaken. There are recognised differences in nurse-patient ratios in these countries, compared to Britain. However, whilst undertaking these comparisons a number of differences make interpretation of this data difficult. As observed by Endacott (1996), it has long since been recognised that the role of the nurse in intensive care within this country is distinct from other countries. With these role distinctions being further augmented by changes in traditional role boundaries influenced by social, political and professional policy developments. Nurses within intensive care are seen to add to their core skills and develop practice to facilitate a more responsive approach to the changing demands of critically ill patients (Hind *et al* 1999, Cox and McGrath 1999, Goodfellow 1997). These perspectives are supported by a recent survey undertaken by the Royal College of Nurses (1997), which demonstrated that nurses within intensive care had increased responsibility for both the management and organisation of patient and health care practices.

Case Mix Variables

In seeking to address appropriate nurse-patient ratios, the actual acuity or severity of illness of the patient has to be taken into account within these equations for any meaningful utilisation of data. There is evidence to suggest that patients cared for within ICU's in the U.K are more severely ill than those in many other countries including Europe, America and Canada (Edbrooke *et al* 1999, DoH 1996, Bion 1995). A recent international study of critical care practices revealed that the UK not only had one of the fewest number of critical care beds, but reinforced the perspective that patients cared for in the UK's critical care units were sicker than their European counterparts. It was also demonstrated that the UK had one of the lowest number of critical care beds per

hospital population, with significantly less medical staff (Edbrooke *et al* 1999). These are all factors which need to be considered in relation to the analysis of optimal staffing levels within these different environments.

The Use of Health Care Support Workers

National problems in recruiting and retaining appropriately trained staff within critical care units has inevitably led to the debate surrounding the development of the role of health care support workers within this specialist environments. The Canadian Association of Critical Care Nurses (CACCN) issued a position statement on the use of non-regulated health care personnel in critical care environments, following concerns that health care assistants were being employed to provide direct patient care (CACCN 1999). Early anecdotal reports were promising regarding the employment of support workers, and the cost effectiveness of patient care. However, this was challenged by research which consistently demonstrated that the care provided by registered nurses could reduce mortality and morbidity rates, decrease lengths of stay and lower re-admission rates (CACCN 1999). Following evaluation of this evidence, the CACCN (1999) recommended that non-regulated support workers should not be employed to provide direct patient care.

The Intensive Care Society (1997) suggested that although health care support workers may be employed within critical care environments to assist nursing staff in performing non nursing duties, the introduction of these staff should not be allowed to reduced skill mix to an inappropriate level for the delivery of patient care. Furthermore, as observed by Mackinnon *et al* (1998), the use of health care support workers may in-fact impact negatively on the workload of registered nurses, due to the requirement for supervision.

Hind *et al* (2000) undertook an exploratory study of the potential role for health care support workers in critical care, and attitudes of nursing staff to the development of this role. Data was collected from a wide variety of personnel including nursing staff, support staff and consultant anaesthetists through focus groups and qualitative interviewing. A common theme that developed within the study was the need for shared learning and continuing education for all staff, including the support worker if that role was to be introduced. The findings from the study suggested that the role of the health care support worker in the critical care setting was viable, and it was a role which would

be supported by the majority of nursing staff. However, it was clear that any such role development would only function within defined parameters, with specific training programmes attached to the role to ensure its effectiveness. With the majority of direct patient care activities remaining within the remit of the registered nurse (Hinds *et al* 2000).

Conclusion

This review of the available literature on the nurse patient ratios within critical care has demonstrated that there is no substantive research literature which can be used to inform nurse-patient ratios. However, the BACCN has attempted to undertake a critical review of this literature in order to develop a meaningful position, which can be used by both users and providers of critical care services. It is not intended to be overtly prescriptive, but reinforces the core beliefs and values of the BACCN, which centres on the needs of critically ill patients and their families and their right, to receive the highest standard of care and attention during both their period of critical illness and beyond. An overriding belief of the BACCN is that nurses within critical care are in a unique position, not only to deliver that care, but also to enable the process by which staffing level decisions are made.

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Glossary of Terms

Critical Care Environment

An environment specifically staffed and equipped for the continuous monitoring, observation and care of individuals with a critical illness.

Intensive Care Unit.

An intensive care unit is a designated area offering facilities for the prevention, diagnosis and management of patients with more than one system organ failure.

High Dependency Unit

High dependency care is a level of care intermediate between that available on a general ward and that on an ICU. A high dependency unit should be able to provide monitoring and support to patients with, or at risk of developing acute or acute on chronic single organ failure. It should not manage patients requiring multiple organ support or mechanical ventilation

Critically Ill Patient

A critically ill patient is an individual who requires continuous observation and intervention to prevent complications and restoration of health where possible. The critically ill patient is characterised by the presence or potential for life threatening illness.

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