An operational neonatal patient acuity tool for measuring clinical dependency of each infant on a unit

This article discusses the development and introduction of an operational 'neonatal patient acuity tool', which enables staff to measure the level of clinical dependency of each infant and use that measurement as the foundation for a risk assessment that is linked to the number of nurses available on each shift. Since its conception the neonatal patient acuity tool has been rolled out to all neonatal units in Wales by the Wales Neonatal Network.

Wendy L. Davies
RGN, RM, ENB 405
Lead Nurse, Wales Neonatal Network
Welsh Health Specialist Services Committee
wendy.davies3@wales.nhs.uk

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Key points

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1. The neonatal acuity tool is based on appropriate recognised neonatal clinical indicators.
2. It highlights when the level of patient clinical dependency is escalating to support active bed and staffing management.
3. The risk assessment tool can by regularly updated by nursing staff to reflect clinical changes and is linked to the number of staff on each shift.
4. The tool is allied to a neonatal escalation policy.

Developing a neonatal acuity tool

In 2009, the neonatal intensive care unit (NICU) at Singleton Hospital, Swansea, and the local neonatal unit (LNU) at the Princess of Wales Hospital, Bridgend, became part of Abertawe Bro Morgannwg Health Board (ABM HB). It was recognised that it was essential to have one risk assessment tool that could measure patient safety across the two sites. The aim was to develop an assessment tool that could measure the levels of patient clinical dependency and escalation of cot capacity, thereby enabling contingency plans to be put in place and keep both units operational.

The neonatal patient acuity tool was introduced as a pilot in July 2009 and was based on recognised neonatal clinical indicators namely, the British Association of Perinatal Medicine (BAPM) *Standards for Hospitals Providing Neonatal Intensive and High Dependency Care and Categories of Babies Requiring Neonatal Care* (2001).[1] This document describes the standard of care that infants should receive and the designations of categories of neonatal care with associated minimum staffing levels. The three categories of care are:

1. **Intensive care** – Those infants that require the most complex care and need 1:1 nursing by a nurse with a neonatal qualification
2. **High dependency care** – Where an infant does not fulfil the criteria for intensive care, but needs 1:2 (nurse:patient) nursing by a skilled nurse
3. **Special care** – For infants who require additional care but do not fulfil the criteria for intensive or high dependency care; a nurse should not be responsible for more than four infants.

The neonatal acuity tool is now fully embedded into practice across both units and enables nursing staff to:

- measure and record the level of dependency of care being given to each infant
- record the nurse staff available on each shift
- use these measurements as the basis of a risk assessment that links patient activity to staff levels
- produce an acuity score that reflects the level of risk on the unit
- link to a neonatal and maternity escalation policy to ensure good communication between both specialties at periods of peak demand for either service.

Patient acuity score calculation

The neonatal acuity tool requires a baseline acuity score that is individual for each neonatal unit. This is calculated by adding together the number of cots at the designated level of dependency using a point scoring system:

Cot dependency level	Number of cots	Point score per cot	Acuity score
Intensive	7	1	7
High dependency	4	0.5	2
Special care	11	0.25	2.75
Total	**22**		**11.75**

FIGURE 1 Calculating the baseline patient acuity score at Singleton Hospital.

Singleton Hospital level 3 unit					**Neonatal daily status acuity tool collection form**							
Date												
Levels of care – BAPM standards												
	Intensive care Level 1 score 1 1:1	High dependency care Level 2 score 0.5 1:2	Special care Level 3 score 0.25 1:4	Total number of infants	Number of staff	Patient acuity score Singleton baseline score = 11.75	Staff number am pm night			Patient acuity	Cot acuity **22 cots**	Unit status
AM	4	6	8	18	9	9	Co-ordinator				77%	82%	Green
PM							Band 7	1					
12 midnight							Band 6	4					
							Band 5	3					
							Band 4	1					

FIGURE 2 An example of a neonatal daily status acuity tool collection form. Designed by W. Davies and S. Acott, 2009.

- each intensive care cot scores 1
- each high dependency cot scores 0.5
- each special care cot scores 0.25

The baseline acuity score for the NICU at Singleton Hospital was calculated at 11.75 (**FIGURE 1**) and the Princess of Wales Hospital at 4.75. This individual acuity score reflects cot use when every cot is used at the correct level of patient dependency.

Using the assessment tool

The neonatal acuity tool also assesses the number of nurses required to provide high quality patient care to infants, according to BAPM standards and categories of care.[1]

At the beginning of each nursing shift the nurse in charge undertakes a risk assessment using the neonatal acuity tool. Two pieces of information are required to undertake the risk assessment.
1. The total number of infants on the unit
2. The level of clinical dependency of each infant using BAPM's three categories of care.

Each infant is assessed and scored according to their level of clinical dependency; points for each infant are added together to obtain the unit daily patient acuity score. For example, if the unit has four intensive care infants, six high dependency infants and eight special care infants, the patient acuity score is 9. This score reflects patient activity and is linked to staff levels; it reflects the number of nurses required to care for that level of patient activity on the unit.

This information is entered onto the 'neonatal daily status acuity tool collection form' (**FIGURE 2**). The patient acuity score is then divided by the unit baseline acuity score and the result expressed as a percentage that is linked to a neonatal escalation policy.

The neonatal escalation policy has four levels of escalation and uses a traffic light system to highlight unit capacity status (**FIGURE 3**). It is important to note that when escalation increases, each case is individually risk assessed and communication is increased between the labour ward and neonatal staff.

The neonatal daily status acuity tool collection form is updated three times a day in line with nursing shift patterns and more frequently if patient clinical activity or cot capacity escalates. The patient acuity tool also calculates the number of nurses required on each shift and supports the need for additional resources to maintain a safe service. This form is emailed daily to the Directorate Management Team so they are aware of the current status of both units and any potential capacity or staffing pressures that could trigger the neonatal escalation policy. The unit capacity status for both units is written on the patient information board in the staff office so every member of the multidisciplinary team is aware of the operational status of both units, ie green = fully open, red = restricted capacity. Having this information regularly updated aids active bed and staff management between both neonatal sites. At times of peak activity, staff can be used flexibly to ensure that the right number of nurses are in the right place to provide safe patient care.

Benefits of implementing the neonatal acuity tool

Since its introduction, the neonatal acuity tool has:
- highlighted when levels of patient clinical dependency and cot capacity are escalating thereby promoting active bed management between neonatal units to keep the service operational
- improved communication between the obstetric and neonatal multidisciplinary teams by the development of maternity and neonatal escalation policies to assist in providing a safe service by clearly outlining the management process that will be initiated in the event of increased activity
- empowered staff to raise concerns when they see that their workload is escalating due to increased patient activity or staffing pressures
- allowed identification of the additional

Neonatal escalation policy triggers		
Patient acuity		Levels of escalation
Green	<80%	Open: normal practice
Amber	>80%	Start escalation policy
Red	100%	Unit has restricted admission capacity One stabilisation cot only Risk assessments are in place and each case will be individually assessed
Black	>100%	No stabilisation cot available

FIGURE 3 The neonatal escalation policy has four levels of escalation and uses a traffic light system to highlight unit capacity status.
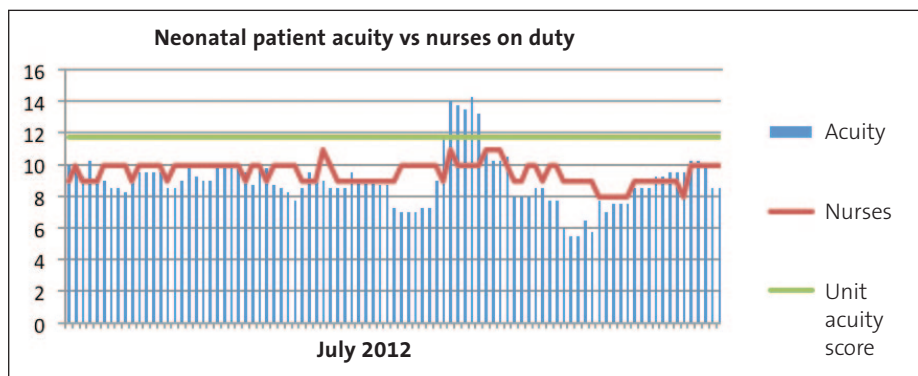
Neonatal patient acuity vs nurses on duty

July 2012

Legend: Acuity, Nurses, Unit acuity score

FIGURE 4 A monthly patient acuity graph showing nursing shift compliance and patient acuity against the unit baseline acuity score.

resources needed, ie staff or equipment in place to maintain a safe service

■ enabled managers to use the nursing workforce flexibly between both neonatal sites thereby ensuring the right nurse with the right skills is in the right place at the right time

■ allowed trends to be analysed by monitoring the nursing shift compliance, patient acuity and unit status.

The acuity information is also used to generate a monthly graph (**FIGURE 4**) that demonstrates the daily patient acuity levels against the number of nurses on duty against the agreed number of cots. These graphs are displayed on the staff notice board and the results are presented to multidisciplinary colleagues at monthly neonatal risk meetings.

The neonatal acuity tool was updated in 2011 in line with the new BAPM service standards and categories of care recommendations,[2,3] which gave further details regarding interventions used in routine care and some elements that were no longer considered to require the level of care in the original 2001 BAPM standards.

Introduction and roll-out across Wales

Following the introduction of the neonatal acuity tool in ABM HB in 2009, the benefits of the acuity tool were recognised by the Wales Neonatal Network. Established in 2010, the Wales Neonatal Network identified achieving nurse staffing

establishments that met the All Wales Neonatal Standards[4] as a key priority. Early on it was recognised that there would be great benefit in adopting a standardised risk assessment tool to ensure patient safety on a neonatal unit and it recommended to health boards that the neonatal acuity tool was implemented by all neonatal units across Wales.

The appointment of a Network Lead Nurse in 2013 was a catalyst to implementing the neonatal acuity tool. This involved the Lead Nurse visiting all 11 neonatal units in Wales to discuss the benefits of the neonatal acuity tool and how it could be applied in practice. The next step was to calculate each unit's unique baseline patient acuity score. Further meetings were held throughout 2013 to show how information from the neonatal acuity tool could be transferred onto a spreadsheet to produce graphs showing patient acuity trends and nursing shift compliance.

The neonatal acuity tool has now been fully adopted into every neonatal unit across Wales. The role of the Network Lead Nurse now focuses on supporting units to ensure they are using the acuity tool to its full advantage, providing updates and sharing best practice information.

The Wales Neonatal Network's Nursing and Therapies subgroup has overseen implementation of the tool and regularly reviews shift-by-shift compliance and staff levels.

Summary

Quality and safety in neonatal care is intricately linked to staff levels, nurse to patient ratios and the specialist levels of education and experience of nurses delivering care. The Wales Neonatal Network has a key role in promoting quality and safety and ensuring staffing levels meet the All Wales Neonatal Standards[4]. The aim of the neonatal acuity tool is to improve patient quality and safety by having a standardised practical risk assessment tool.

The neonatal acuity tool is based on well established clinical indicators that describe the standard of care that infants should receive. It enables nursing staff on the neonatal unit to record the level of clinical dependency of each infant and uses that measurement as the foundation of a risk assessment, which is linked to the number of nurses available on each shift. The tool is linked to escalation policies that promote good communication between neonatal and obstetric services and gives an early warning if capacity is escalating. This promotes active bed management and enables infants who do not require ongoing intensive care to be transferred back to their local referral unit to be closer to home and their families for ongoing care, thereby freeing up intensive care cots and preventing unit closures. The neonatal acuity tool allows clear identification of the additional resources needed to maintain a safe service. Trends can be seen by monitoring nursing shift compliance, which enables managers to use the nursing workforce flexibly.

References

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4. **All Wales Neonatal Standards.** 2nd ed. 2013.