

NURSE WORKFORCE PLANNING for LEVEL 3 Paediatric Critical Care Units (PICU)

Factors affecting Workforce Planning

A number of complex algorithms can be adopted to calculate the number of qualified nursing staff required to staff one level 3 critical care bed (Paediatric Intensive Care Society, 2015).

The RCN (2013) recommends a minimum of 25% uplift to nursing establishments to cover annual leave, study leave and sick leave (maternity leave is not included in this calculation). Within level 3 critical care environments there are additional specific pressures which also need to be considered when calculating overall nursing establishments, including some of the following which may result in increasing the nursing establishment above the base recommended level;

- With the introduction of Agenda for Change there were changes to the annual leave allowances for nursing staff. The nature of critical care nursing may attract more experienced practitioners who qualify for the higher levels of annual leave and this must be taken into account when agreeing of WTE required per bed. The majority of PICU's have good staff retention and thus staff will accumulate additional annual leave.
- As a consequence of the continued expansion of children's critical care services throughout the UK and the number of inexperienced and often newly qualified nurses recruited require close supervision and mentorship over varying periods of time.
- Skill mix and level of experience of the overall nursing workforce need to be taken into account.
- The number of beds, single rooms and the geographical layout of the unit needs to be considered.
- The average acuity of patient mix using PICS Standards 2015 Levels of Care.
- Ever increasing technology at the bedside requires additional study time, assessment and ongoing updates.
- Predominantly a young female workforce resulting in proportionality high maternity leave and ongoing child care needs.
- The number of part time staff within the total nursing workforce who need to undertake the same mandatory and statutory training and their full time counterparts.

The following algorithm sets out one example and is summarised Table 1.

Effect of Annual Leave and Bank Holidays

1WTE = 37.5 hrs/week x 52 weeks = 1950 working hours a year

Annual leave = 30 days x 7.5 hrs = 225 hrs (30 days taken as an average allowance)

Bank Holidays (8 days) = 8 x 7.5 = 60 hrs

Total available to work = 1950 hrs less (225 + 60) hrs. = 1665 hrs per year

Therefore, **Annual Leave and Bank Holidays accounts for 15% 'deficit'**.

Shifts available = 1665hrs divided by 11.5 hours (most PICU's nursing staff work long days) =
144.7 Shifts per year

Therefore, the **number of qualified nurses required to staff 1 critical care bed** over the 24hr period over 365 days is:

2 shifts/24 hrs x 365 days of the year = 730 shifts per bed year

Divide this by the shifts available per WTE = $730/145 = 5.04$ WTE per critical care bed

This calculation **only allows for annual leave**, it does not allow for; study leave, mandatory and statutory training, maternity, special leave or for a nurse in-charge and/or supervising nurse/s on each shift. This should be additional.

Supervising Nurses

The effect of including a nurse in-charge can be expressed as 0.5 WTE. Additionally many larger units (8 bed plus) or those PICUs with a higher than average acuity of patient mix require an additional nurse to support and supervise more junior and inexperienced nurses, this has also been calculated as 0.5WTE per bed.

Therefore, 5.04WTE plus 1 WTE = **6.04 WTE**

Statutory and Mandatory Training

It is necessary to include various forms of ongoing educational activity, Trust Governance Training & CPD. Study leave, based on the average minimum amount of Mandatory and Statutory training – 2.5 days each year and Professional leave – 2.5 days each year, equates to approximately **5% WTE**. The percentage of part time nurses within the total nursing establishment needs to be taken into consideration who need to undertake the same mandatory and statutory training. Additionally there is a need to provide more specialist ongoing training on advanced forms of treatments for example CVVH, ECMO/ECLS. This can equate to an additional **2%WTE** thus it is more realistic to expect training and ongoing education to be set at **7%WTE**.

Sickness and Maternity Leave

Research has shown average sickness per WTE over the year appears to be in the region of a further **5% per WTE**. This figure calculated from work undertaken by the PIC NHS London Consortia (2007) benchmarking PICU's across London. The figure has remained static.

Special Leave i.e. paternity/cares/compassionate equates to a **further 1%** of the workforce over the year.

Adding this **11%** to the 6.04WTE total comes to: $6.04 + 11\% = 6.7$ **nurses per critical care bed**. **There should also be a factor of 5% for maternity leave (in some areas of the country depending on age profile may be higher for example in the West Midlands maternity leave is consistently around 7%) taking the minimum WTE per bed to 7.01.**

This calculation does not include an allowance for special study leave, to undertake intensive care courses and other specialist training e.g. Renal Replacement Therapy, ECMO/ECLS courses for

example. Neither does it compensate for new staff who require varying periods of orientation and supervision by a more experienced practitioner.

In summary the minimum number of qualified nurses required to staff one level 3 critical care bed is, therefore, a minimum of 7.01WTE.

Additional Supernumerary Workforce

Any agreed algorithm used to calculate the number of whole time equivalent should not include; the Senior Nurse/Matron, Research and Audit nurses, Nurse Consultant or any nursing staff employed in clinical education as their main responsibility. However, all should maintain clinical competency and credibility.

Neither should the figure include ancillary staff e.g. Housekeeper, data clerks, PIC technicians etc. and Health Care Assistants/Nurse Assistants equally should not be used in any calculation.

New emerging roles such as the Associate Practitioner or a Nurse Associate and Apprentice Nurse, which may make a valuable contribution to the totality of the nursing workforce, need to be carefully evaluated. The responsibility for direct patient care always lies with the Registered Nurse.

The ratio of registered to unregistered staff across the level 3 critical care workforce should exceed 85:15, respectively.

Effect of Case mix & Skill Mix

It is difficult to make any recommendations regarding skill mix that meets the needs of all PICUs. There are numerous factors that influence skill mix; size of unit, geographical location within the UK, difficulty in recruitment and retention to this exacting speciality and acuity of patient mix, to name but a few. However, there is agreement that all PICUs should have a senior and experienced practitioner to co-ordinate and supervise less experienced nurses to ensure high quality care over the 24 hour period with a Registered Nurse (sub part one, Children) at a Band 7 or above and that all units should be managed overall by a Senior Nurse/Matron, Band 8a or above. **This recognises that the senior nurse has a complex role managing both managerial and clinical leadership responsibilities.**

Summary – as worked example (Table 1):

A PICU with 15 beds with nurses working a 2 shift/day roster (24 hours), each nurse working 3 - 4 days or nights per week. The mean dependency on the unit is 1.0 nurses per patient per shift and the average occupancy is 80%. The unit uses resource nurse, that is nurses with no allocated patient who check drugs and infusions, help set up equipment, assist with more dependent patients, cover meal breaks and provide supervision.

Row No.	Category	Formula	Column B
1	Mean dependency (nurse/patient ratio 1:1)		1.0
2	Number of nursing shifts per day		2
3	Number of days worked per nurse per week		3.12
4	Allowance of annual leave 15%, sickness 5% study leave 5%, maternity leave 5%, special leave 1% (total 31%). Depending on age profile of workforce may need to allow additional allowance for maternity leave.	26% + 5% (Factor =1.31)	

5	Number of beds in unit		15
6	Number of beds per nurse resource (1 nurse resource) 7/8 beds, however, depending on the geography of the unit may be less.		8
7	Number of WTE <i>bedside</i> nurses/bed	$B1 \times B2 \times (7/B3) \times B4$	5.87
8	Total number of nurses (includes 1 in charge per shift and runners as described in 6)	$(B7 \times B5) + (B7) + [(B5/B6) \times B7$	105
9	Total number of bedside nurses	$B7 \times B5$	88
10	WTE of bedside nurses per bed at capacity	$B9/B5$	5.87
11	Overall number WTE per bed at capacity (includes 1 in charge per shift and runners)	$B8 \times B5$	7.06

Conclusion

It is recommended that a ratio of a minimum of **7.06 nurses per bed critical care bed** is used to calculate the Nursing Establishment for Level 3 PICU's.

References

PIC NHS London Consortia (2007) **Benchmarking PICU's across London** – document no longer available for reference

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