National Neonatal Audit Programme 2015 Annual Report on 2014 data

Royal College of Paediatrics and Child Health

On behalf of the NNAP Project Board

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Acknowledgements

The NNAP Project Board would like to thank the many doctors, nurses, administrators and others who have contributed their time and e ort to collect information and review its accuracy; particular thanks are due to the NNAP leads in each unit.

Thanks also to the team at Clevermed, Edinburgh, for their ongoing support and new IT developments to support NNAP data entry and data checking.

We also acknowledge the contribution made towards the development of this report by colleagues within the invited reviews, policy and workforce teams at the RCPCH.

Contents

Foreword

Professor Anne Greenough
Vice President Science and Research
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As a neonatologist I, as do my colleagues in multidisciplinary teams in all neonatal units, strive to provide the highest quality of care to the babies we care for – they deserve it. Essential to providing such care is assessing the results, and where necessary, making improvements. Key to such a process is comprehensive and robust data that are readily available and easily understandable to all stakeholders: including parents, neonatal practitioners and commissioners of the service. The National Neonatal Audit Programme (NNAP) was established eight years ago to provide such data. Over that period, there have been increases in the recording of data and improvements in key outcomes. In England and Wales, we now have an unequalled source of data to further

It is becoming clear that collaboration in quality improvement produces better results than if it is undertaken in an isolated manner. A major future challenge for the NNAP is that it should continue to evolve to ensure that the questions it addresses are relevant and will produce data on which to base standards. From a 'coalface clinician's' viewpoint it is equally important that NNAP links with the myriad of other quality initiatives nationally to which clinicians are obliged to submit data. To achieve this will require continued dialogue with both neonatal professionals and those that commission neonatal services.

Ms Caroline Davey
Chief Executive
Bliss

Every baby admitted into a neonatal unit deserves the highest quality care, and in striving to deliver this we must continue to capture and make e ective use of data to drive continuous improvement. It is therefore heartening to see, in this 8th annual NNAP report, the many areas of improvement in neonatal care in recent years. There is much more to do, however, as the report also highlights unacceptable variations in care across regions, as well as more widespread areas for improvement.

It is particularly notable that, while consultation with parents has increased, far too many parents still don't have a consultation with a senior member of the neonatal team within their baby's rst 24 hours on the unit. This must change. Parents are their baby's primary carers and it is imperative that they are fully informed and involved in their baby's care from the moment they enter the unit. Neonatal sta must also recognise their obligation to consider the long-term impact of being born early or sick on babies as they develop – the starting point for which must be the two-year follow up for early pre-term babies. For many babies born early, time on the neonatal unit is only the start of a journey on which they may face ongoing health, developmental and educational challenges. However, with this data not even recorded for nearly half of babies at two years of age, we are letting down those babies and missing a signi cant opportunity to o er further support for their development. We are also missing out on a vital source of information to allow us to evaluate and drive change in neonatal care.

Bliss' most recent policy report, based on evidence from neonatal units across England, brought into sharp relief the signi cant pressures facing many neonatal services, in particular in relation to both nursing and medical sta ng capacity. We are therefore under no illusions about the challenging circumstances in which neonatal sta work every single day, and this NNAP report provides further evidence of the need for su cient investment in neonatal services. For all babies born premature or sick, the care they receive in their rst minutes, hours, days and weeks is critical to determining their outcomes and giving them the best chance of life. We must make sure that we are delivering the highest quality care for all of them.

1. Executive Summary

Welcome to this 8th annual report of the National Neonatal Audit Programme (NNAP), produced by the Royal College of Paediatrics and Child Health (RCPCH).

Amongst the stark lessons provided by the Kirkup Investigation in March 2015, a key message was the urgent need for consistent and comprehensive monitoring of neonatal services at all levels. While Kirkup focused on the exceptional circumstances in a maternity care setting in Morecambe Bay which may have led to the unnecessary deaths of eleven babies and one mother, the investigation stressed the importance of timely record keeping, adherence to professionally accepted standards of practice and the importance of consistent monitoring of all neonatal services provided for babies and their mothers.

The NNAP was established in 2006 to support professionals, families and commissioners in improving the provision of care provided by neonatal services which specialise in looking after babies who are born too early, with a low birth weight or who have a medical condition requiring specialist treatment. Through its annual comparison of all levels of neonatal units in England and Wales against professionally agreed standards – unique in its scope internationally, the NNAP is well-positioned to highlight where standards of care are being met, and to sound the alarm for areas in need of improvement. The NNAP is commissioned by the Healthcare Quality Improvement Partnership (HQIP), funded by NHS England and the Welsh Government and delivered by the RCPCH.

This audit report of 2014 data covers nine measures of processes of care and one outcome measure. Of the key ndings and recommendations, two demand particular attention:

- Follo w-up at two years of age of pre-term babies – No two year health data at all was recorded for 46% of babies, a major concern given that developmental delay could be missed, only to become apparent later in childhood.
- Consulta tion with parents – The rate of timely consultation with parents has increased over the past two years (89% in 2014 vs 84% in 2013) however, one in ten parents were still not recorded as having had a consultation with a senior member of the neonatal team within 24 hours of their baby's admission to the neonatal unit.

Key recommendations by audience are displayed in Appendix B on page 60 of this report.

Overall, this 2014 report notes striking improvements in the completeness of data entered by units for eligible babies since 2006, along with noted improvements in the quality of aspects of neonatal care over the same period.

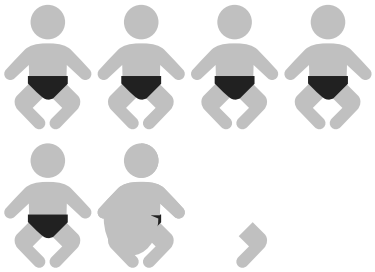
The report also identi es variation in 2014 across regional neonatal Operational Delivery Networks (ODN) which must be addressed in order to ensure that high quality care is available to families across all services and in all regions.

With high rates of data completeness the audit now has the opportunity to move towards capturing a more complete picture of neonatal care by adding measures of the organisation and structure of neonatal services, sta ng levels and increase its focus on some of the speci c outcomes of neonatal care.

The next year will bring further consultation on the introduction of neonatal mortality reporting to the audit. The NNAP will also consider how it should respond to any key ndings and recommendations from the reports of the NHS England National Maternity Review and Scottish Maternity and Neonatal Services Review, to be published in late 2015 and mid 2016 respectively.

2. Key Findings and Recommendations

Approximately 700,000 babies are born each year in England and Wales and of these nearly 1 in 8, or more than 86,000, will be admitted to a Neonatal Unit (NNU) which specialises in looking after babies who are born too early, with a low birth weight or who have a medical condition requiring specialist treatment.



Monitoring the standard of care provided by specialist neonatal units is essential to informing e orts to give all babies the best possible chance of surviving and reaching their full potential. The RCPCH does this through the National Neonatal Audit Programme (NNAP) which encourages individual NNU, regional networks and the nation as a whole, to deliver the very highest levels of care to babies and families by measuring against standards described by professional organisations.

The NNAP measures care based on data provided annually by all three levels of neonatal unit (Special Care Unit, Local Neonatal Unit, and Neonatal Intensive Care Unit). By identifying the areas which require improvement, the audit informs action planning at a unit and network level, whilst helping hospital management, commissioners and policymakers to prioritise future funding and support.

NNAP 2014 audit measures

The NNAP currently focuses on the following areas of neonatal care:

- Temper ature on admission
- Antena tal steroids
- Retinopa thy of Prematurity (ROP) screening
- Mother's milk at dischar ge
- Consulta tion with parents
- Neonatal unit tr ansfers
- Clinical follo w-up at 2 years of age
- Rec ording of bloodstream and cerebrospinal uid cultures
- Pre valence of Central Line-associated Bloodstream Infections (CLABSI)
- Disturbanc e of neurological function (encephalopathy)

The following key ndings and recommendations are based on the analysis of the data provided by NNUs for all 98,840 completed episodes, involving 86,287 babies, admitted to eligible neonatal units and discharged from neonatal care in England and Wales during the calendar year of 1 January to 31 December 2014.

Acknowledging improvements

As the following key ndings show there have been improvements in the adherence to the standards for the NNAP audit measures over the years. The NNAP has also observed a great increase in the rates of data entry for eligible babies by neonatal units since its inception and unit sta should be congratulated for their current levels of engagement and diligence in recording data. Increases shown in adherence to standards have been in uenced by these improvements in data completeness, as seen in the tables within section 5.10 of this report.

2.1 Temperature on admission

Low admission temperature has been associated with an increased risk of illness and death in pre-term infants. It is essential that NNUs maintain a high level of vigilance for hypothermia, an easily preventable condition, even in vulnerable newborns.

Key Findings

- Ninety-f our percent of all babies less than 29 weeks gestation at birth were recorded as having had their temperature measured within an hour of birth (table 1.1).
- Whils t this gure remains unchanged from 2013, it has risen marked5 T635gure remains unc21ked%20085 T

2.2 Antenatal steroids

Antenatal steroids are given to women by obstetricians to reduce the chance that their baby is a ected by respiratory distress syndrome, and constitute the most powerful health promotion tool in neonatal care. When given to the mother prior to preterm birth they reduce the risk of the baby dying and of several serious complications of prematurity. Predicting preterm delivery is not always straightforward, and in addition women may deliver too rapidly for antenatal steroids to be administered.

63%
(2008)

Key Findings

- At a national level, 85% of the mothers of babies born between 24 and 34 weeks of gestation w ere recorded as having received one or more doses of antenatal steroids (table 2.1), a considerable increase from 63% in 2008 (table 2.3).
- Network perf ormance varies considerably, ranging from 77% to 92% (table 2.2).

Key Recommendations

- Neonatal units with r ates of antenatal steroid administration of less than 85% should urgently consider their clinical care pathways with their obstetric colleagues, and review the antenatal course of mothers not given steroids to see whether best practice was followed and if opportunities to do so were missed.
- Neonatal netw orks and commissioners should review antenatal steroid administration for their populations, and provide support for any units whose administration rates could be improved.

Full 2014 results and tables for Antenatal Steroids are found on pages 28 to 29.

2.4 Mother's milk at dischar ge

Neonatal units with lo

Neonatal netw

2.5 Consultation with parents

The parents of the babies admitted for care in neonatal units nd themselves in a di cult and stressful situation, feeling that they have very little control in, or input towards, the care of their baby. It is therefore crucial that neonatal unit sta take the time to explain to parents how their baby is being cared for and also listen to parents, try to understand how they are feeling and respond to any questions that they may have.

Key Findings

- For 89% of babies there was a documented conversation between parents and a senior member of the neona tal team within 24 hours of admission (table 5.1). This represents an increase from 84% in 2013 (table 5.3), but still leaves more than 1 in 10 parents without a record of a timely consultation.

Key Recommendations

- Neonatal units with lo w rates of consultation with parents should critically review their processes of both communicating with parents and recording the details of communications. They should make contact with other units achieving better results in order to gain insight into e ective practices that they might adopt.
- Units should make use of guidanc e on parent involvement in0.7087 Tm 's(the car)2which25(yeir)]TJ 0-16
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2.7 Clinical follo w-up at 2 years of age

Pre-term infants are at high risk of neonatal mortality and adverse developmental outcomes. It is important that the development of very pre-term babies who were admitted to a neonatal unit is monitored by a paediatrician or neonatal consultant after their discharge from the neonatal unit.

Key Findings

- No 2 year f

2.8

3. Impact and future dir ection of the NNAP

3.1 Impact

The NNAP will conclude a consultation on the feasibility of reporting mortality rates to discharge in neonatal services, and how such work could best compliment the work on perinatal mortality undertaken by the Maternal, Newborn and Infant Clinical Outcome Review Programme.

Participation of Scottish Neonatal Units

Negotiations are being undertaken with the Scottish Clinical Outcomes and Measures for Quality Improvement (COMQI) Group which should allow for the participation of Scottish neonatal units in the NNAP in time for 2016 data entry.

New NNAP measures

The NNAP plans to introduce new measures for 2016 data entry covering:

- The identi ca tion of the number of live born babies born at <30 weeks gestation admitted to a neonatal unit who were exposed to antenatal magnesium within 24 hours of birth.
- An additional measure of C entral Line-associated Bloodstream Infections (CLABSI).

4. Case Study: T hames Valley & Wessex Neonatal Operational Delivery Networks (ODNs)

Team Members: Service Impr ovement Manager/Data Analyst, Kujan Paramanantham
Network Manager , Teresa Gri n

Background: Neonatal Oper ational Delivery Networks (ODN) in England and Wales provide advice on neonatal services to Health Boards, Trusts and Commissioners. Thames Valley & Wessex Neonatal ODN has achieved a high level of data completeness and adherence to NNAP standards of care for 2014.

Neonatal clinicians in T hames Valley & Wessex Neonatal ODN had always believed that they were adhering to the NNAP standards but poor data completeness meant that this con dence could not be re ected through analysis.

Boundaries: Thames V

The dashboard (extract from a monthly RAG rated network benchmarking report shown below) has ensured provider units at both clinical and management level benchmark and review their data/ outcome measures on a regular basis, and highlighted the performance that the NNAP data re ects.

The importance of complete and accurate data entry has been included in the programme for biannual network leadership study days for senior nurses. Examples of areas where the dashboard has helped improve practice are:

- Pro vision of parenteral nutrition within 48 hours for infants <29 weeks gestation
- Timelines s of Retinopathy of Prematurity (ROP) screening
- Optimising admission t emperatures

Presenting the results of analysis via the dashboard has helped demonstrate the importance to clinical sta of the bene ts to patient care and service delivery that result from high quality, reliable recording.

Thames Valley & Wessex Neonatal ODN have shown what can be achieved with a dedicated analyst, management support, leadership and clear communication. They can be rightly proud that in 2014 NNAP data was available for almost 100% of eligible babies."

Do you have any achievements that you would like to share?

The NNAP project board would like to thank Kujan and Teresa for helping to develop this case study.

If members of any other neonatal units or networks would like to share the details of any successful quality improvement activities or examples of best practice with the neonatal community via the NNAP then please contact the NNAP project team on 020 7092 6170/6168 or at: nnap@rcpch.ac.uk to discuss this further.

5. 2015 NNAP report based on 2014 data

Introduction

The NNAP was set up by the Department of Health to support healthcare professionals, families and commissioners to improve the provision of neonatal care. The audit commenced in 2006 with the first NNAP report, published in 2007 covering the admission of babies to 107 Neonatal Units (NNUs) in England, with Wales coming on board in 2012. Participation in the NNAP has grown significantly since then, with 174 neonatal units across England and Wales having contributed data to this report. It is hoped that Scottish neonatal units will join in time for 2016 data entry and discussions for the future involvement of units in Northern Ireland are also under way. The NNAP is commissioned by the Healthcare Quality Improvement Partnership (HQIP), funded by NHS England and the Welsh Government and delivered by the Royal College of Paediatrics and Child Health (RCPCH).

5.1 Aims of the NNAP

The key aims of the audit are:

- To assess whether babies admitted to NNU in England and Wales receive consistent care in relation to the NNAP audit measures, and high quality care as measured by adherence to a set of agreed guidelines and standards.
- To identify areas for quality improvement in NNUs in relation to delivery and outcomes of care.

This year's report relates to 98,840 completed episodes involving 86,287 babies discharged from neonatal care during the calendar year of 1 January to 31 December 2014.

5.2 Case ascertainment

Data for the NNAP analyses are extracted from the National Neonatal Research Database (NNRD) held at the Neonatal Data Analysis Unit (NDAU). The NNRD contains a predefined set of variables (the National Neonatal Dataset) obtained from the electronic neonatal patient records of each participating NHS Trust. Data are downloaded from the Badger3 and BadgerNet patient record systems used in NNUs and transferred to NDAU with Trust Caldicott Guardian approval.

Every baby admitted to the NNU would be expected to be entered on this system, and would also be eligible for inclusion in NNAP; the audit therefore achieves 100% case ascertainment in participating organisations. Babies receiving special care in transitional care or postnatal wards can also be entered.

For this report, the cohort comprises all babies with a final discharge from neonatal care from 1 January to 31 December 2014.

5.3 NNAP audit measures

The 2014 NNAP Audit Measures were:

- Do all babies of less than 29 w eeks gestation have their temperature taken within an hour after birth?
- Are all mothers who deliv er babies between 24 and 34 weeks gestation inclusive given any dose of antenatal steroids?
- Are all babies with a ges tational age at birth <32 weeks or <1501g at birth undergoing rst Retinopathy of Prematurity (ROP) screening in accordance with the current national guideline recommendations?
- Wha t proportion of babies of <33 weeks gestation at birth are receiving any of their mother's milk when discharged from a neonatal unit?
- Is there a document ed consultation with parents by a senior member of the neonatal team within 24 hours of admission?
- Are all babies ac cessing neonatal services treated in their own network (except where clinical reasons dictate)?
- Are r ates of normal survival at two years comparable in similar babies from similar neonatal units? (In 2014 we are auditing babies of <30 gestation at birth)
- Wha t percentage of babies admitted to a neonatal unit have:
  (a) one or more episodes of a pur e growth of a pathogen from blood
  (b) one or more episodes of a pur e growth of a pathogen from CSF
  (c) either a pure gr owth of a skin commensal or a mixed growth with 3 clinical signs at the time of blood sampling
- Wha t percentage of babies of 35 weeks gestation or more have an encephalopathy within the rst three calendar days of birth?
- How man y bloodstream infections are there on a NNU per 1000 days of central line care?

5.4 Neonatal unit participa tion

There were 174 neonatal units (NNU) in operation in England and Wales during 2014; all of which contributed data for this report. Full details of the NNU which provided 2014 data are listed in Appendix A.

5.5 Data completeness

For the 2014 data, quarterly reports were produced by the NNAP project team and disseminated to all neonatal units in order to provide regular updates on their data completeness. Following the dissemination of the nal quarterly report for 2014 data, NNU were provided with details of potential outlier status based on provisional data. All NNU were provided with a summary report of their 2014 data in May 2015 and given a nal opportunity to review and amend their 2014 data on the Badger system by 16 June. The nal 2014 data download for this report was extracted from Badger after the reviewing process had closed on 16 June 2015.

- Neonatal int ensive care units (NICUs) are sited alongside specialist obstetric and feto-maternal medicine services, and provide the whole range of medical neonatal care for their local population, along with additional care for babies and their families referred from the neonatal network. Many NICUs in England are co-located with neonatal surgery services and other specialised services. Medical sta in a NICU should have no clinical responsibilities outside the neonatal and maternity services.

5.9 Outlier analysis

Reporting at a unit level is part of a transparency process, designed so that best practice can be

5.10 Full 2014 National, Network and Year on Year Results

This section provides results at a network and national level as well as results across audit years. Individual unit level results and full outlier analyses can be viewed on the NNAP website at: www.rcpch.ac.uk/nnap

Temperature on admission

NNAP audit measure: Do all babies <29 weeks gestation have their temperature taken within an hour after birth?

It is important to take a baby's temperature on admission to the neonatal unit. Hypothermia has long been associated with increased mortality and morbidity, and in a recent randomised trial hypothermia caused increased morbidity. Hypothermia is easily preventable even in vulnerable newborns.

Standards

Table 1.1

Babies born in England and Wales at a gestational age <29 weeks with their temperature taken within the rst hour of birth, infants are assigned to their place of birth.

Table 1.3

Comparison to temperature audit results in previous NNAP reports.

NNAP data year	Number of eligible NNU	Number of eligible babies	Percentage with temperature taken within an hour of birth	Percentage with missing/ unknown temperature data
2008	130	2647	78%	12%
2009	165	3230	63%	26%
2010	169	3380	83%	2%
2011	164	2786	90%	8%
2012	169	3016	89%	5%
2013	170	2908	93%	2%
2014				

Antenatal steroids

NNAP audit measure: Are all mothers who deliver babies between 24 and 34 weeks gestation inclusive given any dose of antenatal steroids?

Antenatal steroids are given to women by obstetricians to reduce the chance that their baby is a ected by respiratory distress syndrome, and constitute the most powerful health promotion tool in neonatal care. When given to the mother prior to preterm birth they reduce the risk of the baby dying and of several serious complications of prematurity. Predicting preterm delivery is not always straightforward, and in addition women may deliver too rapidly for antenatal steroids to be administered.

Standard: 85% of mothers who deliver babies between 24 and 34 weeks gestation inclusive should receiv e a dose of antenatal steroids
Source of Standard: NNAP Board

Results

There were 17,170 eligible mothers identi ed from data submitted for 19,657 babies by 173 neonatal units. Records for 28 babies were excluded from analysis because their data lacked su cient detail to identify their mother, or were inconsistent.

At least one dose of antenatal steroids was administered to 85% of mothers who delivered babies between 24 and 34 weeks gestation (Table 2.1). Antenatal steroids were not administered in 15% of cases and steroid data were missing or unknown for 1% of babies.

Table 2.2

Mothers in England and Wales who delivered their babies between 24 and 34 weeks and received ANY dose of antenatal steroids by neonatal ODN of birth.

Neonatal ODN of birth	Number of eligible mothers	Steroids given (as % of all eligible **mothers**)	Steroids not given	Missing/ unknown data
Other*	238	78 (33%)	156	4
East of England Neonatal ODN	1426	1244 (87%)	175	7
Midlands South West Newborn Neonatal ODN	897	691 (77%)	160	46
North Central & North East London Neonatal ODN	1517	1300 (86%)	192	25
North West London Neonatal ODN	712	654 (92%)	55	3
North West Neonatal ODN	2146	1861 (87%)	275	10
Northern Neonatal ODN	832	711 (85%)	115	6
Peninsula & Western Neonatal ODN	1194	961 (80%)	223	10
South East Coast Neonatal ODN	1197	1031 (86%)	165	1
South London Neonatal ODN	1029	883 (86%)	138	8
Sta ordshire, Shropshire and Black Country Neonatal ODN	690	582 (84%)	107	1
Thames Valley & Wessex ODN (Thames Valley)	628	548 (87%)	79	1
Thames Valley & Wessex ODN (Wessex)	729	658 (90%)	70	1
Trent Perinatal & Central Newborn Neonatal ODN	1443	1187 (82%)	239	17
Wales	732	651 (89%)	78	3
Yorkshire & Humber Neonatal ODN	1760	1477 (84%)	281	2
Total	17170	14517 (85%)	2508	145

Table 2.3

Comparison of antenatal steroids with previous NNAP reports

Retinopathy of Prematurity (ROP) screening

NNAP audit measure: Do all babies <1501g or a gestational age of <32 weeks at birth undergo the first Retinopathy of Prematurity (ROP) screening in accordance with the current guideline recommendations?

Retinopathy is a complication of prematurity with the potential to result in visual loss or blindness. Blindness from ROP is largely preventable if babies are screened and treated on time in line with national guidelines.

Standards: 100% of eligible babies should receive ROP screening within the time windows for rst screening recommended in the guidelines:

-

Results

There were 8,835 babies born with a birth weight <1501g or with a gestational age at birth <32 weeks in NNAP contributing NNU. Of these babies, 15 were excluded because they did not have a recorded episode of care in a NNU until after the closure of the ROP screening window. A further 27 babies were excluded because they were transferred to non-neonatal units before, or during, the ROP screening window. Finally, 569 babies were excluded because they died before the closure of the screening window and had not been screened. This left 8,224 babies eligible for ROP screening from 173 NNU.

Including post-discharge screenings, 97% of eligible babies had at least one screening for ROP recorded, while 93% of babies were screened 'on time' in accordance with current NNAP criteria, including 11% of babies who were screened "on time" after neonatal discharge.

Of the remaining babies, 4% were rst screened after the closure of the screening window, and 1% were only screened before the screening window opened. There were no screening data available for 3% of eligible babies.

Table 3.1

ROP screening for babies born <1501g or gestation at birth <32 weeks by NNU level in England and Wales.

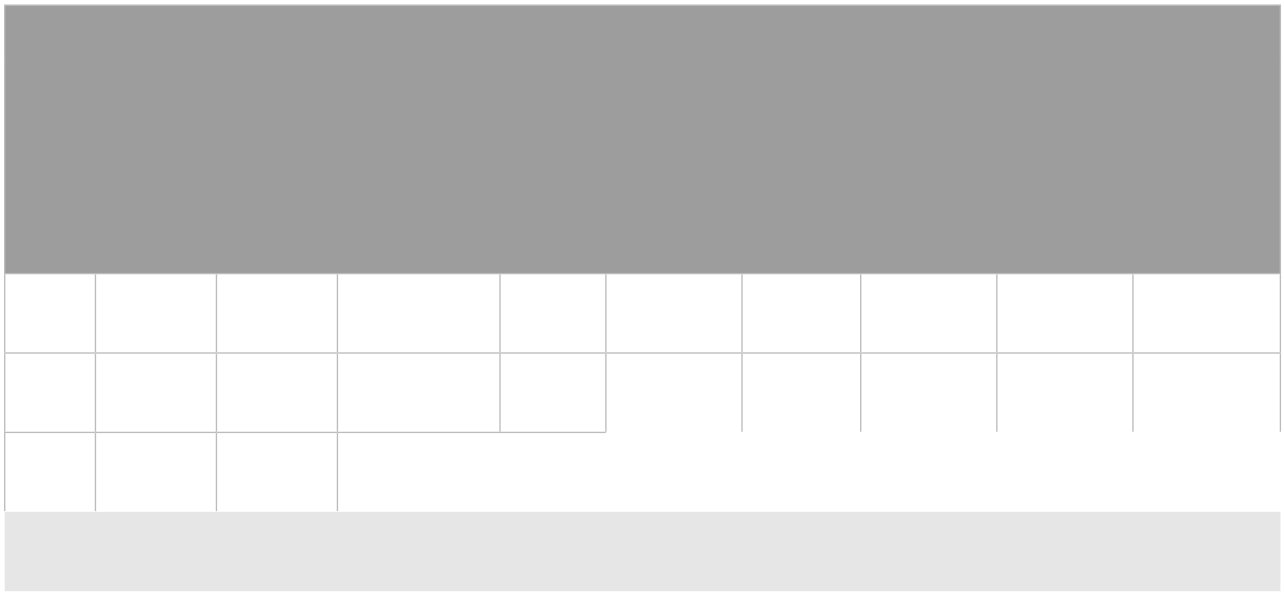


Table 3.3

Comparison to ROP audit results in previous NNAP audits.

NNAP reporting year	Number of eligible NNU	Number of eligible babies	Number of babies with a known ROP screening (as % of all				

Mother's milk at discharge

NNAP audit measure: What proportion of babies <33 weeks gestation at birth were receiving any of their own mother's milk at discharge to home from a neonatal unit?

Mother's milk o ers signi cant health bene ts to pre-term infants, including a reduction in infection and gut pathologies and longer term health and neurodevelopmental outcome.

Standard: No de ned standard, audit measure is used for benchmarking
Source of Standard: NNAP Board

Only babies who had a nal discharge to 'home' at the end of their rst episode of care are included in this analysis, i.e. all the babies included in this question were admitted to and stayed in only one NNU before being discharged home.

Results

Of the 10,204 babies born in NNAP NNU at less than 33 weeks there were 5,942 babies born <33 weeks reported by 169 NNU who met the criteria for inclusion in this question.

Daily data summaries for the last or penultimate day of care indicated that 60% of eligible babies were receiving mother's milk, exclusively or with another form of feeding, at the time of their discharge from neonatal care. Of the remaining babies, 39% were recorded as receiving others types of feeding* at discharge and 1% had no feeding data available from the last or penultimate day of care.

This question concentrates on non transferred babies so that unit level analysis can attribute this outcome to unit processes. However, in doing so 40% of otherwise eligible babies are excluded from the analysis, which remains a limitation of this quality improvement metric.

*Other types of enteral feeds that could be selected were; "Formula", "Donor expressed breast milk" and "Nil by mouth".

Table 4.1

Babies born <33 weeks and receiving any of their mother's milk when discharged from a neonatal unit by NNU level.

NNU level	Number of eligible NNU	Number of eligible babies	Enteral feeds at the time of discharge		
			Feeding with any mothers milk (as % of eligible babies)	Feeding without mother's milk (% of eligible babies)	Missing data (% of eligible babies)
SCU	3te				

Table 4.3

Comparison to mother's milk at discharge results in previous NNAP audits.

NNAP year	Number of eligible NNU	Number of eligible babies	Enteral feeds at the time of discharge		
			Feeding with any mothers milk (as % of eligible babies)	Feeding without mother's milk (% of eligible babies)	Missing data (% of eligible babies)
2011	159	5578	3007 (54%)	2438 (44%)	133 (2%)
2012	169	5678	3271 (58%)	2371 (42%)	36 (<1%)
2013	170	5920	3509 (59%)	2393 (40%)	18 (<1%)
2014	169	5942	3570 (60%)	2296 (39%)	76 (1%)

Mother's milk at discharge "Low performing outlier" units

One unit was identi ed as a low performing outlier for this NNAP audit measure.

Mother's milk at discharge "Non-participant" units

Two units had less than 90% of data for eligible babies entered for this audit measure and were therefore con rmed as "non-participants" for this measure and not included in the 2014 outlier analysis.

Consultation with parents

Table 5.2

Number of parents and/or carers of babies seen by a senior member of the neonatal team within 24 hours of admission by neonatal ODN.

Neonatal ODN	Number of eligible babies	Time of first consultation with parents and/or carers (from admission)				
		Within 24 hours (% of eligible episode)	After 24 hours	Before admission	No consultation	Missing/ unknown data
East of England Neonatal ODN	5488	5078 (93%)	128	107	82	93
Midlands South West Newborn Neonatal ODN	2802	2296 (82%)	102	114	130	160
North Central & North East London Neonatal ODN	4865	4268 (88%)	124	146	142	185
North West London Neonatal ODN	2179	1881 (86%)	62	83	39	114
North West Neonatal ODN	6554	5668 (86%)	383	39	358	106
Northern Neonatal ODN	2169	1969 (91%)	38	75	43	44
Peninsula & Western Neonatal ODN	3792	3001 (79%)	138	196	178	279
South East Coast Neonatal ODN	3901	3593 (92%)	67	46	89	106
South London Neonatal ODN	3406	3080 (90%)	103	71	80	72
Staffordshire, Shropshire and Black Country Neonatal ODN	1953	1689 (86%)	43	75	73	73
Thames Valley & Wessex ODN (Thames Valley)	2178	2168 (100%)	5	0	0	5
Thames Valley & Wessex ODN (Wessex)	2368	2349 (99%)	6	0	13	0
Trent Perinatal & Central Newborn Neonatal ODN	3528	3174 (90%)	79	54	86	135
Wales	2359	1887 (80%)	34	82	113	243
Yorkshire & Humber Neonatal ODN	4830	4384 (91%)	139	46	172	89
Total	52372	46485 (89%)	1451	1134	1598	1704

Table 5.3

Comparison to rst consultation results in previous NNAP audits.

Neonatal unit transfers

NNAP audit measure: Are all babies who require transfer out of a unit kept within their own network, except where clinical reasons dictate otherwise?

In the UK, neonatal care is provided by three di erent levels of unit. There are times where a baby may need to be transferred to another unit that has a level of care that is more appropriate to his or her needs at the time. Where a transfer to a more appropriate level of unit is required the transfer should, wherever possible, be within the same neonatal network. Babies and families should have access to an appropriate level of neonatal service that is as close to home as possible.

Standard: At least 90% of transfers within the baby's rst network of care
Source of Standard: NNAP Board

Results

There were a total of 86,287 babies eligible for inclusion in the NNAP 2014 audit. Of these babies, 23 have been excluded from this question as their complete episodic data, including their rst episode of care, was not available for analysis. This analysis was conducted using the remaining 86,264 babies who had complete episodic data.

From these 86,264 babies, there were a total of 12,335 transfers involving 8,245 babies. This means that 10% of babies experienced at least one transfer during their time in neonatal care. Of these transfers 83% were within the rst known network of care and 17% were to another neonatal network. Please note that NNAP have not determined which babies were born within their "own" network. Instead the analysis was based on the number of babies who were transferred between di erent NNU, and the neonatal networks to which those units belonged.

A transfer within network is one where the baby is transferred to a hospital within the rst known network of care. Conversely, a transfer outside a neonatal network is one where a baby is transferred to a NNU that did not belong to the rst network of care.

Table 6.1

Transfer of babies out of network of rst care by provider of rst admission for babies discharged in 2014.

Clinical follow-up at 2 years of age

NNAP audit measure: Are rates of normal survival at two years comparable in similar babies from similar neonatal units?

Pre-term infants are at high risk of neonatal mortality and adverse developmental outcomes. It is important that the development of very pre-term babies who were admitted to a neonatal unit is monitored after their discharge from the neonatal unit. The purpose of this follow up is to detect signi cant medical or developmental problems attributable to pre-term delivery, and arrange appropriate treatment. Such follow up is also important to facilitate quality improvement in neonatal care. NICE guidance is being developed as to what form follow up should take, but at present the National Neonatal Service Specification for Critical Care mandates that follow up should be undertaken at 2 years corrected age.

Standard: 100% of babies admitted t o a neonatal unit should have a documented clinical follow up at 2 y ears corrected age

Analysis: (a) number of babies with some/all health da ta entered
(b) number of babies los t to follow up
(c) number of babies who died after discharge
(d) number of babies with no da ta entered
(e) number of babies classi ed as mildly/moderately/severely impaired

Source of Standard: NNAP Board

NNAP audited the number of eligible babies born at a gestational age of <30 weeks for whom a two year (corrected post term) health status follow-up has been partially or fully completed. Follow up data were available up to March 2015, and babies born during the 12 month period of July 2011 to June 2012 were selected, as these babies could have been expected to have had a follow up appointment by the end of 2014.

Details of the classi cations for impairment used in this analysis can be viewed in the full online version of this report.

Results

There were 3,656 babies <30 weeks gestation born between July 2011 and June 2012 who survived and were discharged from a NNU to home, to a ward or to foster care.

(a) 54% had some/ all health data entered
(b) 13% were lost to follow up or were not assessed for other reasons
(c) 20 babies w ere reported to have died after discharge
(d) 46% of babies had no f ollow up data entered at all
(e) Of the 1 973 babies with health data entered, 45% had no neurodevelopmental impairment, 17% had mild/moderate impairment, 18% had severe impairment and 20% had insu cient data to determine the impairment category.

Table 7.1

Clinical follow up data recorded at 2 years of age for 3,656 babies <30 weeks gestation born between July 2011 and June 2012 who survived and were discharged from a NNU to home, to a ward or to foster care.

Year	Eligible babies	Some health data entered = 54%				No health data entered = 46%			
		Impairment not determinable	No impairment	Mild/moderate impairment	Severe impairment	Lost to follow up	Not assessed for other reason	Died post discharge	No data entered at all
2014	3656	392 (11%)	889 (24%)	337 (9%)	355 (10%)	80 (2%)	379 (10%)	20 (1%)	1204 (33%)
Total	3656	1973/3656 (54%)				1683/3656 (46%)			

Table 7.2

Neurodevelopmental outcomes and health data completeness from two year (corrected post term) health follow up recorded by neonatal ODN, babies born <30 weeks gestation between July 2011 and June 2012 who survived to discharge from neonatal care.

Table 7.2 (continued)

Neonatal ODN of nal discharge	Eligible babies	Some health data entered					No health data entered			
		Impairment not determinable	Impairment determinable	No impairment	Mild/ moderate impairment	Severe impairment	Lost to follow up	Not assessed for other reason	Died post discharge	No data entered at all
North West Neonatal ODN	486	43 (9%)	200 (41%)	96 (20%)	45 (9%)	59 (12%)	8 (2%)	47 (10%)	2 (0%)	186 (38%)
Northern Neonatal ODN	206	41 (20%)	91 (44%)	58 (28%)	18 (9%)	15 (7%)	0 (0%)	15 (7%)	2 (1%)	57 (28%)
Peninsula & Western Neonatal ODN	236	30 (13%)	81 (34%)	44 (19%)	19 (8%)	18 (8%)	3 (1%)	14 (6%)	0 (0%)	108 (46%)
South East Coast Neonatal ODN	247	24 (10%)	115 (47%)	72 (29%)	24 (10%)	19 (8%)	2 (1%)	42 (17%)	2 (1%)	62 (25%)
South London Neonatal ODN	281	28 (10%)	126 (45%)	66 (23%)	30 (11%)	30 (11%)	8 (3%)	18 (6%)	2 (1%)	99 (35%)
Sta ordshire, Shropshire and Black Country Neonatal ODN	171	32 (19%)	77 (45%)	37 (22%)	19 (11%)	21 (12%)	0 (0%)	14 (8%)	0 (0%)	48 (28%)
Thames Valley & Wessex ODN (Thames Valley)	157	16 (10%)	95 (61%)	49 (31%)	23 (15%)	23 (15%)	13 (8%)	31 (20%)	1 (1%)	1 (1%)
Thames Valley & Wessex ODN (Wessex)	135	10 (7%)	110 (81%)	70 (52%)	24 (18%)	16 (12%)	0 (0%)	12 (9%)	1 (1%)	2 (1%)
Trent Perinatal & Central Newborn Neonatal ODN	293	29 (10%)	101 (34%)	63 (22%)	17 (6%)	21 (7%)	6 (2%)	64 (22%)	3 (1%)	90 (31%)
Yorkshire & Humber Neonatal ODN	378	56 (15%)	173 (46%)	103 (27%)	28 (7%)	42 (11%)	9 (2%)	39 (10%)	3 (1%)	98 (26%)
Total	3656	392 (11%)	1581 (43%)	889 (24%)	337 (9%)	355 (10%)	80 (2%)	379 (10%)	20 (1%)	1204 (33%)

Table 7.3

Respiratory and gastro-intestinal outcomes and health from two year (corrected post term) health follow up recorded by neonatal ODN, babies born <30 weeks gestation between July 2011 and June 2012 who survived to discharge from neonatal care.

Neonatal ODN of nal discharge	Eligible babies with health data entered	Respiratory				Gastro-intestinal			
		Impairment not determinable	No impairment	Mild/ moderate impairment	Severe impairment	Impairment not determinable	No impairment	Mild/ moderate impairment	Severe impairment
East of England Neonatal ODN	137	24	109	1	3	27	107	2	1
Midlands South West Newborn Neonatal ODN	87	8	75	3	1	6	80	1	0
North Central & North East London Neonatal ODN	173	14	155	3	1	17	149	3	4
North West London Neonatal ODN	98	3	93	1	1	2	90	4	2
North West Neonatal ODN	243	21	211	5	6	21	212	5	5
Northern Neonatal ODN	132	33	97	1	1	31	98	0	3
Peninsula & Western Neonatal ODN	111	19	87	2	3	14	93	2	2
South East Coast Neonatal ODN	139	10	124	0	5	11	125	2	1
South London Neonatal ODN	154	24	123	3	4	26	117	7	4
Sta ordshire, Shropshire and Black Country Neonatal ODN	109	12	91	4	2	11	95	2	1

Table 7.3 continued on page 47

Table 7.4

Comparison to clinical follow-up at 2 years of age results in previous NNAP audits.

Table 8.1

Completeness of available culture data by gestational age. Entered blood culture results include the con rmation of "no growth".

Gestational age group	Number of eligible babies	Blood cultures			CSF cultures	
		Number of blood cultures	Number of blood cultures with results entered (% of blood cultures)	Number of blood cultures with results and clinical signs entered* (% of blood cultures)	Number of CSF cultures	Number of CSF cultures with pathogens entered (% of CSF cultures)
Missing	19	4	4 (100%)	2 (50%)	1	1 (100%)
< = 27 weeks	2321	6457	5573 (86%)	3960 (61%)	569	535 (94%)
28-31 weeks	5233	7075	6097 (86%)	4443 (63%)	486	441 (91%)
32-36 weeks	26262	16100	13600 (84%)	9958 (62%)	803	701 (87%)
> = 37 weeks	52452	25752	21311 (83%)	15176 (59%)	4028	3421 (85%)
Total	86287	55388	46585 (84%)	33539 (61%)	5887	5099 (87%)

*Includes cultures that confirmed that "none" of the predefined clinical signs were present at the time the culture was taken.

Table 8.2

Positive blood culture results by NNU level and gestational age.

Table 8.3

Positive CSF culture results by NNU level and gestational age.

Bloodstream and cerebrospinal uid (CSF) infections

NNAP audit measure: How many bloodstream infections [a] are there on a NNU per 1000 days of central line [b] care?

a: the gr owth of a recognised pathogen in pure culture, or in the case of a mixed growth, or growth of skin commensal, the added requirement for 3 or more of 10 prede ned clinical signs
b: centr al line = UAC, UVC, percutaneous long line or surgically inserted long line.

A central line is a catheter (tube) with its tip in a large vein, and is used to deliver vital nutrition and medication directly into a baby's blood. Infections are a risk in any hospitalisation but when babies have central venous catheters, they are at higher risk for serious infections, especially if bacteria get into the bloodstream.

Where bloodstream infections occur and a central line is in situ, this is termed "CLABSI". The risk of CLABSI can be reduced considerably through the use of proper insertion techniques and management of the central line.

Standard: No de ned standard, audit measure is used for benchmarking
Source of Standard: NNAP Board

Results

86,287 babies in 174 NNU received 1,053,014 days of care. In total 13% of all care days included a central line and 317 bloodstream infections were reported for these central line days; 2.25 bloodstream infections per 1000 central line days. This result should be treated with signi cant caution given the potential for under reporting of blood stream and CSF infections described above.

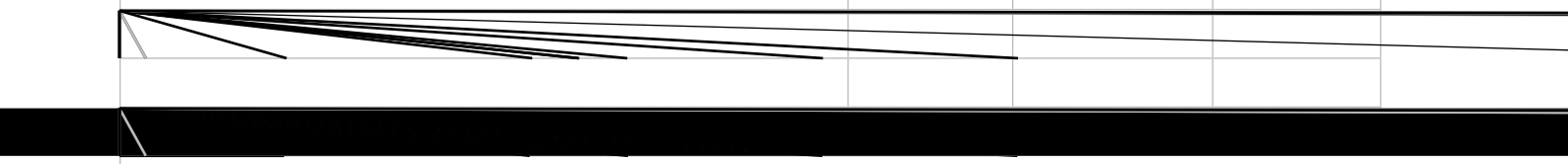
Table 9.1

Occurrence of central line associated bloodstream infection in NNAP participating NNU; babies who died or were discharged during 2014.

Appendix A – Neonatal units that contributed 2014 data

NNU name	NNU level	Number of completed episodes of care included	Number of distinct babies included
Scarborough General Hospital	SCU	244	228
South Tyneside District Hospital	SCU	81	80
The Royal Free Hospital	SCU	340	309
Torbay Hospital	SCU	335	319
University Hospital of North Durham	SCU	784	729
Wansbeck General Hospital	SCU	355	329
Warwick Hospital	SCU	361	324
West Cumberland Hospital	SCU	149	136
West Middlesex University Hospital	SCU	460	421
West Su olk Hospital	SCU	353	340
Worthing Hospital	SCU	651	618
Yeovil District Hospital	SCU	202	193
Ysbyty Gwynedd	SCU	165	151
Airedale General Hospital	LNU	221	215
Barnet Hospital	LNU	1112	1082
Barnsley District General Hospital	LNU	316	296
Basildon Hospital	LNU	517	455
Basingstoke & North Hampshire Hospital	LNU	270	245
Broom eld Hospital	LNU	679	653
Calderdale Royal Hospital	LNU	489	470
Chester eld & North Derbyshire Royal Hospital	LNU	262	251
City Hospital, Birmingham	LNU	1011	969
Colchester General Hospital	LNU	445	407
Countess of Chester Hospital	LNU	538	515
Croydon University Hospital	LNU	483	456
Diana Princess of Wales Hospital	LNU	751	721
Doncaster Royal In rmary	LNU	356	326
Dorset County Hospital	LNU	258	236
East Surrey Hospital	LNU	447	422
Glangwili General Hospital	LNU	187	173
Gloucestershire Royal Hospital	LNU	532	499
Great Western Hospital	LNU	475	434
Hillingdon Hospital	LNU	397	371
Ipswich Hospital	LNU	673	644
Kettering General Hospital	LNU	310	286

NNU name	NNU les 0 0 m 0 50.7 l S Q q 1 0 0 1 485.8941 711.3198 cm		



NNU name	NNU level	Number of completed episodes of care included	Number of distinct babies included
University Hospital of North Tees	NICU	344	329
University Hospital of Wales	NICU	544	524
William Harvey Hospital	NICU	613	573
Wrexham Maelor Hospital	NICU	185	177

[1] Data from James Cook University Hospital includes that of Friarage Hospital. The NNU at the Friarage Hospital closed in October 2014.

[2] Data from Leeds Neonatal Service includes data from Leeds General Hospital and St Jame's Hospital.

[3] Data from Leicester Neonatal Service includes data from Leicester Royal In rmary and Leicester General Hospital.

Appendix B – Key recommendations by audience

The NNAP 2015 Annual Report on 2014 data makes a number of key recommendations of how to address the issues identi ed within the key ndings and results of the audit.

The tables below indicate which of the key recommendations within the report are directed to each of the following audiences:

- Those people who c ommission neonatal services
- The NNAP neona tal unit clinical teams that provide direct neonatal care
- The Health Boar d/Trust senior management that supports neonatal services locally
- The r egional neonatal Operational Delivery Networks (ODN) in England and Wales that provide advice on neonatal services to Health Boards, Trusts and Commissioners.

	For Commissioners of neonatal services
Antenatal Steroids	Commissioners should review antenatal steroid administration for their populations, and provide support for any units whose administration rates could be improved.
Neonatal Unit Transfer	Commissioners should act to minimise clinically unnecessary transfers and take transfers into account when reviewing neonatal unit cot capacity.
Clinical follow-up at 2 years of age	Specialist Commissioners and Health Boards should ensure that their contractual arrangements with NHS units include adequate incentives for neonatal follow up in line with current Neonatal Critical Care Service Speci cations.
Data Management	Neonatal service commissioners should give incentives to high quality data management for national audit and benchmarking and support the provision of sta at a network and unit level with responsibilities for data capture and analysis.

Consultation with parents	Neonatal units with low rates of consultation with parents should critically review

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