

NNAP

National Neonatal
Audit Programme

✧ RCPCH Audits

National Neonatal Audit Programme (NNAP) Summary report on 2023 data

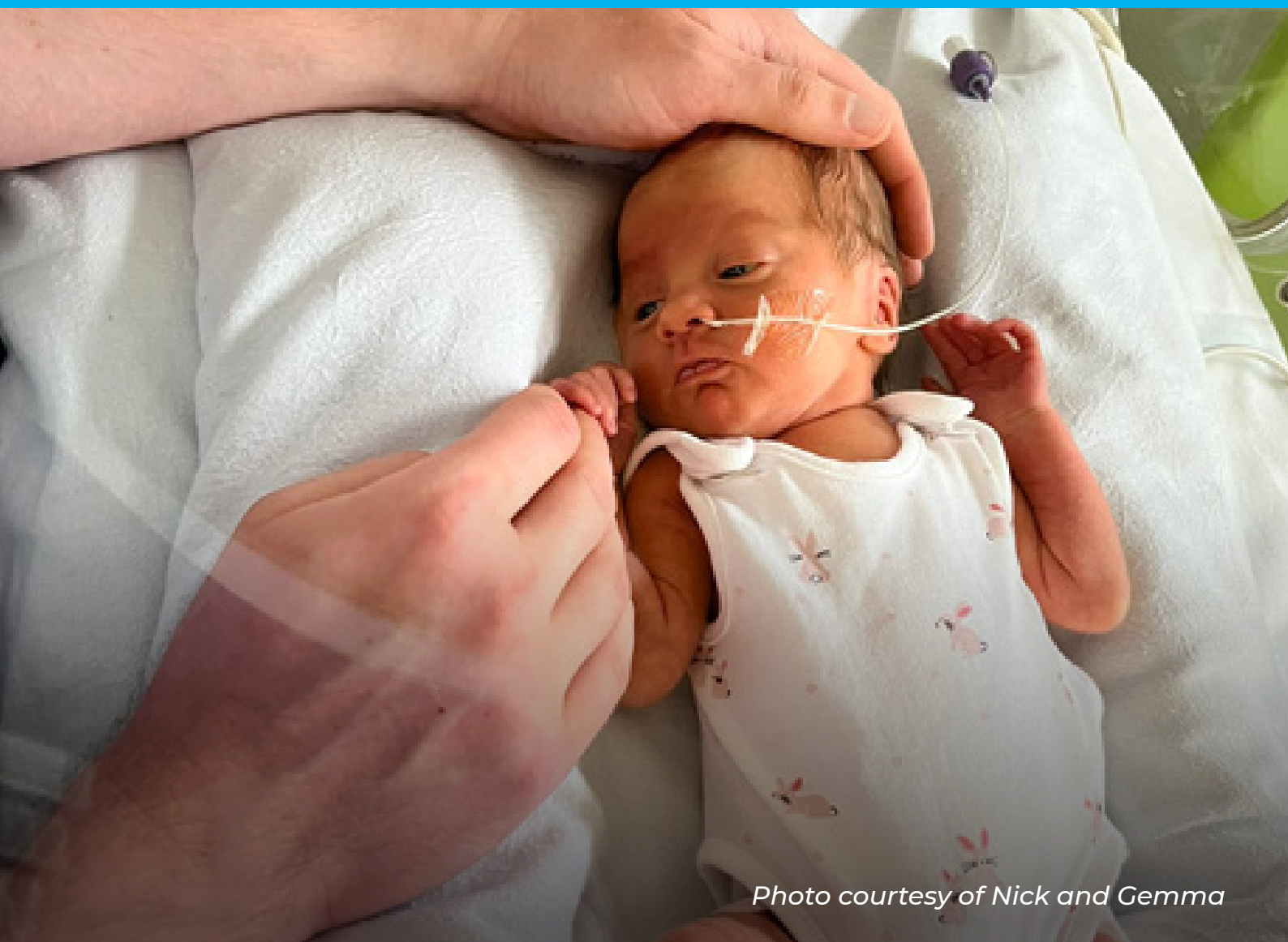


Photo courtesy of Nick and Gemma



HQIP

Healthcare Quality
Improvement Partnership

✧ RCPCH

Royal College of
Paediatrics and Child Health

Leading the way in Children's Health



Summary report on 2023 data

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Front cover photo courtesy of Nick Furlong and Gemma Hextall:

“ We can see here just how small Allegra looked in comparison to my hands. What we can't see is that feeling of how the world stopped and nothing else mattered, every time we got to put our hands into the incubator and lay our hands on her to comfort. ”

Introduction

Established in 2006, the National Neonatal Audit Programme (NNAP) is commissioned by the Healthcare Quality Improvement Partnership (HQIP) and delivered by the Royal College of Paediatrics and Child Health (RCPCH).



It assesses whether babies admitted to neonatal units receive consistent high-quality care in relation to the NNAP audit measures that are aligned to a set of professionally agreed guidelines and standards. The NNAP also identifies variation in the provision of neonatal care at local unit, regional network and national levels and supports stakeholders to use audit data to stimulate improvement in care delivery and outcomes.

The audit reports key outcomes of neonatal care, measures of optimal perinatal care, maternal breastmilk feeding, parental partnership, neonatal nurse staffing levels, and other important care processes.

This report presents the key messages and national recommendations developed through consensus at the NNAP Key Findings and Recommendations Workshop. Data is based on babies eligible for inclusion in NNAP measures between the dates of 1 January and 31 December 2023.

Further information:

Further information about the background, aims, and scope of the NNAP is available at:

www.rcpch.ac.uk/about-nnap



Full results

Full results at unit and network level, interactive reporting tools and unit posters are available on NNAP Online at: nnap.rcpch.ac.uk

Line of Sight Table

The Line of Sight Table (2023 data) describes the evidence base for the recommendations made in this report, and is available at: www.rcpch.ac.uk/nnap-report-2023-data

Extended analysis report

The NNAP 2023 data extended analysis report provides results for all NNAP measures by unit type, by neonatal network, and for England, Scotland, Wales and the Isle of Man combined.

There is also a summary of findings for each audit measure, recommended next steps for services seeking to make improvements and links to further resources and case studies.

www.rcpch.ac.uk/nnap-report-2023-data

NNAP Governance

Details of the NNAP governance structure and membership of the NNAP Project Team, Project Board and Methodology and Dataset Group are available at:

www.rcpch.ac.uk/work-we-do/quality-improvement-patient-safety/national-neonatal-audit-programme/governance-delivery

Results at a glance

The National Neonatal Audit Programme (NNAP) assesses whether babies admitted to neonatal units receive consistent high-quality care and identifies areas for improvement.

This poster summarises the results based on NNAP data relating to babies admitted to neonatal care between January and December 2023, unless otherwise stated. Results displayed in the horizontal pink bars show the range of neonatal network proportions (lowest and highest) and the pink circles shows the overall audit proportion.

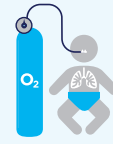
Outcomes of neonatal care



Mortality

6.4% of babies born at less than 32 weeks died before discharge home.

↓ 0.1% decrease from previous year (2022: 6.5%)



Bronchopulmonary dysplasia (BPD)

31.5% of babies born at less than 32 weeks developed BPD or died.

↑ 0.2% increase from previous year (2022: 31.3%)



Necrotising enterocolitis

5.5% of babies born at less than 32 weeks developed necrotising enterocolitis.

↓ 0.7% decrease from previous year (2022: 6.2%)



Bloodstream infection

4.6% of babies born at less than 32 weeks had growth of a clearly pathogenic organism.

↓ 0.8% decrease from previous year (2022: 5.4%)



Preterm brain injury – Intraventricular haemorrhage (IVH)

6.6% of babies born at less than 32 weeks experienced IVH.

↓ 0.9% decrease from previous year (2022: 7.5%)



Preterm brain injury – cystic periventricular leukomalacia (cPVL)

2.6% of babies born at less than 27 weeks' were born in a centre with a NICU on site.

→ 0% change from previous year (2022: 2.6%)



Optimal perinatal care



Antenatal steroids

52.9% of mothers of babies born at less than 34 weeks' were given a full course of antenatal steroids in the week prior to delivery.

↑ 0.9% increase from previous year (2022: 52%)



Born in a centre with a NICU

79.6% of babies born at less than 27 weeks' were born in a centre with a NICU on site.

↑ 0.6% increase from previous year (2022: 79%)



Deferred cord clamping

68.3% of babies born at less than 34 weeks' had their cord clamped at or after one minute.

↑ 7.9% increase from previous year (2022: 60.4%)



Temperature on admission

80.4% of babies born at less than 27 weeks' were admitted with a temperature within the recommended range of 36.5°C-37.5°C.

↑ 4.1% increase from previous year (2022: 76.3%)



Antenatal magnesium sulphate

85.1% of mothers of babies born at less than 30 weeks' were given antenatal magnesium sulphate.

↓ 0.4% decrease from previous year (2022: 85.6%)



Breastmilk feeding in first 2 days of life

62% of babies born at less than 34 weeks' received their mother's milk in the first 2 days of life.

↑ 13% increase from previous year (2022: 49%)



Parental partnership in care

WITHIN
14
DAYS



Breastmilk feeding at 14 days of life

79.6% of babies born at less than 34 weeks' received their mother's milk at 14 days of life.

↑ 0.6% increase from previous year (2022: 79%)

70.4% **79.6%** 90.3%

AT
DISCHARGE



Breastmilk feeding at discharge

63% of babies born at less than 34 weeks' received their mother's milk at discharge.

↑ 0.1% increase from previous year (2022: 62.9%)

47.4% **63%** 82%



Parent consultation within 24 hours

95.2% of parents had a documented consultation with a senior member of the neonatal team within 24 hours of their baby's admission.

↓ 0.7% decrease from previous year (2022: 95.2%)

92.6% **95.2%** 97.4%



Parent inclusion in consultant ward rounds

38.7% of baby care days had a consultant-led ward round with at least one parent included.

↓ 8.5% decrease from previous year (2022: 47.2%)

25.7% **38.7%** 62.3%

Care processes and nurse staffing



On-time screening for retinopathy of prematurity (ROP)

78.4% of eligible babies were screened on time for ROP.

↑ 9.4% increase from previous year (2022: 69%)

65.4% **78.4%** 86.4%

I am
2



Medical follow up at two years

77% of babies born at less than 30 weeks' had a documented medical follow up at the right time.

↑ 2.6% increase from previous year (2022: 74.4%)

61.7% **77%** 90.1%

Non-invasive breathing support

49.3% of babies born at less than 32 weeks' received only non-invasive breathing support in the first seven days of life.

↑ 1.7% increase from previous year (2022: 47.6%)

41.1% **49.3%** 57.3%

Neonatal nurse staffing

79.3% of nursing shifts were staffed according to recommended levels.

↑ 8.2% increase from previous year (2022: 71.1%)

69.3% **79.3%** 91.2%

Further information and resources

For neonatal services, neonatal networks and trusts/health boards

Full annual results

Full annual results at neonatal unit and network levels, interactive reporting tools and unit posters are available on NNAP Online at: www.nnap.rcpch.ac.uk

Extended Analysis Report

The NNAP 2023 Data: Extended Analysis Report, providing in-depth results and a summary of findings by audit measure, along with full national recommendations, local quality improvement recommendations and links to case studies and useful resources is available at: www.rcpch.ac.uk/nnap

For parents and families

Your Baby's Care Guide 2023

Parents and families can find more information about the NNAP and 2023 results in **Your Baby's Care**, a guide to the NNAP, while **NNAP Online** provides more in-depth results for each neonatal unit and network in England and Wales.

Your Baby's Care: www.rcpch.ac.uk/your-babys-care
NNAP Online: www.nnap.rcpch.ac.uk

How we use information



To find out more about how we use information about babies experiencing neonatal care and their mothers, visit www.rcpch.ac.uk/your-babys-information or scan the QR code with your phone to read our leaflet Your Baby's Information.

Key messages & recommendations

1 Outcomes of neonatal care

- Neonatal unit mortality in very preterm infants in England, Scotland, Wales, and the Isle of Man is:
 - Not improving. The one-year cohorts, shown for this report, demonstrate a relatively stable mortality trend between 2018 and 2023 (2018 - 6.4%, 2019 - 6%, 2020 - 6.6%, 2021 - 6.6%, 2022 - 6.5%, 2023 - 6.4%).
 - Similar to that seen in Australia, New Zealand¹ and Canada². Neonatal unit mortality is known to vary within Europe³.
 - Dynamic. From 2018 to 2023, the mortality trend in several neonatal networks varied by over 2%, whereas others showed relative stability.
 - Up to twice as high in some neonatal networks compared to others in a way that is not explained by case mix and with the differences undiminished over time.
- The NNAP Healthcare Improvement Strategy (2022-2025)⁵ introduced an improvement goal with the stated aim of “reducing the difference between the networks with the most negative and most positive treatment effect for mortality until discharge home by 0.3% per year”. No reduction has been seen. In 2023, the difference in mortality treatment effect was 3.9%, compared to 3.8% in 2022 and 2021. Detailed mortality trend data is also available in the [NNAP Extended Analysis Report](#) (fig 5, p19) and the [NNAP Online](#) dashboard.
- The overall rate of admission and survival for babies at 23 weeks gestation remained relatively unchanged (46.3% of 244 admitted babies survived in 2023, compared to 48.6% of 286 admitted babies in 2022). Compared to changes in previous years, there was only a small rise in the number of babies born and admitted for neonatal intensive care at 22 weeks gestation (110 in 2023 compared to 100 in 2022).
- The rates of complications relating to preterm birth and the management of preterm infants have not improved. This is clearest in the commonly occurring complication of bronchopulmonary dysplasia (BPD), which continues to rise despite recent clinical initiatives (2021 - 30.2%, 2022 - 31.3%, 2023 - 31.5%). An example of such treatments is the use of non-invasive breathing support, which varies strikingly between neonatal units of the same type. The observed increase in the rate of BPD cannot be attributed to falling mortality or an increase in the number of the least preterm infants. The increase in rates of BPD is not seen in the babies affected by the most serious forms of BPD such as ventilation at term equivalent. Striking variations in rates of BPD continue to be observed between units and neonatal networks. A full breakdown of the network and unit level BPD results can be found in the [NNAP Extended Analysis Report](#) (p25-27) and [NNAP Online](#).
- Serious preterm brain injury was identified in 9.0% of very preterm babies nationally (572 of 6,390). 6.6% and 2.6% of very preterm infants had IVH 3, 4 and cystic periventricular leukomalacia (cPVL). Research indicates that preterm brain injury represents 40% of the total number of serious brain injuries recorded in infancy⁶, itself part of a wider government ambition (England and Wales) to reduce all avoidable harm by 50%⁷. Despite the existence of an agreed surveillance definition and established reporting mechanisms, rates of data completeness remain a serious concern (for example five neonatal networks had missing data rates that ranged from 22.7% to 55.8% for IVH). A high proportion of missing data, wide inter-unit variation in the rates of missing data and the fact that overall, the data suggests that one in ten babies did not receive relevant imaging within a week of birth, implies that measurement of progress towards the national ambition may be seriously undermined by data quality issues. Further trend data relating to preterm brain injury is available in the [NNAP Extended Analysis Report](#) (p44) and [NNAP Online](#).
- Rates of necrotising enterocolitis (NEC) are not yet falling in a sustained and credible way. 5.5% (385 of 6,967) of babies born at less than 32 weeks gestational age met the NNAP surveillance definition of NEC. 88% of units provided assurance that their 2023 data were accurate, but as with preterm brain injury measurement of this serious complication of preterm birth is compromised by poor data quality. Trend data is available in the [NNAP Extended Analysis Report](#) (fig 13, p34).

1. Report of the Australian and New Zealand Neonatal Network 2021. [Available here](#).

2. The Canadian Neonatal Network (CNN) Annual Report 2022. [Available here](#).

3. Shah, Prakesh S et al. The International Network for Evaluating Outcomes of very low birth weight, very preterm neonates (iNeo): a protocol for collaborative comparisons of international health services for quality improvement in neonatal care. 2014. BMC paediatrics vol. 14 110.

4. NNAP Healthcare Improvement Strategy 2022-2025. [Available here](#).

5. BAPM. Antenatal Optimisation for Preterm Infants less than 34 weeks. A Quality Improvement Toolkit. October 2020. [Available here](#).

6. Gale C et al; Brain Injuries expert working group. Neonatal brain injuries in England: population-based incidence derived from routinely recorded clinical data held in the National Neonatal Research Database. 2018.

7. Health Do. New ambition to halve rate of stillbirths and infant deaths. 2015. [Available here](#).

- Rates of bloodstream infection in very preterm infants show tentative signs of an overall decrease (2023 - 4.6%, 2022 - 5.4%). The rigour of such a finding will be enhanced by forthcoming data linkage projects.



In addition to previous recommendations, The NNAP makes the following national recommendations:

1. National Health Service England and health departments in the **Devolved Governments** should:

- Ensure that **Neonatal Networks** with low rates of survival review their mortality data and develop locally prioritised improvement plans. Quality improvement activity should focus on best practices identified from **Neonatal Networks** exhibiting low mortality with particular attention given to differences in network structure, staffing, clinical governance, and clinical practices.
- Review survival rates in very preterm infants and work with **The National Institute for Health and Care Research (NIHR)** to support future research investigating the reasons for the observed geographical variation in mortality.

2. National Health Service England and health departments in the **Devolved Governments** should ensure that **Neonatal Networks** work with their constituent units and are:

- Regularly reviewing and addressing their rates of missing data for preterm brain injury (intraventricular haemorrhage, cystic periventricular leukomalacia, and post haemorrhagic ventricular dilatation) and necrotising enterocolitis.
- Utilising the NNAP restricted access dashboard to validate these data in order that units and networks can develop quality improvement plans based on babies' outcomes.

2 Optimal perinatal care

- Over three quarters of babies born at less than 34 Weeks' gestation did not receive an optimal care journey. Whilst there is encouraging improvement in this metric across most regions there remains significant variation between neonatal units and networks.
- 68.3% (9,031 of 13,227) of babies born at less than 34 weeks' gestation had deferred cord clamping (DCC). In 2022, the proportion was 60.4%, indicating a striking 7.9% improvement over the past year. Many neonatal units are now delivering DCC at or above the levels observed in the clinical trials that demonstrated reduced neonatal mortality after preterm birth⁸. In contrast to practice in some of the trials, less than 7% of babies had DCC of more than two minutes, likely reflecting a literal adoption of published guidance. A small number of neonatal units can be identified as low outliers in the proportion of babies who get DCC (alarm threshold). These and other units may perceive barriers to wider use of DCC that are not appreciated in higher use units. The [NNAP Extended Analysis Report](#) (fig 35, p74) provides the unit level proportions for DCC in the form of caterpillar plots.
- 52.9% (6,090 of 11,518) of mothers who delivered a baby between 23 and 33 weeks gestational age received a full course of antenatal steroids within one week prior to delivery. Antenatal steroids are acknowledged to be the most powerful influence on the survival and wellbeing of preterm infants. Changes in their use are difficult to interpret reliably from the 2023 NNAP data. This is in part due to the lack of balancing measures and in part due to concerns that any apparent improvement in adherence to the existing measure may simply reflect a measurement driven trend to administer antenatal steroids with a shorter than recommended dosage interval. The NNAP has developed a dataflow to address the latter problem.
- 85.1% (3,317 of 3,897) of mothers who delivered a baby at less than 30 weeks gestational age received antenatal magnesium sulphate. This represents a small decrease from 2022 data (0.5%) and remains below the new developmental standard (90%). While it is not likely that all eligible women can receive magnesium sulphate due to the emergency nature some preterm labour, further increases in aggregate usage can likely be achieved by examining and learning from cases where administration did not occur, particularly in centres with below average adherence. The [NNAP Extended Analysis Report](#) (fig 32, p70) provides trend charts illustrating the administration of antenatal magnesium sulphate.

8. Tarnow-Mordi, William et al. Delayed versus Immediate Cord Clamping in Preterm Infants. The New England journal of medicine vol. 377,25 (2017): 2445-2455.



- 80.4% (10,000 of 12,441) of babies had a temperature measured on time and within the normal range. This data represents a continuation of the trend of year-on-year improvement in the proportion of babies admitted with a normal temperature and may be attributable to national perinatal improvement programmes⁹. Further trend data is available in the [NNAP Extended Analysis Report](#) (fig 38, p78).
- There has not been any significant improvement in the proportion of the most premature babies delivered in the most appropriate hospitals (2023 - 79.6%, 2022 - 79.0%). As with timely administration of antenatal steroids and administration of magnesium sulphate, early recognition of symptoms and signs of preterm labour will be central in facilitating further improvement. Further detail can be found in [NNAP Extended Analysis Report](#) (p62).

In addition to previous recommendations, The NNAP makes the following national recommendations:

3. In order for perinatal teams to identify and implement the necessary perinatal interventions at the earliest opportunity, the **Departments of Health** in England, Wales, Scotland, and the Isle of Man should:
 - Commission public health campaigns aimed at raising public and professional awareness of the nature and importance of the signs and symptoms of preterm labour and the effectiveness of clinical interventions.
 - Work with relevant manufacturers and distributors to address supply chain challenges in the delivery of quantitative fetal fibronectin testing kits¹⁰.
4. **Neonatal Networks** should ensure that their constituent units are using the NNAP restricted access dashboard to review their rates of optimal perinatal care delivery, identifying instances of non-adherence, and implementing quality improvement activities in response to them.

3 Parental partnership in care

- There has been a rise in the proportion of babies less than 34 weeks' gestation who received at least some maternal breastmilk within the first two days of life from 49% in 2022 to 62% in 2023. This may reflect increased recording of small amounts of milk administered to babies as 'mouth care'. However, a temporal change can be seen in data collected since 2021, meaning that this factor does not explain all the observed change. There remains a large variation by region (41.4% - 78.3%) in the proportion of babies receiving breastmilk within 2 days of life. This may reflect differences in clinical preference or the availability of breastmilk. Striking regional variation in rates of breastmilk feeding later on in babies' stays and at discharge remains evident.
- The proportion of babies receiving breastmilk feeding at 14 days of life (79.6% - 9,328 of 11,718) shows some modest improvement in promoting maternal milk use for premature babies.
- There has been no change in the proportion of babies receiving breastmilk feeding at discharge home (2023 - 63%, 2022 - 62.9%). Breastmilk feeding proportions from admission to day 90 are available in the [NNAP Extended Analysis Report](#) (fig 48, p101) for each network.
- For more than one neonatal unit admission in twenty, there is no record of parents being seen by a senior member of staff with 24 hours. This poor adherence represents a small decline (0.3%) since this measure was last subject to outlier identification in 2020. This highlights the known challenges in maintaining improved quality and further suggests that outlier identification may support efforts to maintain adherence, which has implications for this audit and perinatal quality improvement generally.
- 38.7% of baby care days had a consultant-led ward round with at least one parent included (264,824 days of a possible 683,717 days). There is wide variation in the proportion of consultant ward rounds with parental involvement. Adherence at neonatal network level ranged from 26.5% to 68.6% and even more strikingly unit level adherence ranged from 3.3% to 99%. There may however be differential interpretation or implementation of this measure in neonatal units.

9. [Maternal and Neonatal Safety Improvement Programme](#) (MatNeoSIP), Perinatal Excellence to Reduce Injury in Premature Birth (PERIPrem), and the [Scottish Patient Safety Programme](#) (SPSP).

10. NHS England and the Department of Health and Social Care (DHSC), December 2023. [Available here](#).



In addition to previous recommendations, The NNAP makes the following national recommendation:

- 5. Neonatal Networks** should work with their constituent units and encourage them to use the monthly data available in the NNAP restricted access dashboard to identify cases where optimal parental partnership in care did not occur. These data will support neonatal units to enhance their delivery of family centred care.

4 Neonatal nurse staffing

- The proportion of neonatal nurse shifts staffed according to recommended levels in 2023 is 79.3% (95,893 of 120,946), an improvement from last year (2022 – 71.1%). This increase in the proportion of appropriately staffed shifts is encouraging and likely reflects increased funding for nurses specified by Implementing the Recommendations of the [Neonatal Critical Care Transformation Review](#) (NCCR). Longitudinal nurse staffing graphs are available in the [NNAP Extended Analysis Report](#) (p113.) for each network.

5 Care processes

- Overall, 49.3% (3,402 of 6,894) of babies born at less than 32 weeks gestational age received only non-invasive respiratory support in the first seven days of life, which is recommended by NICE for support of the most premature infants¹¹. The proportion of babies in NICUs receiving only non-invasive breathing support in the first 7 days varies from 18.5% to 70.5%. The high variance observed is not explained by gestational age differences in the babies cared for by the NICU – this is shown in the treatment effect analysis available in the [NNAP Extended Analysis Report](#) (fig 69, p133) and [NNAP Online](#).
- Overall, national adherence to the UK screening for retinopathy of prematurity (ROP) [guideline](#) has improved markedly. In 2023, 78.4% (5,333 of 6,799) of eligible babies are screened according to the guideline which represents a 9.4% increase from 2022 (69% - 3,509 of 5,083). This improvement can be observed in more detail through the quarterly trend data available on the [NNAP Online Dashboard](#). There are however three neonatal networks where improvement in adherence lags behind that of most others.
- There was only a small increase (2.6%) in the proportion of babies born at less than 30 weeks gestation who received a two-year follow-up assessment within the appropriate time window (77% - 2,494 of 3,240).

11. NICE Quality Standard [QS193]. Specialist neonatal respiratory care for babies born preterm. 15 July 2020. [Available here](#).

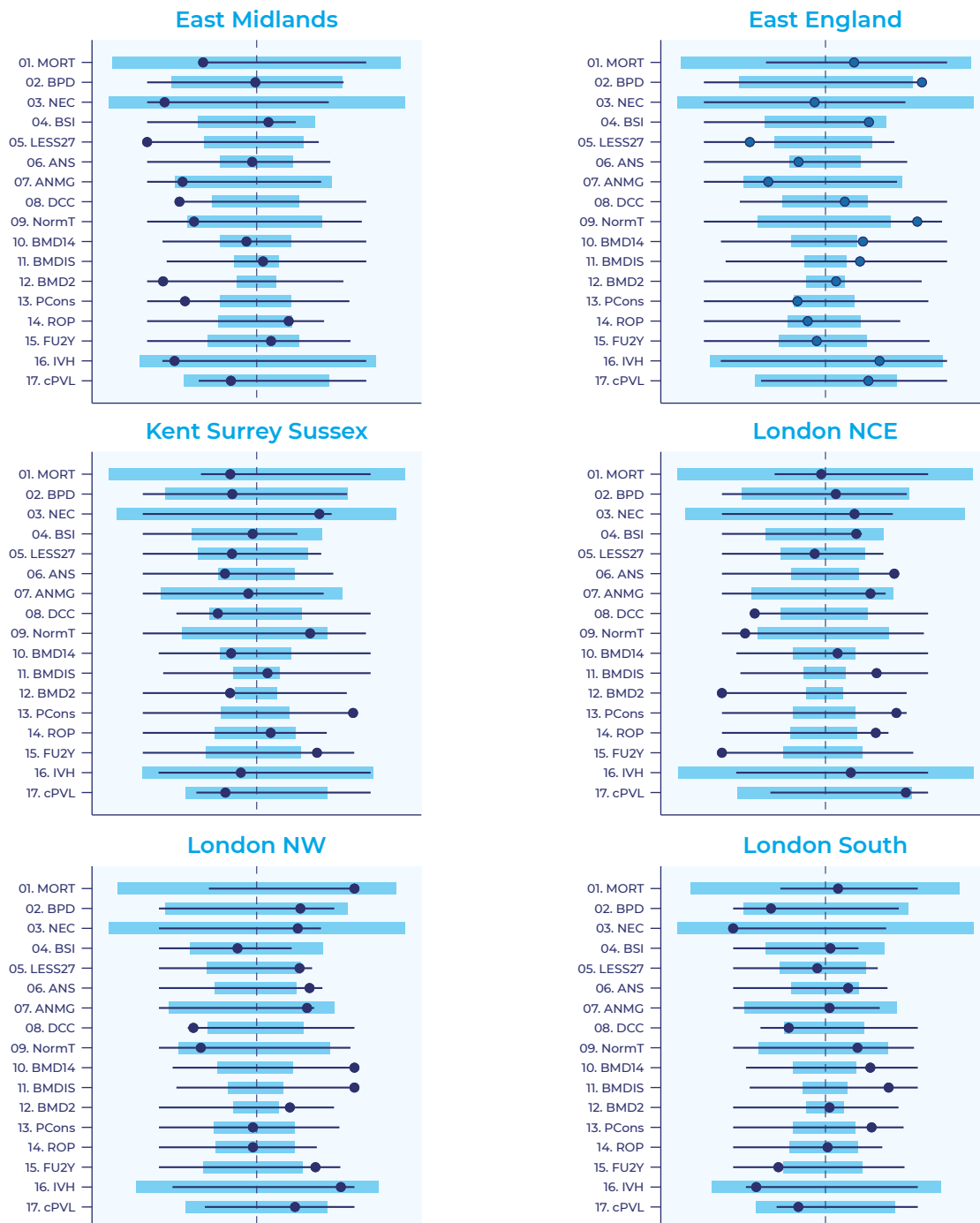
Summary results by network

The spine plots below give an overview of overall neonatal network performance across NNAP measures and support the management of quality improvement priorities.

Performance is shown with a black dot positioned on a horizontal line for each measure. The horizontal line extends from the lowest to the highest value for that measure among all networks. Proportions are scaled so

the overall mean for each measure is aligned along a single vertical line, with better performance oriented to the right-hand side. The grey bar indicates two standard deviations either side of the overall proportion.

The measures of NEC, BSI, BPD or death and mortality are represented by treatment effect (see the extended analysis report for further information, available at: www.rcpch.ac.uk/resources/NNAP-summary-report-2023-data)

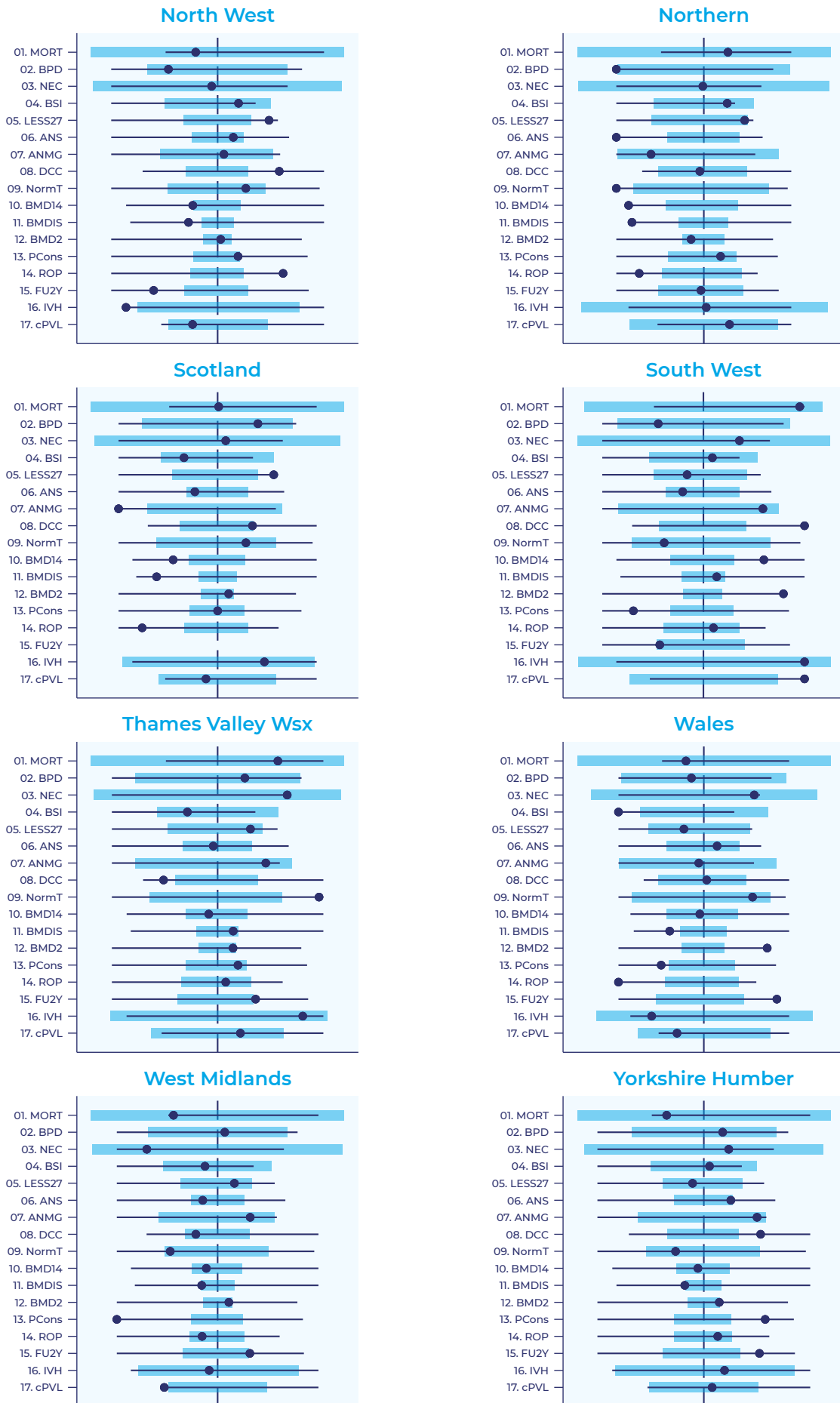


KEY:

- MORT:** Treatment effect of mortality
- BPD:** Treatment effect of bronchopulmonary dysplasia/death
- NEC:** Treatment effect of necrotising enterocolitis
- BSI:** Treatment effect of bloodstream infection
- LESS27:** Birth in a centre with a NICU
- ANS:** Antenatal steroids

- ANMG:** Antenatal magnesium sulphate
- DCC:** Deferred cord clamping
- NormT:** Normal temperature
- BMD14:** Breastmilk day 14
- BMDIS:** Breastmilk at discharge
- BMD2:** Breastmilk at day 2

- PCons:** Parental consultation in 24h
- ROP:** Retinopathy of prematurity
- FU2Y:** Two year follow up
- IVH:** Intraventricular haemorrhage or death
- cPVL:** Cystic periventricular leukomalacia or death



FULL RESULTS:

Full results at unit and network level, including unit level spine plots are available on NNAP Online at: <https://nnap.rcpch.ac.uk/>

A guide to the
**National Neonatal
Audit Programme**
Summary report
on 2023 data



The National Neonatal Audit Programme is commissioned by the Healthcare Quality Improvement Partnership (HQIP) as part of the National Clinical Audit and Patient Outcomes Programme (NCAPOP). HQIP is led by a consortium of the Academy of Medical Royal Colleges, the Royal College of Nursing and National Voices.

Its aim is to promote quality improvement in patient outcomes, and in particular, to increase the impact that clinical audit, outcome review programmes and registries have on healthcare quality in England and Wales.

HQIP holds the contract to commission, manage and develop the National Clinical Audit and Patient Outcomes Programme (NCAPOP), comprising around 40 projects covering care provided to people with a wide range of medical, surgical and mental health conditions. The programme is funded by NHS England, the Welsh Government and, with some individual projects, other devolved administrations and crown dependencies. www.hqip.org.uk/national-programmes



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