British Association of Perinatal Medicine

# Optimal arrangements for Local Neonatal Units and Special Care Units in the UK including guidance on their staffing:

## A Framework for Practice

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Main Authors: Tyler W, Fenton AC, Jones S
Additional Working Group Members: Al-Muzaffar I, Anderson J, Holman J, Kirk S, Narayanan S, Nicholl R, Rao S, Wilson D, & MacKenzie MJ

## 1. Introduction

### 1.1 Aim

To provide guidance on the optimal activity of Local Neonatal Units (LNUs) and Special Care Units (SCUs), akin to the BAPM Framework for Practice for Neonatal Intensive Care Units (NICUs) [1].

### 1.2 Definitions

**LNU and SCU** are defined in the Department of Health (DH) Toolkit for Neonatal Services [2,3-7], equivalent to a Level two and Level one neonatal unit respectively in accordance with the international classification.

**Medical staffing** comprises roles traditionally undertaken by Medical Practitioners now also undertaken by appropriately trained and experienced Advanced Neonatal Nurse Practitioners (ANNPs) and augmented by Extended Nurse Practitioners (ENP).

**Respiratory care days (RCDs)** are defined as days during which the patient receives either invasive ventilator support via an endotracheal tube or tracheostomy, or non-invasive respiratory support with continuous positive airway pressure or high-flow nasal cannulae. It excludes days in which oxygen is administered via low-flow nasal cannulae or headbox or directly into an incubator. Intensive care is defined using BAPM 2011 definitions or by using HRG definitions 2016 [8,9].

**Admission weight** is defined as the weight on admission to a neonatal unit, either directly following birth or on repatriation from another neonatal unit including NICUs.

### 1.3 Target users

This document is aimed at individuals, organisations and government bodies involved in the provision, planning and commissioning of neonatal care.

### 1.4 Purpose

To provide guidance on optimal activity levels and additional guidance on medical staffing for LNUs and SCUs in the UK.

### 1.5 Background

**1.5.1** Neonatal intensive care in the UK developed as a service provided in many local units in each region which is not the case in many other developed countries.

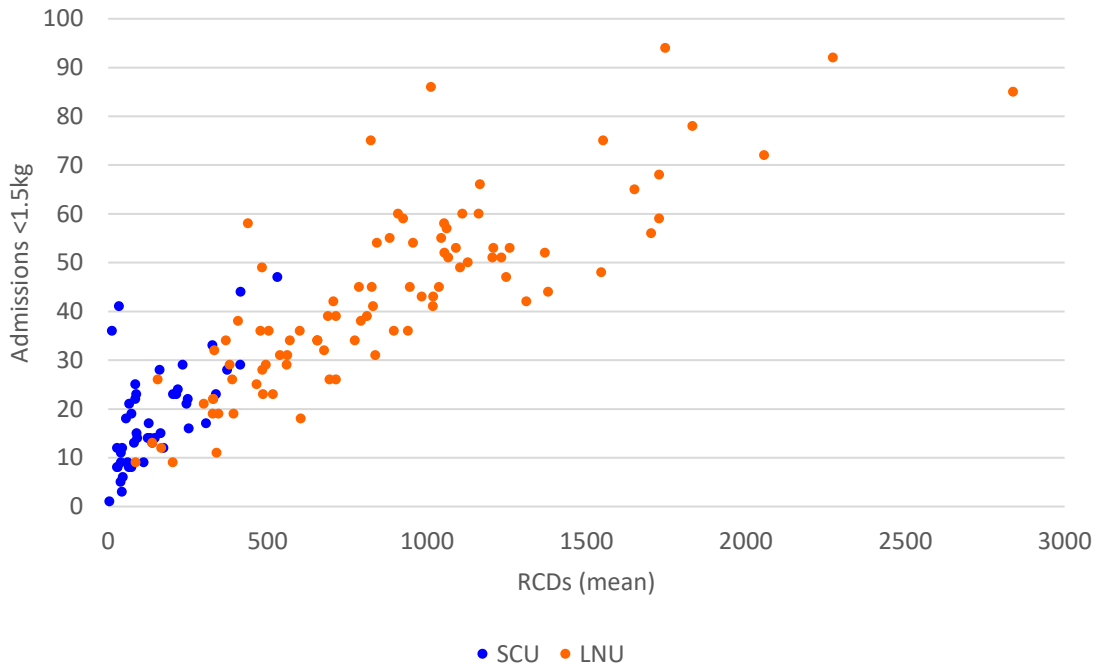
A hub and spoke model of neonatal care coordinated by Operational Delivery Networks (ODNs) was adopted following a National Review in 2003 (10) to provide better services for babies and families, improve outcomes and optimise resource utilisation.

Recent evidence demonstrates improved outcomes for extremely preterm babies delivered in larger units in the UK [14] strengthening the published data supporting the National Review 2003 and evidence available from the USA and the Vermont Oxford Network showing that larger regional neonatal units with high levels of activity are associated with improved outcomes for extreme preterm infants [11-13, 15-31].

### 1.5.2: Activity versus Staffing Data LNUs & SCUs

A BAPM survey of LNUs & SCUs in the UK has shown that the numbers of babies with an admission weight of <1.5kg correlates with Respiratory Care Days (RCDs) activity (Figure 1)

**Figure 1: LNU+SCU Admissions <1.5kg v RCDs (2013-15)**



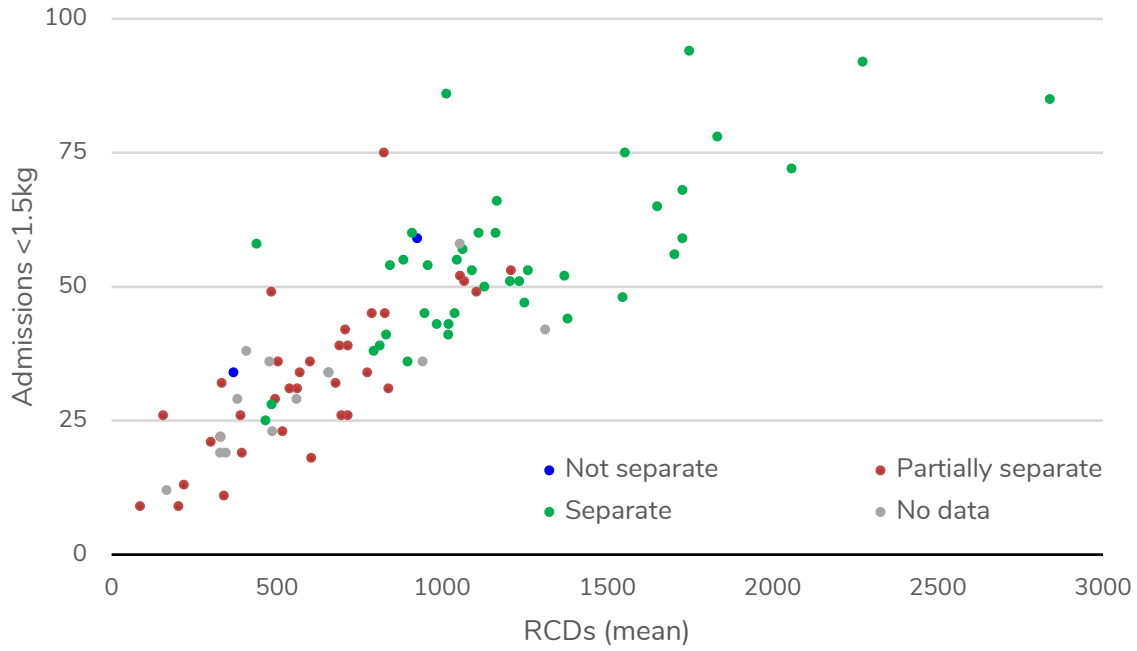

Whilst the units' activities appear to lie on a continuum in Figure 1 the colour-coding for unit designation, median and interquartile ranges (IQR) for the activity data within LNUs & SCUs describe two different types of unit for the majority (Table 1). Of note only one SCU in the UK survey delivered more than 500 RCDs annually.

**Table 1: Interquartile ranges & median values for activity (BAPM survey)**

| | LNUs | SCUs |
|---|---|---|
| **<1.5kg admissions** | 29-55 (median 42) | 10-23 (median 16.5) |
| **RCDs mean 2013-15** | 484-1120 (median 827) | 45-226 (median 90) |

Figure 2 demonstrates the variation in provision of a dedicated 24/7 Tier 1 practitioner in 2016-17 (medical or ANNP) to the neonatal unit in those designated as LNUs in the BAPM UK survey. Those units with a fully separate Tier 1 rota dedicated to the neonatal unit 24/7 are shown in green.

**Figure 2: Tier 1 availability 2016-17 LNU**
**Admissions <1.5kg v RCDs**




The DH Toolkit for Neonatal Services [2] recommendations are not currently being met in all units. Units intending to provide short-term intensive care (LNUs) should have Tier 1 24-hour cover for provision of direct care with sole responsibility for the neonatal service (ST1–3 or ANNP). The higher activity LNUs (as defined by mean RCDs) do have dedicated Tier 1 staffing to the neonatal unit but those providing 500 - 1000 RCDs have mostly partially separate Tier 1 rotas with two LNUs having a fully shared rota at Tier 1 level with paediatric services. A number of units were unable to provide data because they closed or merged before the 2016-17 staffing survey. Most units in Wales and a significant proportion in Northern Ireland did not provide data.

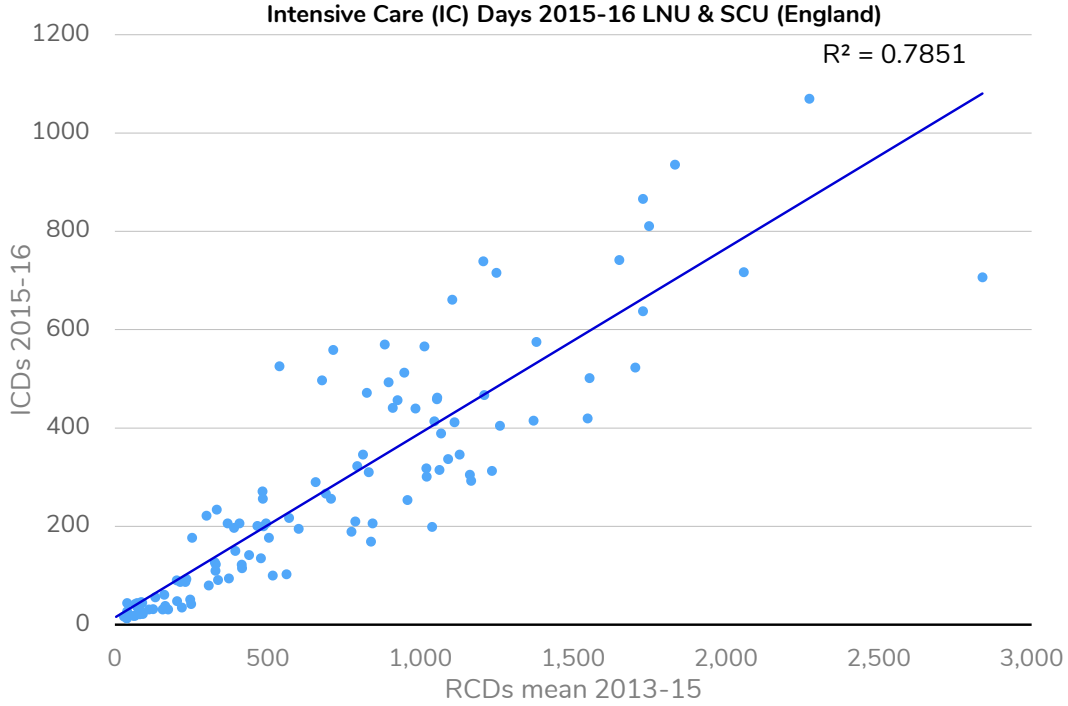
The BAPM LNU SCU UK staffing survey determined the availability of dedicated neonatal unit staffing at all 3 Tiers in 2016-17 (Table 2). Whilst a number of solutions have been developed which are pertinent to local geography and paediatric service, there remains unexplained variation across the UK. Deficiencies in neonatal medical staffing have been described (32-34).

**Table 2: Dedicated 24/7 neonatal unit medical/practitioner staffing (BAPM survey)**

| Unit type (respondents/total) | Tier 1 | Tier 2 | Tier 3 |
|---|---|---|---|
| **LNUs (n=78/90)** | 42 (53.8% of respondents) | 17 (21.8% of respondents) | 24 (30.8% of respondents) |
| **SCUs (n=38/40)** | 4 (10.5% of respondents) | 1 (2.6% of respondents) | 1 (2.6% of respondents) |

RCDs as an indicator of activity has been compared to data on Intensive Care Unit days (ICD) 2015-16 data [35] (Figure 3). There is a range of IC days in units providing similar levels of activity

**Figure 3: Correlation between Respiratory Care Days (RCDs) 2013-15 & Intensive Care (IC) Days 2015-16 LNU & SCU (England)**




as defined by RCDs. The intersections for 1000, 1500 & 2000 RCDs lie close to 400, 600 & 750 ICU days. 365 RCDs is equivalent to 500 combined ICD & High-Dependency (HD) days. Activity defined both by IC days and RCDs has been used to provide consensus recommendations for medical staffing in this document.

## 2. Recommendations - activity

### 2.1 Optimal activity levels in LNUs and SCUs

**2.1a Local Neonatal Units**

- Units designated as LNUs should admit ≥25 infants <1500g admission weight and perform ≥365 RCDs annually
- ODNs should consider re-designating LNUs with less activity as SCUs, with the more preterm babies being transferred to other LNUs or NICUs as appropriate within the network

**2.1b Special Care Units**

- SCUs should anticipate admitting up to 25 infants <1500g or undertake up to 365 RCDs annually
- ODNs should ensure that where SCUs regularly exceed these levels of activity they are staffed safely to provide that activity and consider whether re-designation as an LNU with consequent change in care pathways is warranted

The group recognized that local geography is an important consideration in decisions, particularly for isolated rural areas of the country. However, it is important that the more preterm infants <32 weeks and those requiring respiratory support are cared for in a unit that has adequate numbers of trained staff available and can demonstrate consistent good outcomes for such infants. Support for parents and families with appropriate facilities and accommodation should be provided for those travelling to neonatal units remote from their home to support their baby.

It is essential to provide appropriate pathways of care for all infants within a network, particularly for the sickest and the most preterm. The use of timely antenatal transfer within networks should be maximised (36), in addition to on-going development of neonatal transfer services to optimise volume of activity for different levels of units.

## 3. Recommendations – staffing

### 3.1 Nursing staffing

Standards for defining neonatal nurse to patient ratio determined by illness severity were defined by BAPM giving one-to-one nursing for intensive care, one-to-two nursing for patients in high dependency care and one-to-four nursing for neonates in special or transitional care. The Toolkit also defined a standard for the proportion of the nursing establishment qualified in specialty. We believe these remain key standards across all levels of units.

### 3.2 Medical staffing of LNUs and SCUs

#### 3.2.1 Tier One

**3.2.1a Local Neonatal Units**

- Units designated as LNUs should have immediately available at least one resident Tier 1 practitioner dedicated to providing emergency care for the neonatal service 24/7; the provision of newborn infant physical examination should not be the sole responsibility of this individual and midwives should be trained to deliver this aspect of care [37, 38]
- In large LNUs (>7000 births) there should be two dedicated Tier 1 practitioners 24/7 to support emergency care, in keeping with the NICU framework [1]

**3.2.1b Special Care Units**

- SCUs should provide a resident Tier 1 practitioner dedicated to the neonatal service in day-time hours on weekdays and a continuously immediately available resident Tier 1 practitioner to the unit 24/7. This person could be shared with a co-located Paediatric Unit out of hours if this does not reduce quality of care delivery and safety to the neonatal unit assessed using national standards (39, 40)
- SCUs delivering higher than recommended activity levels should provide a dedicated Tier 1 practitioner as required for LNUs; see 2.1b
- In stand-alone SCUs without co-located paediatric services this resident Tier 1 practitioner would be dedicated to the neonatal service alone

#### 3.2.2 Tier Two

**3.2.2a Local Neonatal Units**

- LNUs should provide an immediately available resident Tier 2 practitioner dedicated solely to the neonatal service at least during the periods which are usually the busiest in a co-located Paediatric Unit e.g. between 09.00-22.00, seven days a week
- LNUs undertaking either >1500 RCDs or >600 IC days annually should have immediately available a dedicated resident Tier 2 practitioner separate from paediatrics 24/7
- LNUs undertaking either >1000 RCDs or >400 IC days annually should strongly consider providing a 24/7 resident Tier 2 dedicated to the neonatal unit and entirely separate from paediatrics; a risk analysis should be performed to demonstrate the safety, timeliness and quality of care delivery to both paediatrics, delivery suite, maternity unit and neonatal services if the Tier 2 is shared at any point 24/7 in these units. Considerations should include the level of activity of

any Paediatric Unit including peak activity times and the geography of the site including the location of A&E and the Paediatric wards.

- The Tier 2 should be immediately available at all times to the neonatal unit and the labour ward. If the site of the paediatric unit makes this immediate response impossible separate Tier 2 rotas are required.

**3.2.2b Special Care Units**

- SCUs should provide a resident Tier 2 to support the Tier 1 in SCUs admitting babies requiring respiratory support or of very low-admission weight <1.5kg. This Tier 2 would be expected to provide cover for co-located paediatric services but be immediately available to the neonatal unit
- SCUs delivering higher than recommended activity levels should provide a Tier 2 practitioner as required for similar activity levels in LNUs; see 2.1b

**3.2.3 Tier Three**

**3.2.3a Local Neonatal Units**

- Units designated as LNUs providing either >2000 RCDs or >750 IC days annually should provide a separate Tier 3 Consultant rota for the neonatal unit
- LNUs providing >1500 RCDs or >600 IC days annually should strongly consider providing a dedicated Tier 3 rota to the neonatal unit entirely separate from the paediatric department; a risk analysis should be performed to demonstrate the safety & quality of care if the Tier 3 is shared with paediatrics at any point in the 24 hours in these LNUs.
- All LNUs should ensure that all Consultants on-call for the unit also have regular weekday commitments to the neonatal service. This is best delivered by a 'consultant of the week' system and no consultant should undertake <4 'consultant of the week' service weeks annually.
- No on-call rota should be more onerous than one in six and all new appointments to units with separate rotas should either have a SCCT in neonatal medicine or be a general paediatrician with a special interest in neonatology or have equivalent neonatal experience and training

**3.2.3b Special Care Units**

- In SCUs there should be a Lead Consultant for the neonatal service and all consultants should undertake a minimum of continuing professional development (equivalent to a minimum of eight hours CPD in neonatology) [41]

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## Membership of Working Group

| Name | Position | Place of Work |
|---|---|---|
| Dr Wendy Tyler (Co-Chair and main author) | Consultant Neonatologist | Princess Royal Hospital, Telford |
| Dr Stephen Jones (Co-Chair & main author) | Consultant Neonatologist | Royal United Hospital, Bath |
| Dr Alan Fenton (main author) | Consultant Neonatologist | Royal Victoria Infirmary, Newcastle |
| Dr Al-Muzaffar | Consultant Neonatologist | Royal Glamorgan Hospital |
| Josie Anderson | Senior Policy and Public Affairs Officer | Bliss |
| Kate Dinwiddy | Executive Manager | BAPM |
| Dr Jennifer Holman | Consultant Paediatrician | Gloucestershire Royal Hospital |
| Sarah Kirk | ANNP | Princess Royal Hospital, Telford |
| Megan Jean MacKenzie | N/A | Parent based in Manchester |
| Dr Sankara Narayanan | Consultant Neonatologist | Watford General Hospital |
| Dr Richard Nichol | Consultant Neonatal Paediatrician | Northwick Park Hospital |
| Dr Sudhakar Rao | Consultant Paediatrician & Clinical Director for Women and Children (Pantrust) | United Lincolnshire Hospitals NHS Trust |
| Deb Wilson | ANNP | East Surrey Hospital |