



Determining Nurse to Patient Ratios in New Zealand Emergency Departments

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Introduction

An Emergency Department (ED) provides a clinically integrated 24 hour service that is part of a secure pathway from pre-hospital to definitive care (National Service Specifications for NZ Emergency Departments, 2002 [NEDSS]). New Zealand EDs are rated from level 2 through to level 6 based on the range of services provided. All levels of ED are required to be able to offer resuscitation services (NEDSS). Resuscitation is considered a normal part of the spectrum of ED care which requires a high level of preparedness.

The College of Emergency Nurses New Zealand, NZNO (CENNZ) has established a formula that can be used to calculate nursing staff levels for EDs. The formula is based on achieving safe minimum staffing levels for the provision of nursing care in New Zealand Emergency Departments.

Section one details the formula, section two; how to apply the formula to each level of ED and section three; key definitions used in the document.

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Section One: The formula to establish the nurse to patient ratio

The ED nurse:patient ratio formula is based on the requirements outlined in the Ministry of Health National Service Specifications for Emergency Departments, (2002). The basic premise behind the formula is that when average acuity is combined with average occupancy it is possible to predict average daily staffing needs for an ED. The longer the length of stay, the more nursing time will be required in the care of the patient (Ray, Jagim, Agnew, Ingalls McKay and Sheehy, 2003 2003)

Basic assumptions underpinning the formula

1. Average acuity + average occupancy = base nursing staff level
2. The minimum nurse:patient ratio of immediately available staff is 1:3
3. The minimum number of nursing staff required to safely manage the nursing component of a resuscitation situation is 3.

(Ray, et.al. 2003)

Using acuity based patient categories

The most accurate determinant of the amount of nursing care required is patient acuity. ED patients can be broadly defined into 4 acuity categories (which are similar, but more refined than Australasian Triage Scale (ATS)(Australasian College of Emergency Medicine, 2000) categories¹) and it is possible to attach base ratios to these categories.

Table 1: acuity categories and base ratios

Acuity Category	Nurse:patient ratio
▪ Critical (ATS Cat 1)	3:1
▪ High risk or has time critical needs (HRTC) (ATS Cat 2)	1:2
▪ Stable (ATS Cat 3 / 4)	1:3
▪ Minor (ATS Cat 4 / 5)	1:4

(New Zealand Nurses Organisation, 2003)

¹ Why not use triage scoring to determine acuity?

There is currently no effective acuity tool in use in NZ EDs. Triage scoring is not a sufficiently sensitive tool to be used as a predictor of ongoing acuity during the ED episode and should not be used for this purpose.

The acuity based ratios in table 1 reflect safe levels of nursing care. However ED occupancy can change dramatically over short periods. Therefore the ability to flex the ratios upward for short periods is considered acceptable while contingency plans are invoked. However, sustaining the ratios at the upper end of the flex will compromise patient safety. Table 2 outlines the acceptable flex ratios for each patient category.

Patient acuity category	Flex ratio
Critical	3:1
High risk: Time critical (HRTC)	1:2 - 1:3
Stable	1:3 - 1:4
Minor	1:4 - 1:6

Example: The ratio for an HRTC category patient is 1:2. This can be reasonably extended to 1:3 for a short period while further nursing support is organised.

It is imperative that EDs have workable plans to manage periods where the base ratio cannot be sustained. Once the 1:3 ratio has been exceeded for a continuous period of 2 hours or at any time when the senior nurse and senior doctor present agree that acuity exceeds staff resource to a level that compromises patient safety **facility overload** is deemed to have been established and the facility overload plan must be invoked.

Establishing average acuity

While there are four clear categories of patients, the current profile of most NZ EDs cluster acuity around the HRTC and stable categories (ie critical and minor form a small part of the workload). Therefore for the purposes of calculating staffing needs, these two categories (HRTC and stable patients) have been considered to reflect the average acuity of an ED patient.

When you average the nursing needs of the HRTC and stable categories (including the flex ratio) you arrive at a base ratio of 1 nurse available (on the floor for the

purpose of direct patient needs) for every 3 patients in the department; this is the figure that is used in calculating the nursing needs. **Base ratio = 1:3²**

Determining the average daily workload peaks

Due to the extreme variations in day to day occupancy that occur in EDs it is accepted that it is not feasible to staff for unexpected peaks. Staffing should be based around average daily peak occupancy adjusted to the 85th percentile. This figure is reached by calculating the average occupancy (averaged over 12 months), adjusted to the 85th percentile at 1200hrs, 1800hrs and 2400hrs. This should reflect the **average daily workload peaks** for an ED over the three shifts.

Applying the occupancy: acuity formula

The average daily workload peaks are applied to the average acuity ratio of 1:3 to determine the required staffing level. The Victorian (Australia) nurses have a business agreement to have a ratio of 1:3 in their Emergency Departments (Victorian Government, 2004)

Example: average daily workload peak at 1200hrs = 24 patients

24 patients at a 1:3 ratio = 8 nurses available for direct patient care on this shift.

The non-direct roles (triage and co-ordination) are then added to this number, according to the level of the ED (see section 2) to reach the total staffing requirement for the shift (NZNO, 2003, and Ray, et. al, 2003).

Example: 8 nurses required for direct patient care plus 1 co-ordinator and 1 triage nurse = **10** (level 5 and 6 facility)

Would the use of health care assistants influence the 1:3 ratio?

The cornerstone of the role of an ED nurse is skilled surveillance and observation of patients with undiagnosed illness or injury. Therefore when health care assistants are added to the skill-mix, while this may significantly enhance the comfort of patients and support specific tasks, it will not replace the safety net that is

² The 1:3 ratio is an **average** and does not imply that each nurse will carry a workload of 3 patients. Patients with critical needs will require up to 3 nurses. HRTC patients require a 1:2 ratio. A nurse caring for minor patients may have a 1:5 ratio.

provided by the qualified registered nursing staff. Therefore the 1:3 ratio is considered the minimum level for providing safe care to patients.

Section Two: Applying the formula to the Level of the ED

CENNZ believes that a continuous core staff of two Registered Nurses at all times was the minimum number of Registered Nurses needed to be continuously present in order to function safely 24 hours a day, 7 days a week (Ray, et.al. 2003)

Level Two Emergency Departments

The NEDSS states that *Emergency care must be available 24 hours a day and Emergency Departments that are not fully staffed continuously must establish appropriate systems to ensure that appropriate staff are available in the unit when the patient arrives and that all levels of ED are required to be prepared to manage resuscitation.*

Level two EDs should calculate their ratios based on the occupancy:acuity formula. Where the occupancy average is below 9 the department must be able to demonstrate a contingency plan that allows for 3 nurses to be **immediately available** to the department to allow for resuscitation episodes. The ED must also have a workable plan to cover **facility overload**. Level two EDs who have less than 5000 attendances per year should be able to incorporate the support functions of triage, co-ordination and resuscitation in the **on the floor** staffing matrix.

Single nurse staffing is unsafe for both the patient and the staff (Ray, et.al. 2003).

Level Three Emergency Departments

Level three EDs should use the occupancy:acuity formula to establish base staffing levels and should also provide dedicated clinical co-ordination and triage roles for a minimum of 16 hours a day, 7 days a week. Where the occupancy average is below 9 the department must be able to demonstrate a contingency plan that allows for 3 nurses to be **immediately available** to the department to allow for resuscitation episodes. The ED must also have a workable plan to cover **facility overload**.

Level Four Emergency Departments

Level four facilities should use the occupancy:acuity formula to establish base staffing levels, and must also provide dedicated clinical co-ordination and resuscitation roles at least 16 hours per day, 7 days a week and a dedicated triage role 24 hours per day, 7 days a week (Ray, et.al. 2003). The department must also have a workable plan to cover **facility overload**. **On the floor** numbers must be maintained at a minimum of 3 at all times.

Levels Five and Six Emergency Departments

Level five and six facilities should use the occupancy:acuity formula to calculate base staffing levels, and in addition provide dedicated clinical co-ordination, triage and resuscitation roles 24 hours per day, 7 days a week. The department must also have a workable plan to cover **facility overload**.

Support roles for all levels of ED

In addition to the above roles, all departments must factor into their staffing matrix non-clinical **support** nursing roles as outlined in the NEDSS.

Section Three: Key Definitions

Immediately available means staff who are either physically present in the ED or able to respond at short notice from another part of the facility. It does not refer to staff on-call outside the facility.

On the floor means staff who are physically present in the ED for the primary purpose of the provision of direct patient care.

Facility overload is deemed to have been established when the 1:3 ratio has been exceeded for a continuous period of 2 hours or at any time when the senior nurse and senior doctor present agree that acuity exceeds staff resource to a level that compromises patient safety.

Support roles refer to nursing roles and activities that are not directly clinical. Examples would include Nurse Educator, Nurse Consultant and administrative components of the nursing function.

References

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