# Appendix A: Results and methods

## National Neonatal Audit Programme (NNAP) Annual Report on 2020 Data



Published by RCPCH March 2022.

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Cite as: Appendix A: Results and Methods, National Neonatal Audit Programme Annual Report on 2020 Data. RCPCH: London.

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# 1. Introduction

This document is an appendix to the National Neonatal Audit Programme (NNAP) Annual Report on 2020 Data. It provides results by NNAP measure at unit level (SCU, LNU, NICU), by neonatal network, and for England and Wales combined, grouped by theme. It also includes the NNAP methodology, list of participating neonatal services and list of pathogens used for reporting bloodstream infection.

The NNAP Annual Report on 2020 Data contains key messages and recommendations by theme, case studies, support and resources for healthcare improvement, information for parents and carers, and the future direction of the Programme. It is available to download at: www.rcpch.ac.uk/nnap.

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

# 2. Outcomes of neonatal care

## 2.1. Mortality until discharge in very preterm babies

*What proportion of very preterm babies die before discharge home, or 44 weeks post-menstrual age (whichever occurs sooner)?*

The NNAP reports mortality until discharge, or 44 weeks post-menstrual age (whichever occurs sooner) for a three-year cohort of babies born at 24 to 31 weeks gestational age inclusive between 1 July 2018 and 30 June 2020.

We chose to report this measure of mortality to supplement other measures of mortality such as that reported by Mothers and Babies: Reducing Risk through Audits and Confidential Enquiries in the UK (MBRRACE-UK). The NNAP measure focusses only on very preterm babies (those born at less than 32 weeks gestation) because they experience higher mortality. MBRRACE-UK report all gestations' mortality. Also, unlike MBRRACE-UK, NNAP reporting is limited to those babies born alive and admitted to neonatal units. An important additional strength of NNAP mortality reporting is that it describes mortality up to the point of hospital discharge. MBRRACE-UK report neonatal mortality, defined as that occurring before 28 days of age, by centre. There is evidence that important numbers of babies die after 28 days[1]. MBRRACE-UK have published data showing national rates of infant mortality (death before a year of age)[2].

We present three summary measures of mortality: the observed proportion, an adjusted proportion, and a treatment effect. The observed proportion is simply the number of babies in NNAP who died before discharge home or 44 weeks, divided by the total number of babies in NNAP.

The adjusted proportion uses a statistical method, called multilevel logistic regression, to remove the influence of "casemix" variables (characteristics which raise or lower a baby's risk of dying). Any unexplained variation in mortality left over that shows as networks with a higher or lower proportion than the national average goes to make up the adjusted proportion.

These casemix variables are: birthweight; sex; gestation; birth year; maternal age; number of previous pregnancies; maternal ethnicity; multiplicity; maternal smoking; medical problems of pregnancy; placental abruption; onset of labour and children living in low income families.  We are using children in low income families as a measure of deprivation.

The adjusted proportion in effect answers the question "what would the results have been for a unit/network if their casemix had been representative of all national NNAP data?"

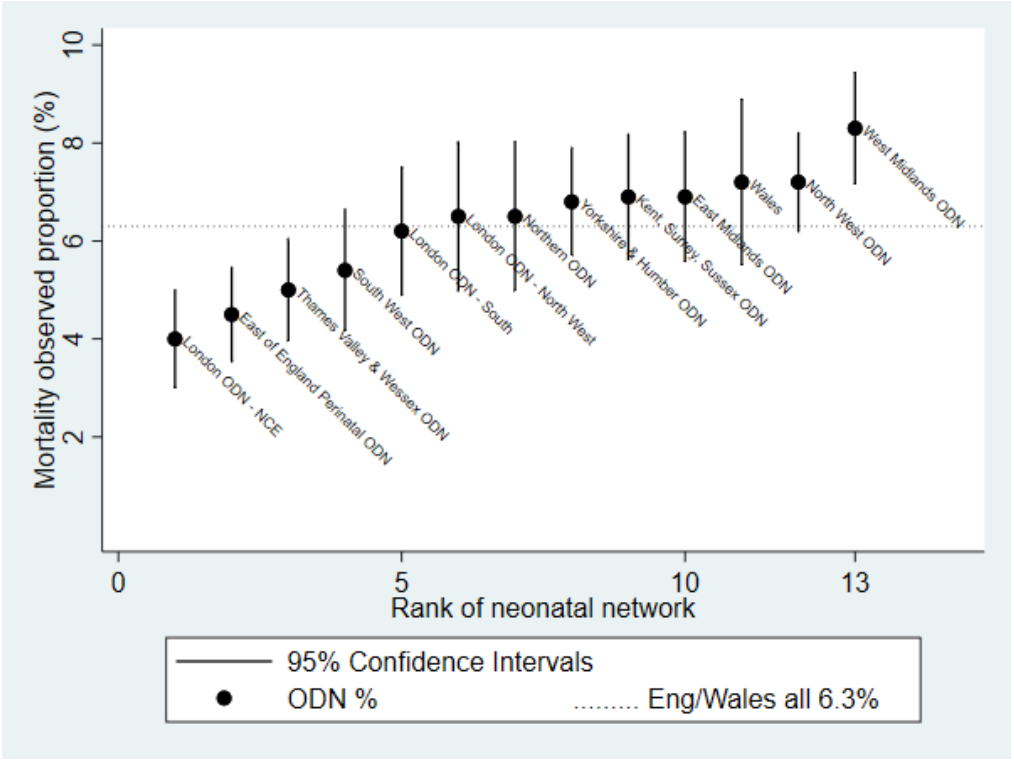
The treatment effect is the difference between the adjusted proportion and the national average. A positive treatment effect indicates that the rate of mortality is higher than expected in the network of interest.

NNAP clinical leads were asked to provided assurance that all deaths meeting the inclusion criteria were entered onto BadgerNet. In England and Wales, 89.6% (147/164) of neonatal units provided this assurance of their data.

# Results

**Figure 1. Caterpillar plot of observed proportion of mortality until discharge in babies born at less than 32 weeks (top) and adjusted proportion of mortality until discharge (bottom), by neonatal network or operational delivery network (ODN).**

*Network proportions are represented by dots. The 95% confidence intervals for a network are shown by a vertical line with each dot.*



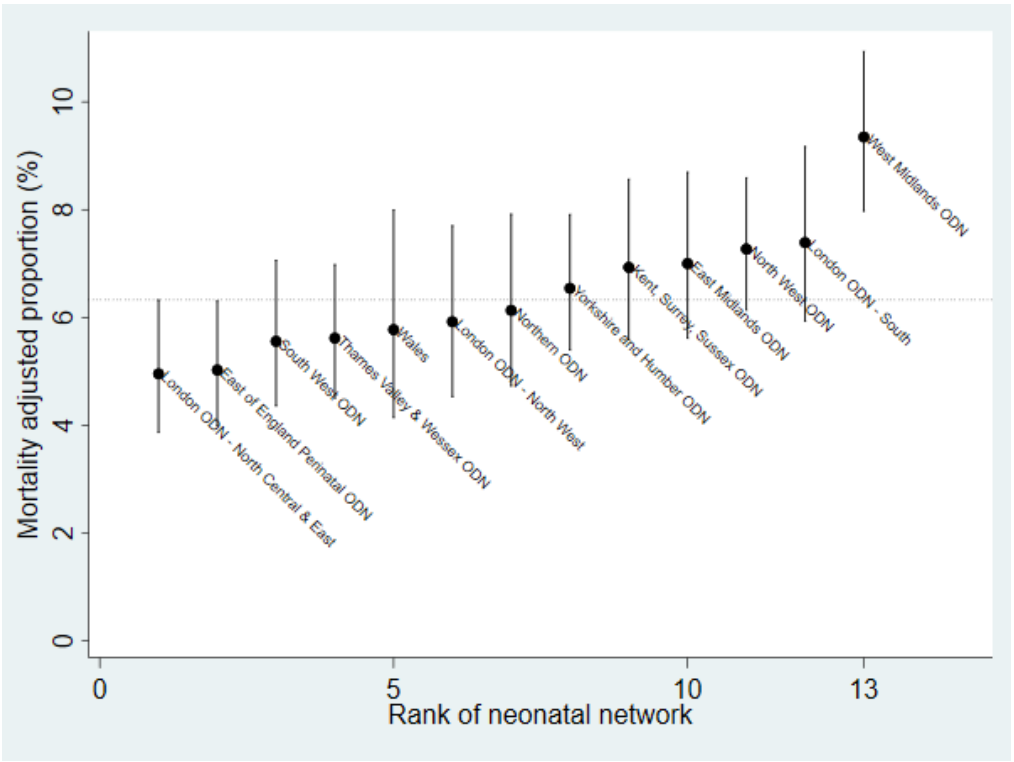
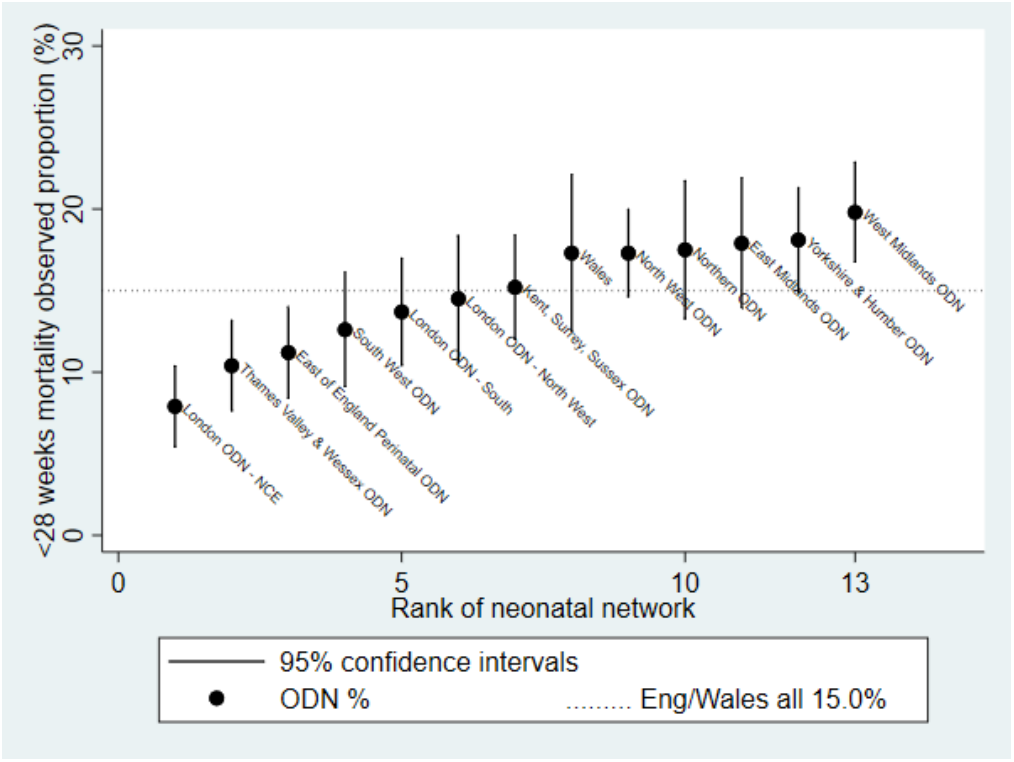



**Figure 2. Caterpillar plot of observed proportion of mortality until discharge in babies born at less than 28 weeks gestational age (top) and adjusted proportion of mortality until discharge (bottom), by neonatal network or operational delivery network (ODN).**

*Network proportions are represented by dots. The 95% confidence intervals for a network are shown by a vertical line with each dot.*



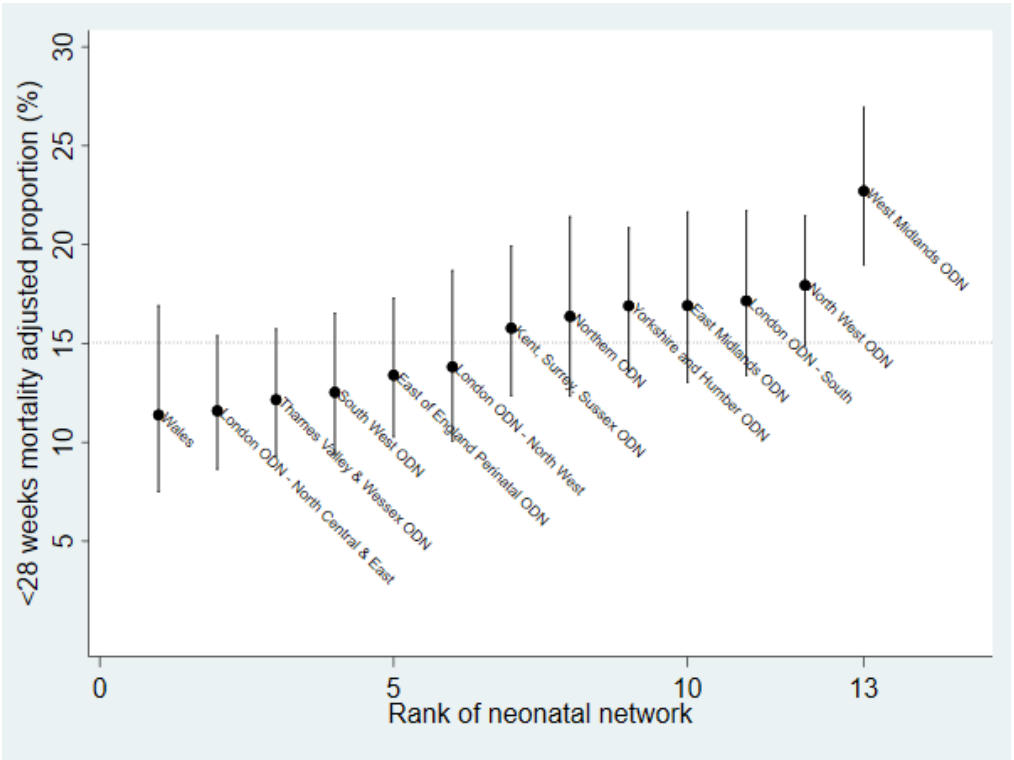



**Table 1. Mortality until discharge home from neonatal care, observed and adjusted proportions: neonatal networks (all units).**

| Network | Total eligible babies | Total with outcome | Survived to 44 weeks PMA or discharge home | Died before 44 weeks PMA (observed) % | Adjusted mortality % | Missing | Treatment effect % |
|---|---|---|---|---|---|---|---|
| East Midlands ODN | 1,484 | 1,484 | 1,381 | 103 (6.9%) | 7.0% | 0 | 0.7% |
| East of England Perinatal ODN | 1,863 | 1,863 | 1,780 | 83 (4.5%) | 5.0% | 0 | -1.3% |
| Kent, Surrey, Sussex ODN | 1,585 | 1,585 | 1,476 | 109 (6.9%) | 6.9% | 0 | 0.6% |
| London ODN - North Central & East | 1,564 | 1,562 | 1,500 | 62 (4.0%) | 5.0% | 2 | -1.4% |
| London ODN - North West | 1,073 | 1,071 | 1,001 | 70 (6.5%) | 5.9% | 2 | -0.4% |
| London ODN - South | 1,376 | 1,373 | 1,288 | 85 (6.2%) | 7.4% | 3 | 1.1% |
| North West ODN | 2,663 | 2,662 | 2,470 | 192 (7.2%) | 7.3% | 1 | 0.9% |
| Northern ODN | 1,052 | 1,052 | 984 | 68 (6.5%) | 6.1% | 0 | -0.2% |
| South West ODN | 1,336 | 1,336 | 1,264 | 72 (5.4%) | 5.6% | 0 | -0.8% |
| Thames Valley & Wessex ODN | 1,749 | 1,749 | 1,662 | 87 (5.0%) | 5.6% | 0 | -0.7% |
| Wales | 943 | 942 | 874 | 68 (7.2%) | 5.8% | 1 | -0.6% |
| West Midlands ODN | 2,390 | 2,384 | 2,186 | 198 (8.3%) | 9.3% | 6 | 3.0% |
| Yorkshire & Humber ODN | 2,114 | 2,114 | 1,970 | 144 (6.8%) | 6.5% | 0 | 0.2% |
| Other* | 112 | 112 | 108 | 4 (3.6%) | NA | 0 | NA |
| **England and Wales** | **21,304** | **21,289** | **19,944** | **1,345 (6.3%)** | **NA** | **15** | **NA** |

**Includes deliveries in an unknown location or in a maternity unit not allied with a NNAP participating unit in the first neonatal unit admission. Deliveries at home or in transit are attributed to the network of first recorded episode of care.*

**Table 2: Observed mortality until discharge home from neonatal care, by NNAP reporting period.**

| NNAP year | Babies | With data entered | Survived to 44 weeks PMA or discharge home | Died before 44 weeks PMA (%) | Missing data (%) |
|---|---|---|---|---|---|
| July 2016-June 2018 | 22,937 | 22,607 | 21,069 | 1,538 (6.8%) | 330 (1.4%) |
| July 2017-June 2019 | 23,906 | 23,767 | 22,200 | 1,567 (6.6%) | 139 (0.6%) |
| July 2018-June 2020 | 21,304 | 21,289 | 19,944 | 1,345 (6.3%) | 15 (0.1%) |

# 2.2. Bronchopulmonary dysplasia (BPD)

*Does an admitted baby born at less than 32 weeks develop bronchopulmonary dysplasia (BPD)?*

Babies born preterm typically have incompletely developed lungs and often need support with their breathing from a ventilator or other device. Simply being born early can cause some ongoing breathing difficulty. Being on a ventilator can cause damage to the lungs, exacerbate breathing problems later in life and put babies at risk of chest infections. This condition is known as bronchopulmonary dysplasia (BPD) and is sometimes called chronic lung disease. NNAP reports on the proportion of babies born very preterm who are still receiving help with their breathing or extra oxygen four weeks before their due date, for a three-year cohort of babies discharged from neonatal care between 1 January 2018 and 31 December 2020. Only babies who survive their early course can develop BPD, and therefore it is important that we consider rates of BPD alongside rates of death. For this reason, we report the combined outcome of 'BPD or death'.

Differing proportions of BPD or death between units and networks might be the result of differing treatments or might partially result from differences in the readiness of clinicians to administer oxygen to very preterm infants.

We present three summary measures of BPD: the observed proportion, an adjusted proportion, and a treatment effect. The observed proportion is simply the number of babies in NNAP with BPD, divided by the total number of babies in NNAP.

The adjusted proportion uses a statistical method, called multilevel logistic regression, to remove the influence of "casemix" variables (characteristics which raise or lower a baby's risk of BPD). Any unexplained variation left over that shows as units or networks with a higher or lower proportion than the national average goes to make up the adjusted proportion.

The casemix variables are: birthweight; sex; gestation; birth year; maternal age; number of previous pregnancies; maternal ethnicity; multiplicity; maternal smoking; medical problems of pregnancy; placental abruption; onset of labour and children living in low income families.

The adjusted proportion in effect answers the question "what would the results have been for a unit/network if their casemix had been representative of all national NNAP data?"

The treatment effect is the difference between the adjusted proportion and the national average. A positive treatment effect indicates that the rate of BPD is higher than expected in the unit/network of interest.

Full details of this measure can be found in the NNAP 2020 audit measures guide.

# Results

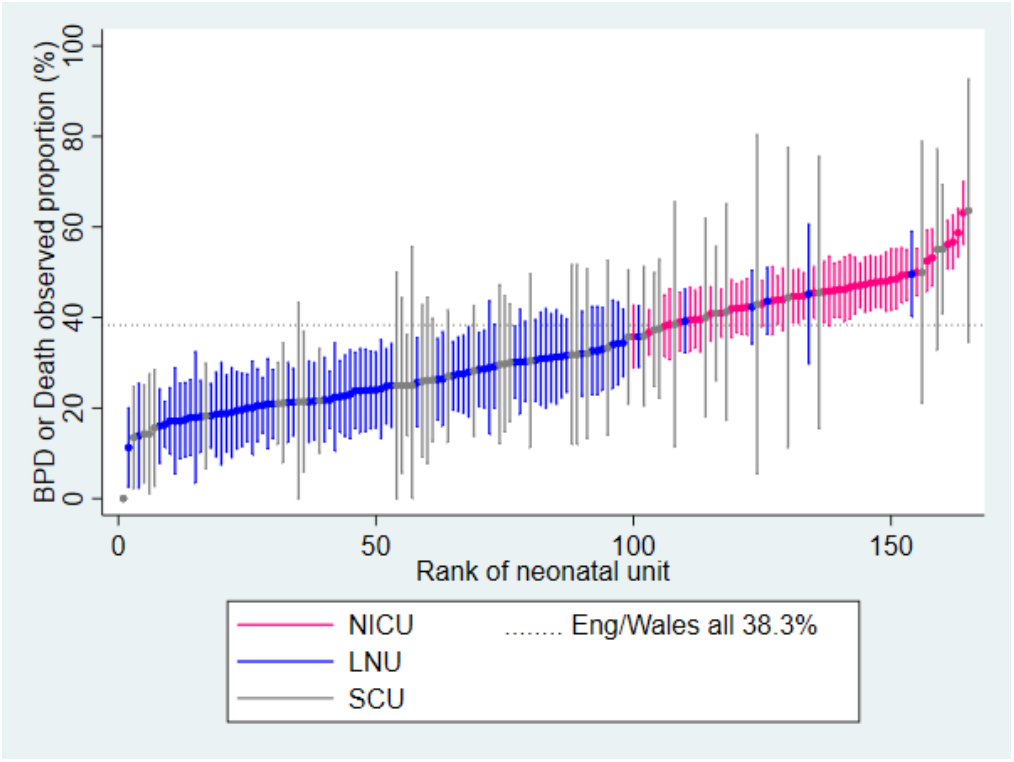
**Table 3. BPD or death, by neonatal network.**

| Network | Eligible babies | With data entered | BPD | Death before 36 weeks' corrected gestational age | Observed BPD or death (%) | Adjusted BPD or death (%) | Treatment effect % | No BPD | Indeterminable |
|---|---|---|---|---|---|---|---|---|---|
| East Midlands ODN | 1,488 | 1,485 | 370 | 126 | 496 (33.4%) | 35.6% | -2.6% | 989 | 3 |
| East of England Perinatal ODN | 1,866 | 1,855 | 540 | 100 | 640 (34.5%) | 34.6% | -3.7% | 1,215 | 11 |
| Kent, Surrey, Sussex ODN | 1,598 | 1,591 | 475 | 126 | 601 (37.8%) | 36.4% | -1.8% | 990 | 7 |
| London ODN - North Central & East | 1,617 | 1,602 | 540 | 83 | 623 (38.9%) | 40.3% | 2.0% | 979 | 15 |
| London ODN - North West | 1,077 | 1,071 | 321 | 78 | 399 (37.3%) | 37.2% | -1.1% | 672 | 6 |
| London ODN - South | 1,397 | 1,395 | 485 | 110 | 595 (42.7%) | 42.9% | 4.7% | 800 | 2 |
| North West ODN | 2,739 | 2,732 | 847 | 260 | 1,107 (40.5%) | 39.8% | 1.6% | 1,625 | 7 |
| Northern ODN | 1,082 | 1,078 | 398 | 80 | 478 (44.3%) | 43.7% | 5.4% | 600 | 4 |
| South West ODN | 1,337 | 1,335 | 447 | 84 | 531 (39.8%) | 41.3% | 3.0% | 804 | 2 |
| Thames Valley & Wessex ODN | 1,741 | 1,732 | 517 | 112 | 629 (36.3%) | 35.4% | -2.9% | 1,103 | 9 |
| Wales | 959 | 956 | 286 | 89 | 375 (39.2%) | 36.7% | -1.6% | 581 | 3 |
| West Midlands ODN | 2,435 | 2,416 | 706 | 248 | 954 (39.5%) | 41.4% | 3.2% | 1,462 | 19 |
| Yorkshire & Humber ODN | 2,117 | 2,109 | 577 | 162 | 739 (35.0%) | 32.7% | -5.5% | 1,370 | 8 |
| Other* | 152 | 152 | 68 | 11 | 79 (52.0%) | NA | NA | 73 | 0 |
| **England and Wales** | **21,605** | **21,509** | **6,577** | **1,669** | **8,246 (38.3%)** | **NA** | **NA** | **13,263** | **96** |

**Includes deliveries in an unknown location or in a maternity unit not allied with a NNAP participating unit in the first neonatal unit admission. Deliveries at home or in transit are attributed to the network of first recorded episode of care.*

**Figure 3. Caterpillar plot of observed proportion of BPD or death (2018-2020): neonatal units (top) and adjusted proportions of BPD or death (bottom). (Level two and level three only).**

*Unit proportions are represented by dots. The 95% confidence intervals for a unit are shown by a vertical line with each dot. Neonatal units can be identified on NNAP Online.*



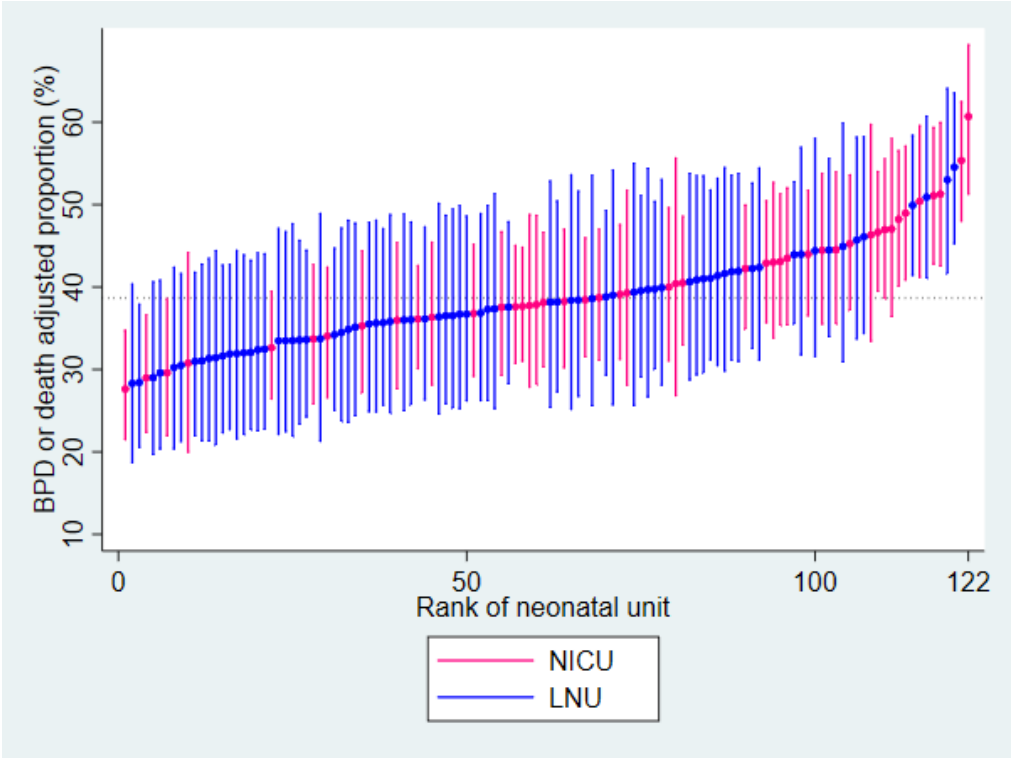
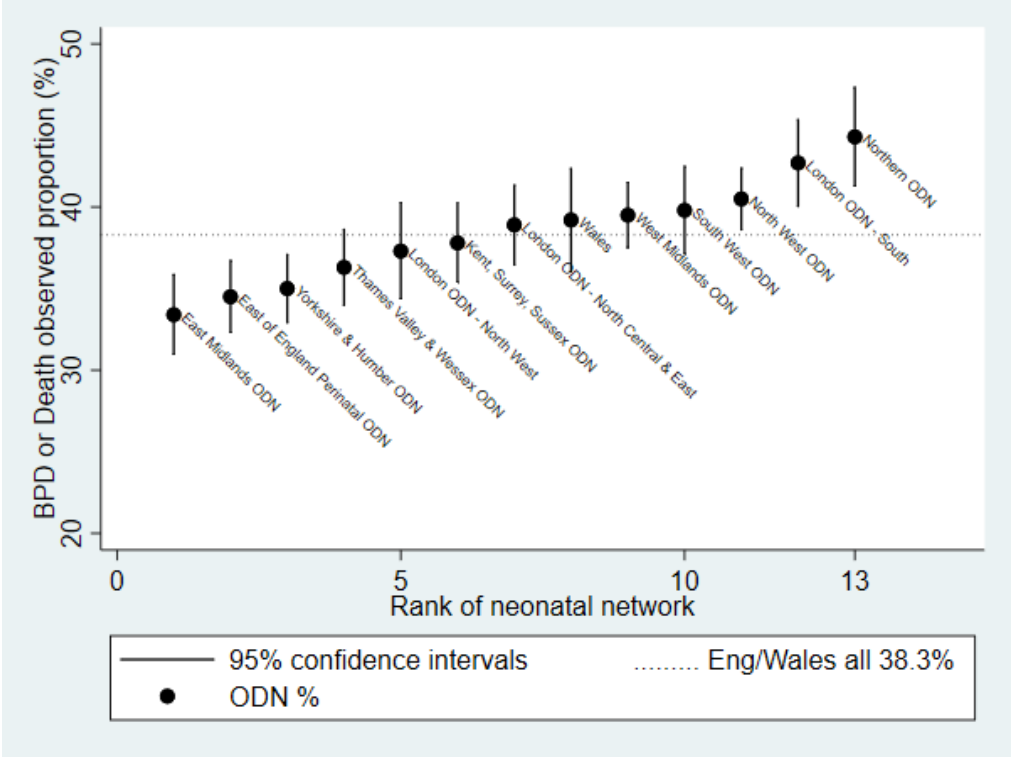



**Figure 4. Caterpillar plot of the proportions of BPD or death (2018–2020) (top) and adjusted proportion of BPD or death (bottom), by neonatal network or operational delivery network (ODN).**

*Network proportions are represented by dots. The 95% confidence intervals for a network are shown by a vertical line with each dot. Neonatal units can be identified on NNAP Online.*



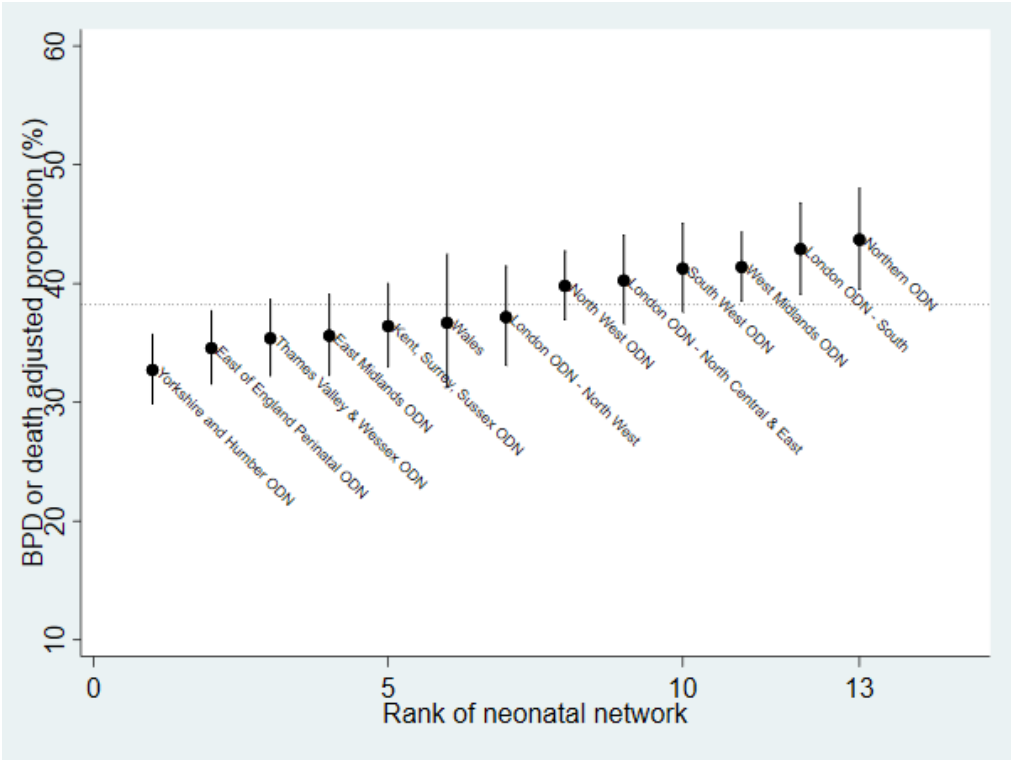



**Table 4. BPD only, and the combined outcome of BPD and death, by NNAP reporting period (2013-2020).**

| NNAP year | Babies | With data entered | BPD (%) | Death (%) | BPD or death (%) | Missing data (%) |
|---|---|---|---|---|---|---|
| 2013-2015 | 21,805 | 21,673 | 6,508 (30.0%) | | | 134 (0.6%) |
| 2014-2016 | 22,049 | 21,978 | 6,792 (30.9%) | | | 71 (0.3%) |
| 2015-2017 | 24,517 | 22,595 | 6,971 (30.9%) | 1,880 (7.7%) | 8,851 (39.2%) | 42 (0.2%) |
| 2016-2018 | 23,849 | 23,773 | 6,931 (29.2%) | 1,740 (7.3%) | 8,671 (36.5%) | 76 (0.3%) |
| 2017-2019 | 23,772 | 23,683 | 6,879 (29.0%) | 1,799 (7.6%) | 8,678 (36.6%) | 89 (0.4%) |
| 2018-2020 | 21,605 | 21,509 | 6,577 (30.6%) | 1,669 (7.8%) | 8,246 (38.3%) | 96 (0.4%) |

*Note: Prior to 2015-2017, the combined outcome of BPD or death was not reported.*

# 2.3. Necrotising enterocolitis (NEC)

*Does an admitted baby born at less than 32 weeks gestational age meet the NNAP surveillance definition for necrotising enterocolitis (NEC) on one or more occasion?*

Necrotising enterocolitis (NEC) is a devastating illness which can follow preterm birth. Bowel inflammation prevents milk feeding and surgery may be needed. Babies who develop NEC typically stay in hospital for a long time. Rates of mortality in babies with NEC are high, at over 20%. Babies who survive NEC can have developmental as well as long-term feeding and bowel problems. Reporting of NEC is based on a surveillance definition, and cases and denominators are attributed to the unit at which the baby is nursed at 48 hours.

Full details of this measure can be found in the NNAP 2020 audit measures guide.

## Results

NNAP clinical leads are asked to provide assurance of the accuracy of their NEC data. In England and Wales, 87.2% (143/164) of units provided that assurance. NEC results are presented below based on all units' data (Table 5) and on data from those providing assurance (Table 6).

**Figure 5: Caterpillar plot of proportions of NEC (all units), by neonatal unit.**

*Unit proportions are represented by dots. The 95% confidence intervals for a unit are shown by a vertical line with each dot. Neonatal units can be identified on NNAP Online.*

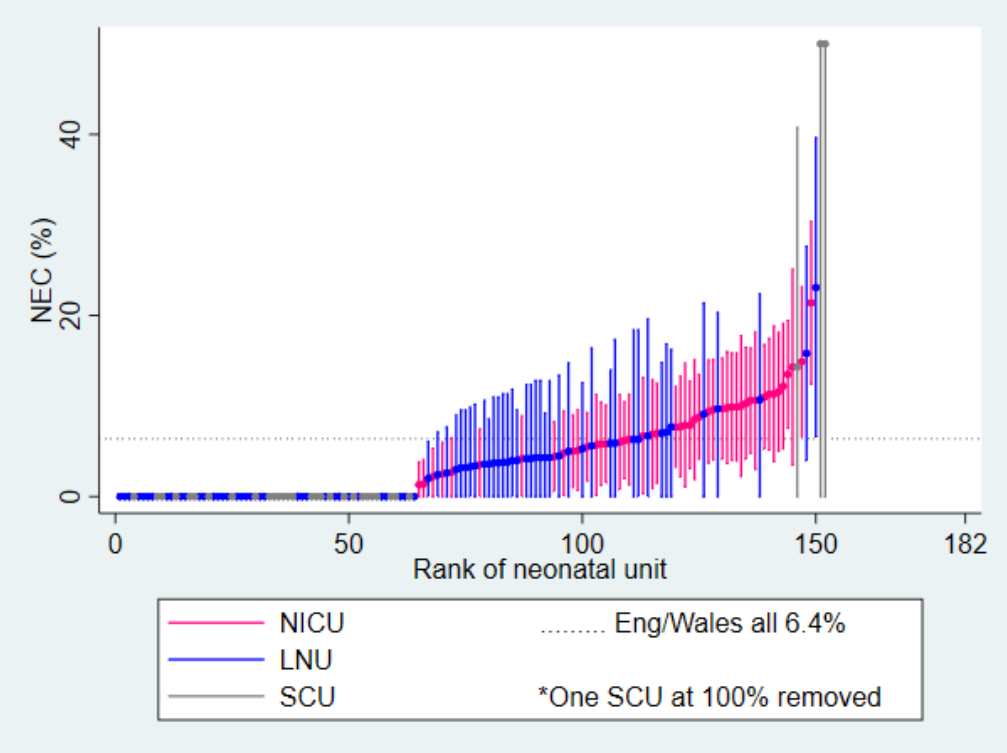


**Figure 6: Caterpillar plot of proportions of NEC (all units), by neonatal network or operational delivery network (ODN).**

*Network proportions are represented by dots. The 95% confidence intervals for a network are shown by a vertical line with each dot. Neonatal units can be identified on [NNAP Online](#).*

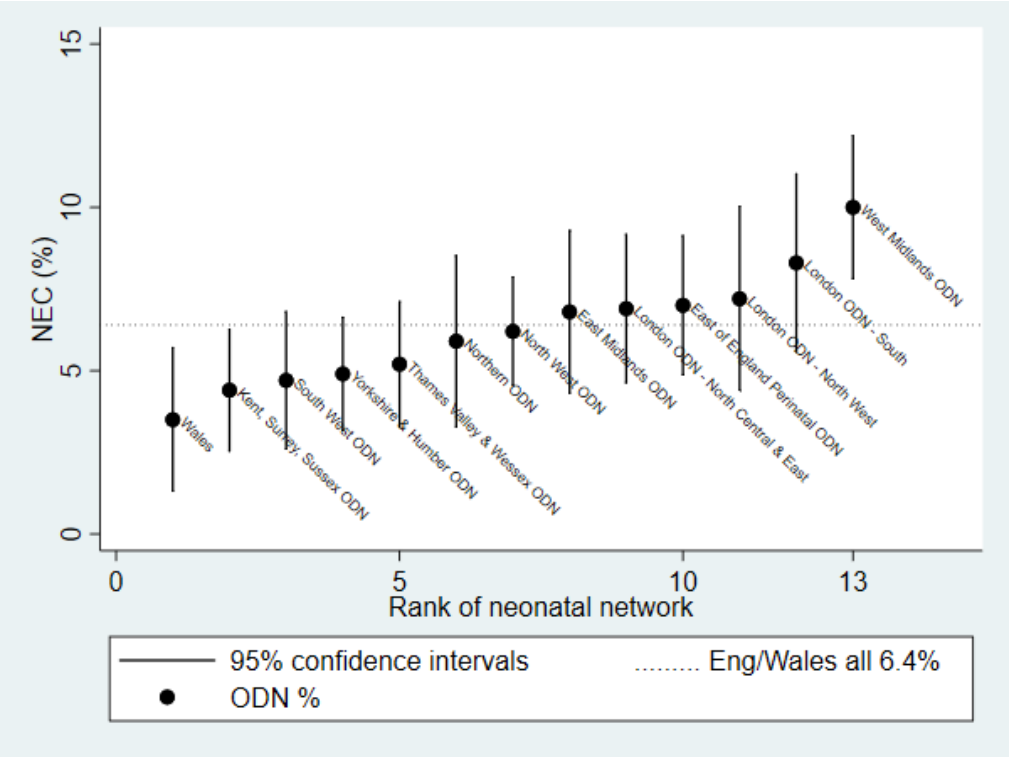


**Table 5. NEC status, by neonatal unit level – all units.**

| Unit level | Babies | With data entered | NEC status | | | Missing data | | |
|---|---|---|---|---|---|---|---|---|
| | | | Died prior to discharge home, but no NEC | No NEC | NEC (%) | Death before discharge | Alive at discharge | Total missing |
| SCU | 109 | 105 | 0 | 102 | 3 (2.9%) | 0 | 4 | 4 |
| LNU | 2,117 | 2,034 | 12 | 1,957 | 65 (3.2%) | 3 | 80 | 83 |
| NICU | 4,504 | 4,356 | 262 | 3,745 | 349 (8.0%) | 39 | 109 | 148 |
| **England & Wales** | **6,730** | **6,495** | **274** | **5,804** | **417 (6.4%)** | **42** | **193** | **235** |

**Table 6. NEC status, units who provided assurance that their NEC diagnosis data was complete.**

| Unit level | Babies | With data entered | NEC status | | | Missing data | | |
|---|---|---|---|---|---|---|---|---|
| | | | Died prior to discharge home, but no NEC | No NEC | NEC (%) | Death before discharge | Alive at discharge | Total missing |
| SCU | 96 | 92 | 0 | 89 | 3 (3.3%) | 0 | 4 | 4 |
| LNU | 1,848 | 1,785 | 12 | 1,719 | 54 (3.0%) | 2 | 61 | 63 |
| NICU | 3,628 | 3,533 | 214 | 3,051 | 268 (7.6%) | 22 | 73 | 95 |
| **England & Wales** | **5,572** | **5,410** | **226** | **4,859** | **325 (6.0%)** | **24** | **138** | **162** |

**Table 7: NEC status, all units, by NNAP reporting year (2017-2020).**

| NNAP year | Babies | With data entered | NEC (%) | Proportion of hospitals validating their data | Missing data (%) |
|---|---|---|---|---|---|
| 2017 | 8,228 | 7,628 | 428 (5.6%) | 45% | 134 (0.6%) |
| 2018 | 7,810 | 7,389 | 410 (5.5%) | 69% | 411 (5.2%) |
| 2019 | 7,692 | 7,518 | 413 (5.5%) | 64% | 174 (2.3%) |
| 2020 | 6,730 | 6,495 | 417 (6.4%) | 87% | 235 (3.5%) |

**Table 8. NEC status, by network – all units.**

| Network | Count | With data entered | NEC status | | | Missing data | | |
|---|---|---|---|---|---|---|---|---|
| | | | Died prior to discharge home, but no NEC | No NEC | NEC (%) | Death before discharge | Alive at discharge (%) | Total missing (%) |
| East Midlands ODN | 453 | 411 | 9 | 374 | 28 (6.8%) | 9 | 33 | 42 (9.3%) |
| East of England Perinatal ODN | 594 | 574 | 22 | 512 | 40 (7.0%) | 4 | 16 | 20 (3.4%) |
| Kent, Surrey, Sussex ODN | 494 | 482 | 21 | 440 | 21 (4.4%) | 4 | 8 | 12 (2.4%) |
| London ODN - North Central & East | 525 | 496 | 16 | 446 | 34 (6.9%) | 0 | 29 | 29 (5.5%) |
| London ODN - North West | 342 | 335 | 13 | 298 | 24 (7.2%) | 4 | 3 | 7 (2.0%) |
| London ODN - South | 427 | 411 | 23 | 354 | 34 (8.3%) | 3 | 13 | 16 (3.7%) |
| North West ODN | 869 | 849 | 46 | 750 | 53 (6.2%) | 2 | 18 | 20 (2.3%) |
| Northern ODN | 338 | 323 | 15 | 289 | 19 (5.9%) | 6 | 9 | 15 (4.4%) |
| South West ODN | 410 | 405 | 15 | 371 | 19 (4.7%) | 0 | 5 | 5 (1.2%) |
| Thames Valley & Wessex ODN | 549 | 539 | 16 | 495 | 28 (5.2%) | 2 | 8 | 10 (1.8%) |
| Wales | 292 | 283 | 17 | 256 | 10 (3.5%) | 1 | 8 | 9 (3.1%) |
| West Midlands ODN | 787 | 758 | 31 | 651 | 76 (10.0%) | 5 | 24 | 29 (3.7%) |
| Yorkshire & Humber ODN | 650 | 629 | 30 | 568 | 31 (4.9%) | 2 | 19 | 21 (3.2%) |
| **England and Wales** | **6,730** | **6,495** | **274** | **5,804** | **417 (6.4%)** | **42** | **193** | **235 (3.5%)** |

# 2.4. Late onset infection

Sick and premature babies are prone to infection by a variety of germs, including some that are normally harmless to healthy people. Infections increase the risk of death, can lengthen the stay in the neonatal unit and may worsen the long-term developmental outlook for babies.[3] Neonatal unit staff and parents can reduce the risk of infection by following good infection prevention and control practice.

The NNAP reports two measures of late onset bloodstream infection. To look for infection in babies, neonatal staff usually take blood cultures to check whether bacteria or other organisms are present in their blood. Units are encouraged to report positive blood cultures: that negative blood cultures are underreported is accepted as likely, or even inevitable. The NNAP reports proportion of blood cultures positive for bacteria, fungi or yeasts, as well as a measure of bloodstream infection that occurs on the same day as a central line is present. Neither measure takes account of case mix, so when comparisons between trusts are made, case mix should be considered as one possible explanation for any differences in proportions. A significant strength of the bloodstream infection measure is that it is not undermined by any differences in use of central venous access that might exist between units.

Full details of this measure can be found in the NNAP 2020 audit measures guide.

NNAP Clinical Leads were asked to provide assurance that all of their positive blood cultures had been entered. In England and Wales, 84% (138/164) provided this validation of their infection data.

## Late onset bloodstream infection

*Does an admitted baby have one or more episodes of bloodstream infection, characterised by one or more positive blood cultures taken, after 72 hours of age?*

## Results

Some organisms grown may either represent true bloodstream infection or contamination of the blood culture sample with skin organisms. For this reason, results for bloodstream infection are presented in two columns. One column presents the number of babies for whom any culture grew any organism. The other column presents the number of babies for whom one or more culture grew an organism of clear pathogenicity. Clearly pathogenic organisms were those whose growth indicated significant infection with or without the presence of clinical confirmation (a true infection). A list of such organisms is provided in section 11. Pathogens in the NNAP. Babies contribute to the denominator for this measure for all units to which they were admitted.

**Table 9. Positive blood cultures, by gestational age group (<32 weeks and ≥32 weeks).**

| Gestational age group | Eligible babies | Number (%) of babies with any positive blood culture | Number (%) of babies with growth of any clearly pathogenic organism |
|---|---|---|---|
| < 32 weeks | 6,698 | 1,211 (18.1%) | 390 (5.8%) |
| ≥ 32 weeks | 39,489 | 318 (0.8%) | 92 (0.2%) |
| **England and Wales** | **46,187** | **1,529 (3.3%)** | **482 (1%)** |

**Table 10. Positive blood cultures by gestational age group - units who provided assurance that all positive blood cultures were entered.**

| Gestational age group | Eligible babies | Number (%) of babies with any positive blood culture | Number (%) of babies with growth of any clearly pathogenic organism |
|---|---|---|---|
| < 32 weeks | 5,930 | 1,094 (18.4%) | 348 (5.9%) |
| ≥ 32 weeks | 33,811 | 274 (0.8%) | 79 (0.2%) |
| **England and Wales** | **39,741** | **1,368 (3.4%)** | **427 (1.1%)** |

**Figure 7: Caterpillar plot of proportion of admitted babies who experienced one or more positive blood cultures with a clearly pathogenic organism (born at <32 weeks gestational age), by neonatal unit.**

*Unit proportions are represented by dots. The 95% confidence intervals for a unit are shown by a vertical line with each dot. Neonatal units can be identified on NNAP Online.*

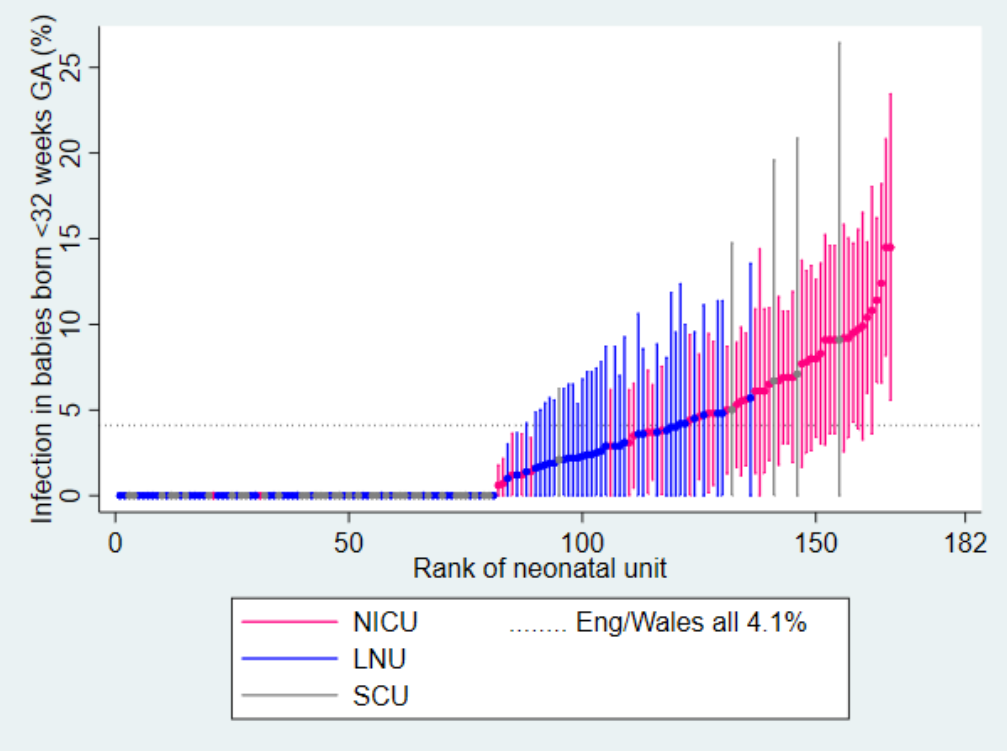
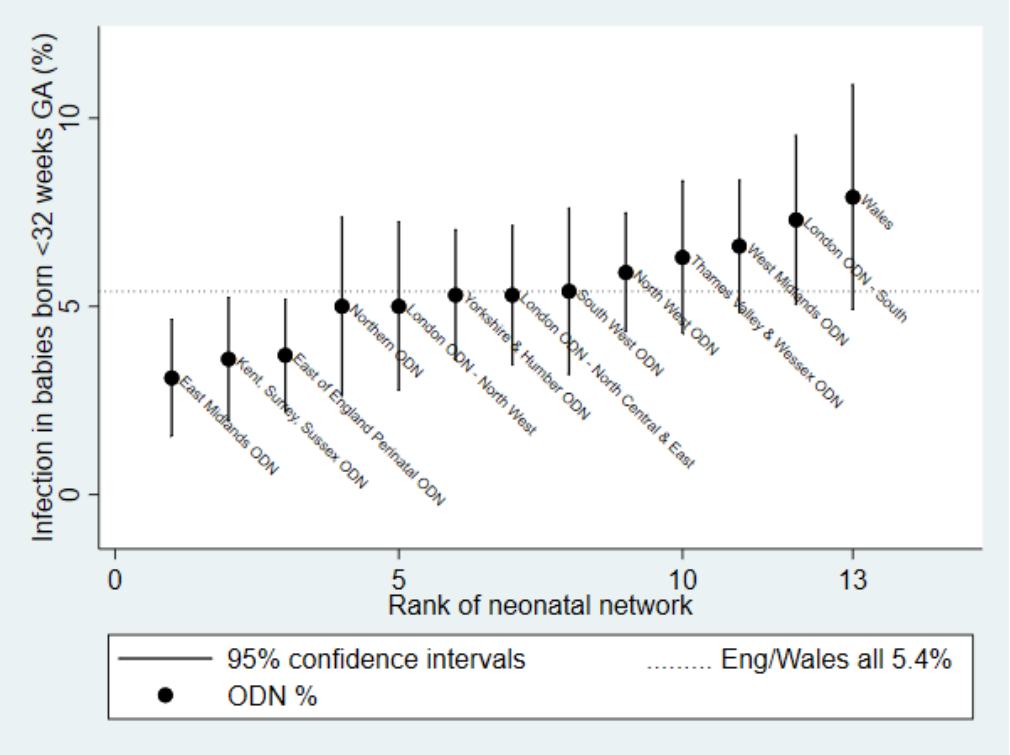


**Figure 8: Caterpillar plot of proportion of admitted babies who experienced one or more positive blood cultures with a clearly pathogenic organism (born at <32 weeks gestational age), by neonatal network or operational delivery network (ODN).**

*Network proportions are represented by dots. The 95% confidence intervals for a network are shown by a vertical line with each dot. Neonatal units can be identified on NNAP Online.*




# Central Line Associated Bloodstream Infection (CLABSI)

*How many babies have a positive blood culture (any species) with a central line present, after the first 72 hours of life, per 1000 central line days?*

# Results

**Table 11. Babies with central line associated bloodstream infections, by gestational age group.**

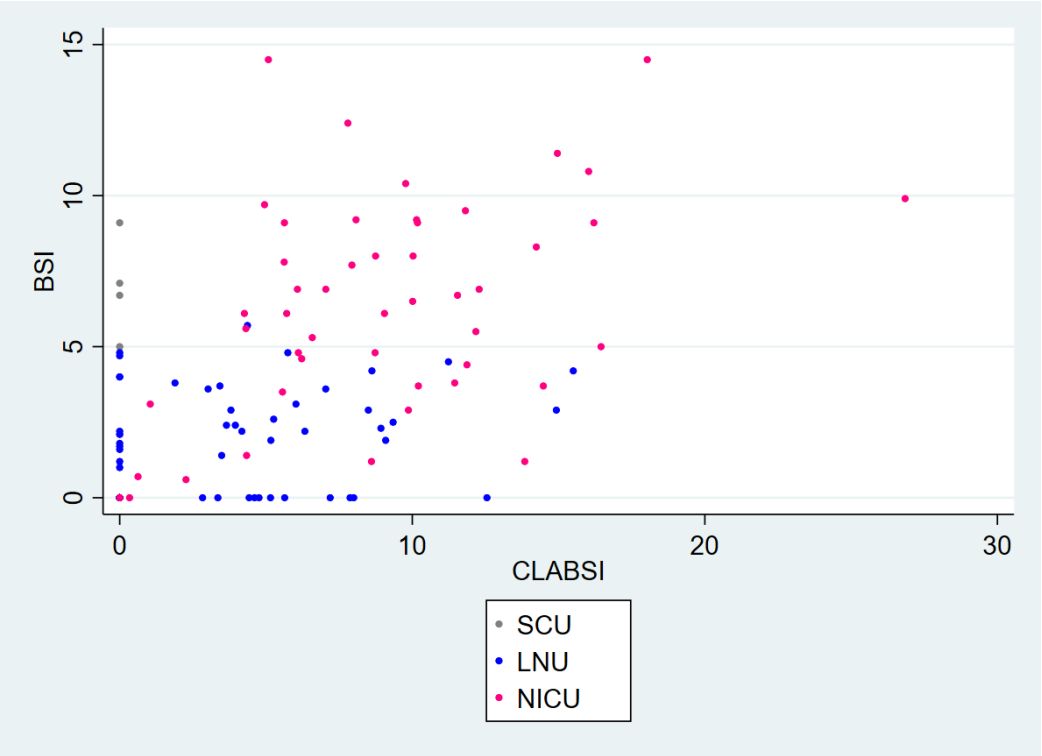
| Gestational age group | Babies | Babies with central line associated blood stream infections | Line days | Babies with central line associated bloodstream infection per 1000 central line days |
|---|---|---|---|---|
| < 32 weeks | 6,698 | 686 | 93,626 | 7.3 |
| ≥ 32 weeks | 39,488 | 129 | 45,747 | 2.8 |
| **England and Wales** | **46,186** | **815** | **139,373** | **5.8** |

**Table 12: Babies with central line associated bloodstream infections, by gestational age group - units who provided assurance that all positive blood cultures were entered.**

| Units | Gestational age group | Babies | Babies with central line associated blood stream infections | Line days | Babies with central line associated bloodstream infection per 1000 central line days |
|---|---|---|---|---|---|
| | < 32 weeks | 5,930 | 635 | 79,876 | 7.9 |
| | ≥ 32 weeks | 33,811 | 116 | 39,786 | 2.9 |
| **138** | **Total** | **39,741** | **751** | **119,662** | **6.3** |

*Note: In previous years, proportions of central line associated bloodstream infection were presented using a denominator of all admitted babies, not just those present on the unit at 72 hours of age.*

**Figure 9: Scatter plot for babies with gestation at birth of less than 32 weeks: Proportion of central line associated bloodstream infection (CLABSI) against bloodstream infection (BSI) with a clearly pathogenic organism, all neonatal units.**



# 3. Optimal perinatal care

## 3.1. Birth in a centre with a neonatal intensive care unit (NICU)

*Is an admitted baby born at less than 27 weeks gestational age delivered in a maternity service on the same site as a designated NICU?*

Babies who are born at less than 27 weeks gestational age are at high risk of death, serious illness, and brain injury. National recommendations in England[4,5] state that neonatal networks should aim to configure and deliver services to increase the proportion of babies at this gestational age being delivered in a hospital with a neonatal intensive care unit (NICU) on site. This is because there is evidence that outcomes improve if such premature babies are cared for in a NICU from birth. Eighty-five percent (85%) of babies born at less than 27 weeks gestational age should be delivered in a maternity service on the same site as a NICU. Full details of this measure can be found in the NNAP 2020 audit measures guide.

**Table 13: Birth in a centre with a NICU by neonatal network**

| Network | Babies | Delivery location | |
|---|---|---|---|
| | | Hospital with a designated NICU (%) | Other (%) |
| East Midlands ODN | 69 | 54 (78.3%) | 15 (21.7%) |
| East of England Perinatal ODN | 100 | 73 (73.0%) | 27 (27.0%) |
| Kent, Surrey, Sussex ODN | 96 | 83 (86.5%) | 13 (13.5%) |
| London ODN - North Central & East | 113 | 82 (72.6%) | 31 (27.4%) |
| London ODN – North West | 82 | 69 (84.1%) | 13 (15.9%) |
| London ODN - South | 109 | 90 (82.6%) | 19 (17.4%) |
| North West ODN | 200 | 173 (86.5%) | 27 (13.5%) |
| Northern ODN | 67 | 56 (83.6%) | 11 (16.4%) |
| South West ODN | 71 | 52 (73.2%) | 19 (26.8%) |
| Thames Valley & Wessex ODN | 116 | 100 (86.2%) | 16 (13.8%) |
| Wales | 57 | 43 (75.4%) | 14 (24.6%) |
| West Midlands ODN | 171 | 144 (84.2%) | 27 (15.8%) |
| Yorkshire & Humber ODN | 133 | 96 (72.2%) | 37 (27.8%) |
| Other* | 11 | 0 (0.0%) | 11 (100%) |
| **England & Wales** | **1,395** | **1,115 (79.9%)** | **280 (20.1%)** |

**Includes deliveries in an unknown location or in a maternity unit not allied with a NNAP participating unit in the first neonatal unit admission. Deliveries at home or in transit are attributed to the network of first recorded episode of care.*

**Figure 10. Caterpillar plot of the proportions of birth in a centre with a NICU, by neonatal network or operational delivery network (ODN).**

*Network proportions are represented by dots. The 95% confidence intervals for a network are shown by a vertical line with each dot.*

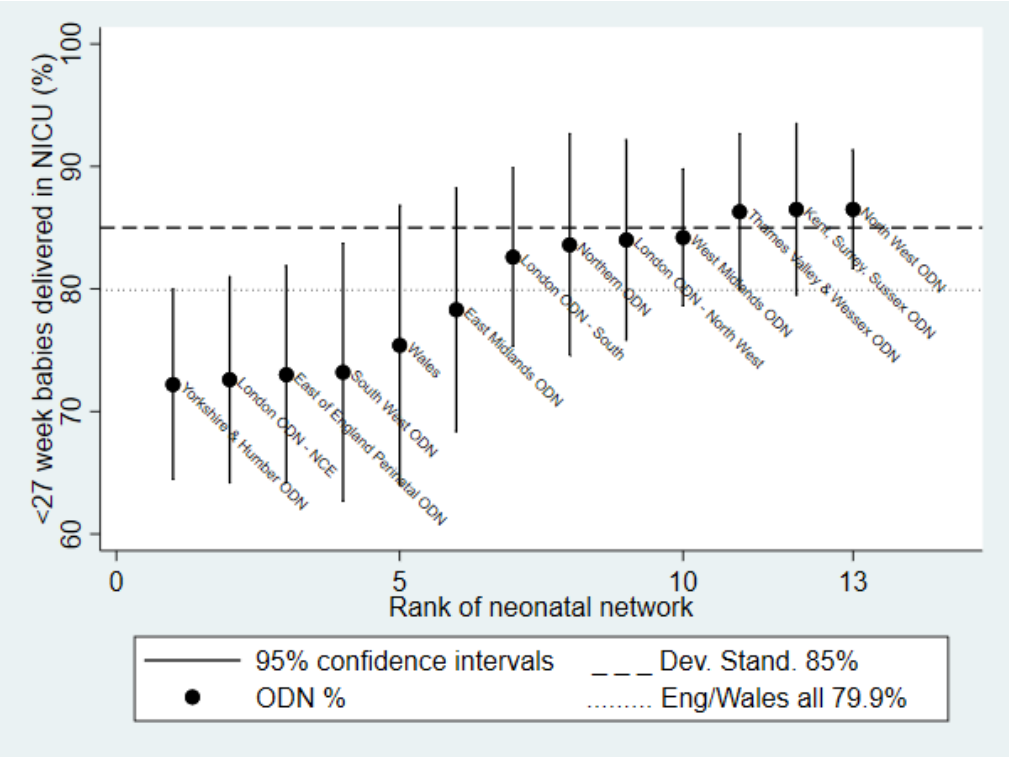
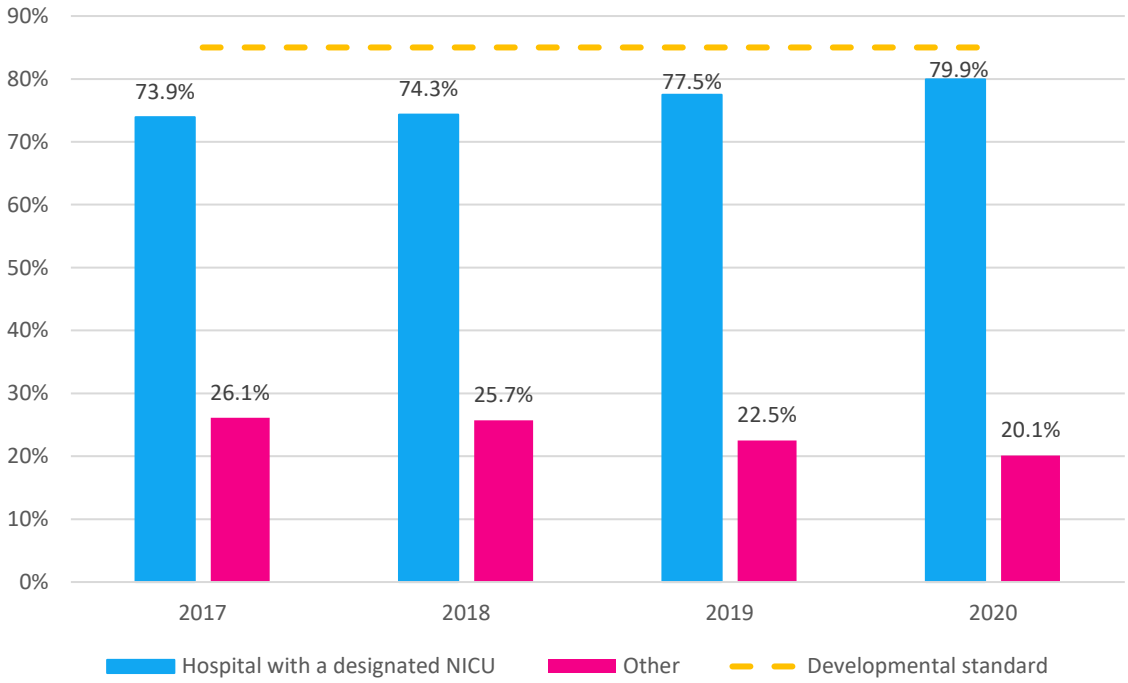



**Figure 11: Birth in a centre with a NICU by NNAP reporting year, 2017-2020.**



# 3.2. Antenatal steroids

*Is a mother who delivers a baby between 23 and 33 weeks' gestational age inclusive given at least one dose of antenatal steroids?*

Babies born at less than 34 weeks gestational age sometimes have breathing difficulties in the first few days after they are born. Antenatal steroids are a powerful health intervention, given to mothers by obstetricians and midwives before delivery of a preterm baby. Antenatal steroids help reduce breathing difficulties (respiratory distress syndrome) and make other serious complications, such as bleeding into the brain, less likely. The NNAP developmental standard is that eighty-five percent (85%) of eligible mothers should receive at least one dose of antenatal steroids.

Full details of this measure can be found in the NNAP 2020 audit measures guide.

## Results

**Table 14. Administration of antenatal steroids, by neonatal unit level.**

| Unit level | Eligible mothers | With data entered | Steroids given (%) | Steroids not given | Missing data (%) |
|---|---|---|---|---|---|
| Other* | 144 | 140 | 46 (32.9%) | 94 | 4 (2.8%) |
| SCU | 851 | 843 | 739 (87.7%) | 104 | 8 (0.9%) |
| LNU | 4,062 | 4,055 | 3,757 (92.7%) | 298 | 7 (0.2%) |
| NICU | 5,065 | 5,053 | 4,706 (93.1%) | 347 | 12 (0.2%) |
| **England & Wales** | **10,122** | **10,091** | **9,248 (91.6%)** | **843** | **31 (0.3%)** |

**Delivered at home, in transit, in an unknown location or in a maternity unit not allied to an NNAP participating unit.*

**Table 15: Administration of antenatal steroids, by neonatal network level**

| Network | Eligible mothers | With data entered | Steroids given (%) | Steroids not given | Missing data (%) |
|---|---|---|---|---|---|
| East Midlands ODN | 741 | 739 | 682 (92.3%) | 57 | 2 (0.3%) |
| East of England Perinatal ODN | 914 | 913 | 825 (90.4%) | 88 | 1 (0.1%) |
| Kent, Surrey, Sussex ODN | 705 | 704 | 628 (89.2%) | 76 | 1 (0.1%) |
| London ODN - North Central & East | 736 | 734 | 672 (91.6%) | 62 | 2 (0.3%) |
| London ODN - North West | 437 | 433 | 399 (92.1%) | 34 | 4 (0.9%) |
| London ODN - South | 595 | 593 | 552 (93.1%) | 41 | 2 (0.3%) |
| North West ODN | 1,305 | 1,305 | 1,205 (92.3%) | 100 | 0 (0.0%) |
| Northern ODN | 474 | 468 | 427 (91.2%) | 41 | 6 (0.0%) |
| South West ODN | 649 | 647 | 592 (91.5%) | 55 | 2 (0.3%) |
| Thames Valley & Wessex ODN | 818 | 818 | 750 (91.7%) | 68 | 0 (0.0%) |
| Wales | 514 | 508 | 469 (92.3%) | 39 | 6 (1.2%) |
| West Midlands ODN | 1,184 | 1,184 | 1,090 (92.1%) | 94 | 0 (0.0%) |
| Yorkshire & Humber ODN | 1,018 | 1,016 | 936 (92.1%) | 80 | 2 (0.2%) |
| Other* | 32 | 29 | 21 (72.4%) | 8 | 3 (9.4%) |
| **England & Wales** | **10,122** | **10,091** | **9,248 (91.6%)** | **843** | **31 (0.3%)** |

**Includes deliveries in an unknown location or in a maternity unit not allied with a NNAP participating unit in the first neonatal unit admission. Deliveries at home or in transit are attributed to the network of first recorded episode of care.*

**Figure 12. Caterpillar plot of the proportions of administration of antenatal steroids: neonatal units.**

*Unit proportions are represented by dots. The 95% confidence intervals for a unit are shown by a vertical line with each dot. Neonatal units can be identified on NNAP Online.*

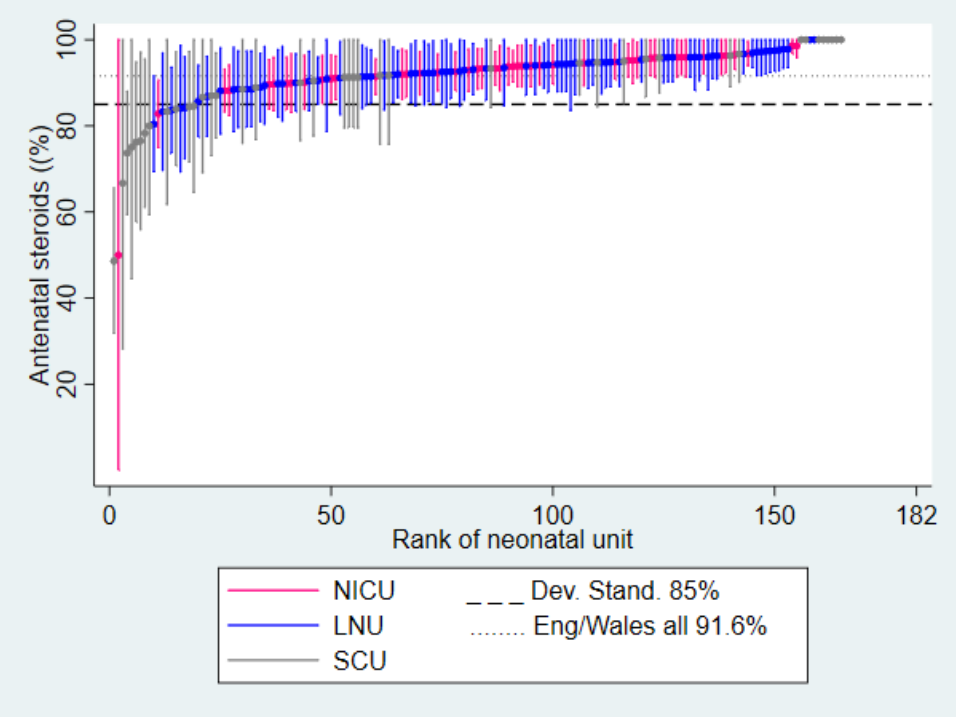



**Figure 13. Caterpillar plot of the proportions of administration of antenatal steroids, by neonatal network or operational delivery network (ODN).**

*Unit proportions are represented by dots. The 95% confidence intervals for a unit are shown by a vertical line with each dot.*

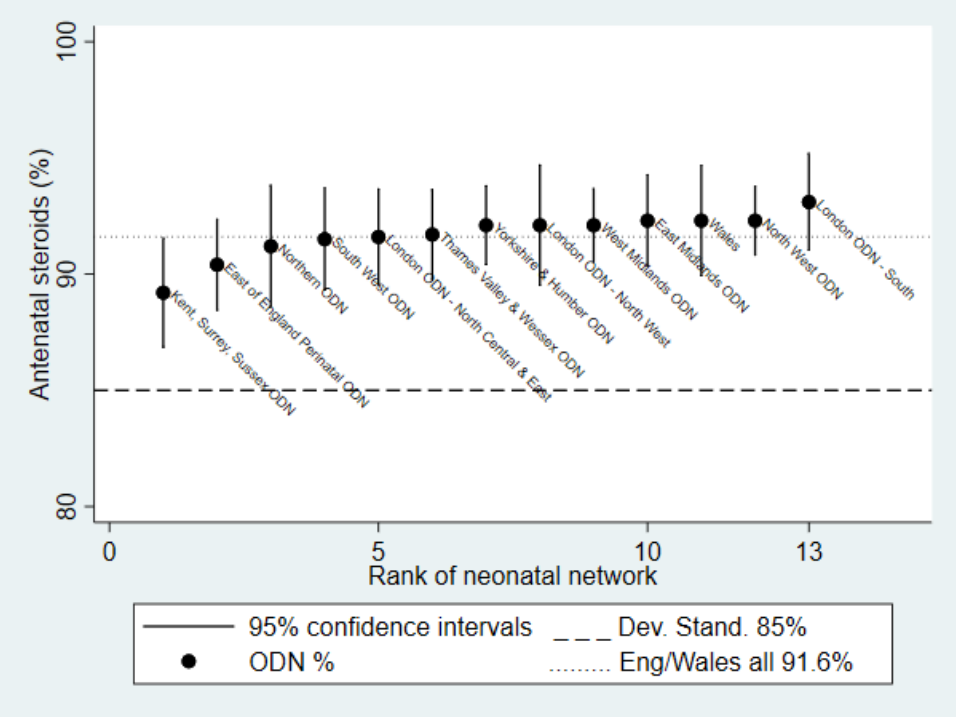
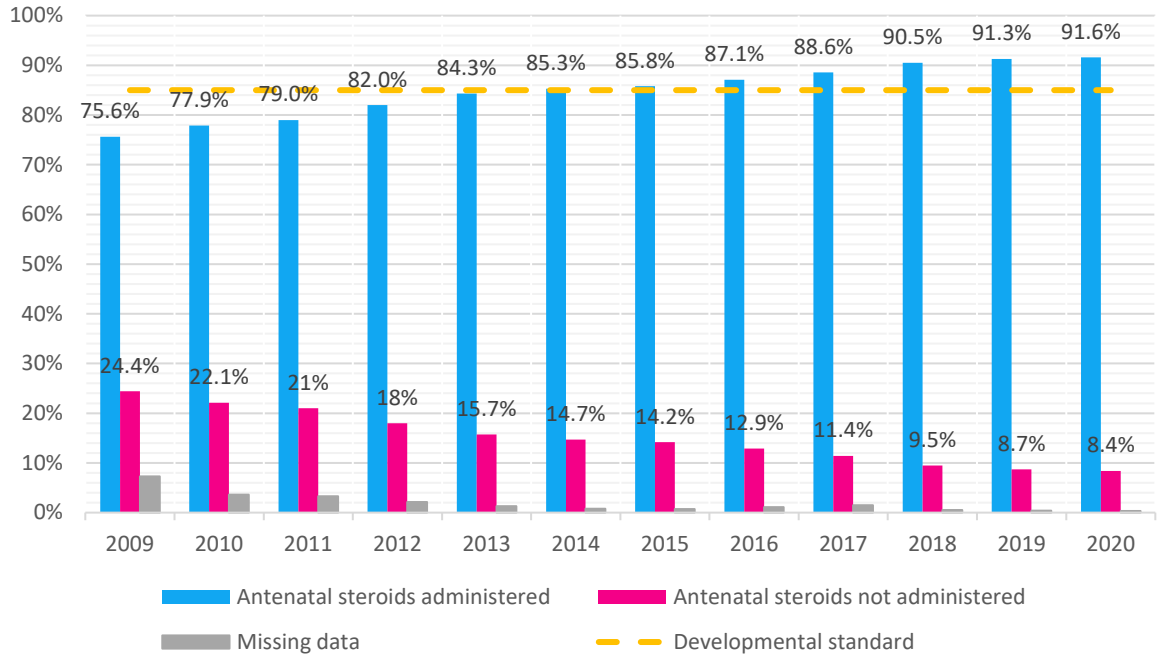


**Figure 14. Administration of antenatal steroids, by NNAP reporting year (2009 to 2020).**




*Note: The gestational age inclusion criteria changed in 2018 from 24 to 34 weeks inclusive to 23 to 33 weeks inclusive.*

# 3.3. Antenatal magnesium sulphate

*Is a mother who delivers a baby below 30 weeks gestational age given magnesium sulphate in the 24 hours prior to delivery?*

Giving magnesium sulphate to women who are at risk of delivering a preterm baby reduces the chance that their baby will develop cerebral palsy by 32%.[6] The NICE quality standard *Preterm Labour and Birth* recommends that all women who may deliver their baby at less than 30 weeks gestational age are offered magnesium sulphate where possible.[7] The NNAP developmental standard is that eighty-five percent (85%) of eligible mothers should receive antenatal magnesium sulphate, which maps to the NHSE PRECEPT programme target.

Full details of this measure can be found in the NNAP 2020 audit measures guide.

## Results

**Table 16. Administration of magnesium sulphate, by neonatal unit level.**

| Unit level | Eligible mothers | With data entered | Magnesium given | Magnesium not given | Missing (% of eligible mothers) |
|---|---|---|---|---|---|
| Other* | 58 | 58 | 13 (22.4%) | 45 | 0 (0%) |
| SCU | 153 | 147 | 106 (72.1%) | 41 | 6 (3.9%) |
| LNU | 963 | 959 | 815 (85%) | 144 | 4 (0.4%) |
| NICU | 2,231 | 2,222 | 1,968 (88.6%) | 254 | 9 (0.4%) |
| **England & Wales** | **3,405** | **3,386** | **2,902 (85.7%)** | **484** | **19 (0.6%)** |

**Delivered at home, in transit, in an unknown location or in a maternity unit not allied to an NNAP participating unit.*

**Table 17: Administration of magnesium sulphate, by neonatal network level**

| Network | Eligible mothers | With data entered | Magnesium given (%) | Magnesium not given | Missing (% of eligible mothers) |
|---|---|---|---|---|---|
| East Midlands ODN | 196 | 195 | 166 (85.1%) | 29 | 1 (0.5%) |
| East of England Perinatal ODN | 292 | 292 | 241 (82.5%) | 51 | 0 (0.0%) |
| Kent, Surrey, Sussex ODN | 246 | 245 | 211 (86.1%) | 34 | 1 (0.4%) |
| London ODN - North Central & East | 263 | 260 | 216 (83.1%) | 44 | 3 (1.1%) |
| London ODN - North West | 165 | 161 | 144 (89.4%) | 17 | 4 (2.4%) |
| London ODN - South | 221 | 220 | 197 (89.5%) | 23 | 1 (0.5%) |
| North West ODN | 439 | 438 | 378 (86.3%) | 60 | 1 (0.2%) |
| Northern ODN | 169 | 166 | 133 (80.1%) | 33 | 3 (1.8%) |
| South West ODN | 210 | 207 | 184 (88.9%) | 23 | 3 (1.4%) |
| Thames Valley & Wessex ODN | 277 | 277 | 252 (91.0%) | 25 | 0 (0.0%) |
| Wales | 160 | 158 | 119 (75.3%) | 39 | 2 (1.3%) |
| West Midlands ODN | 412 | 412 | 359 (87.1%) | 53 | 0 (0.0%) |
| Yorkshire & Humber ODN | 338 | 338 | 289 (85.5%) | 49 | 0 (0.0%) |
| Other* | 17 | 17 | 13 (76.5%) | 4 | 0 (0.0%) |
| **England and Wales** | **3,405** | **3,386** | **2,902 (85.7%)** | **484** | **19 (0.6%)** |

**Figure 15. Caterpillar plot of the proportions of administration of magnesium sulphate: neonatal units.**

*Unit proportions are represented by dots. The 95% confidence intervals for a unit are shown by a vertical line with each dot. Neonatal units can be identified on NNAP Online.*

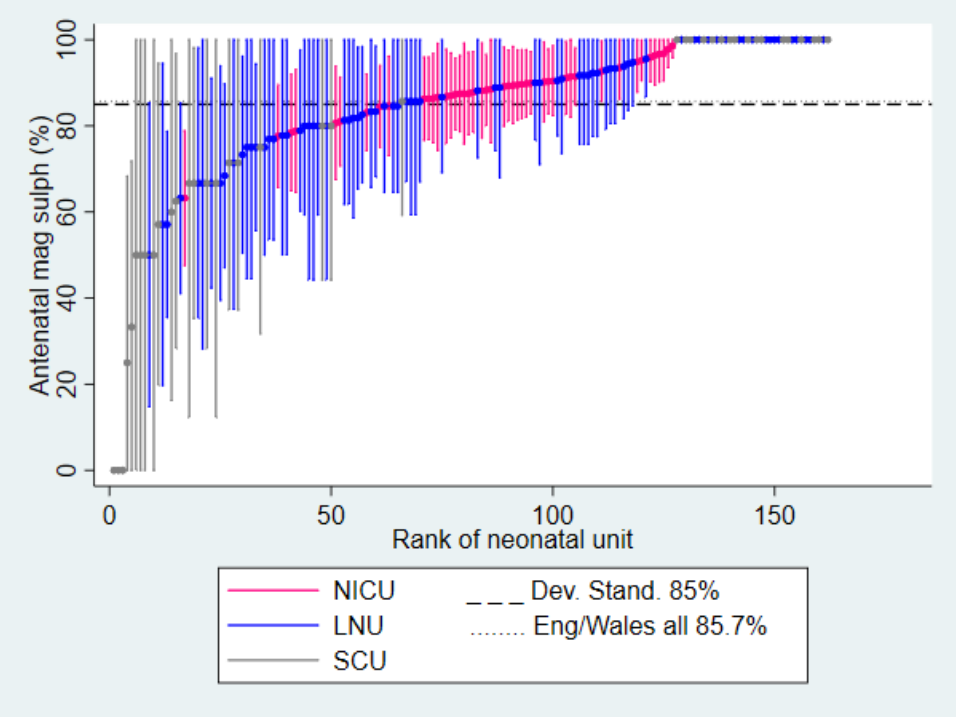



**Figure 16. Caterpillar plot of the proportions of administration of magnesium sulphate, by neonatal network or operational delivery network (ODN).**

*Network proportions are represented by dots. The 95% confidence intervals for a network are shown by a vertical line with each dot.*

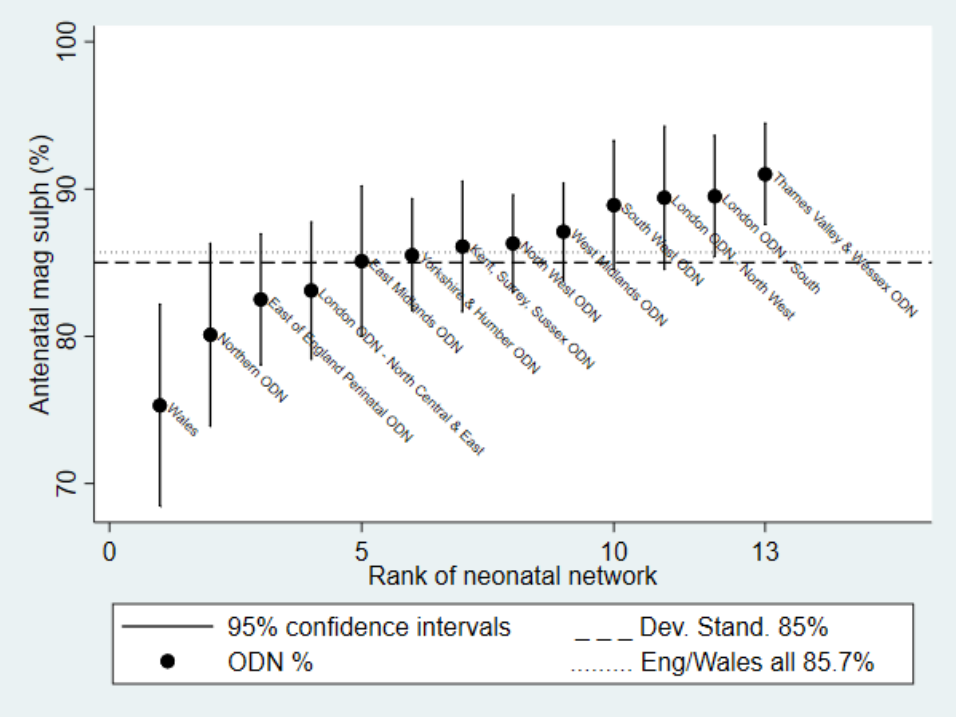
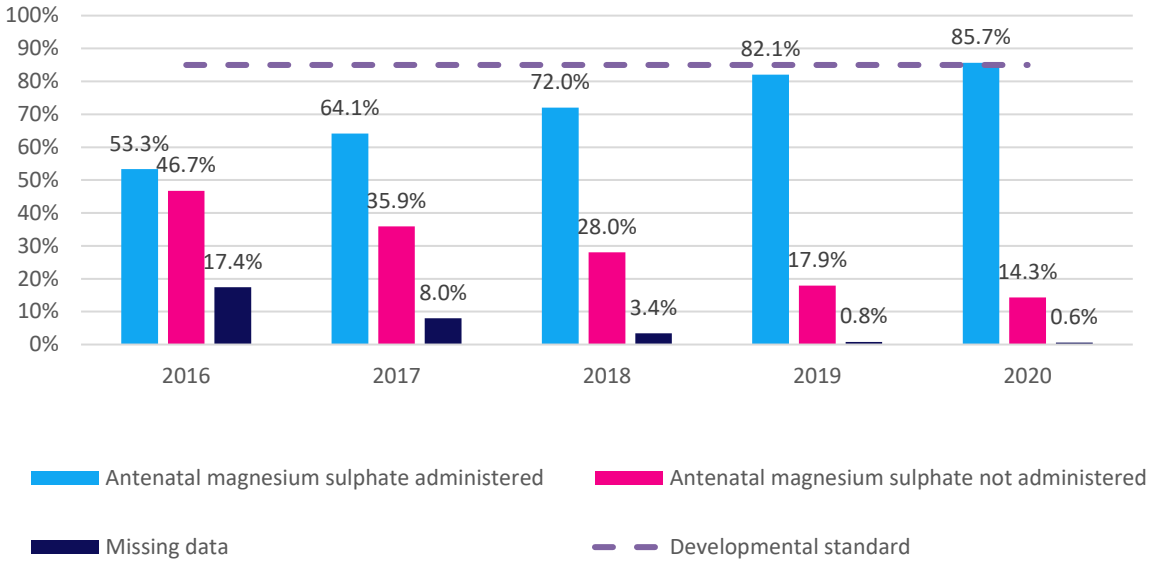


**Figure 17. Administration of magnesium sulphate, by NNAP reporting year (2016-2020).**



# 3.4. Deferred cord clamping

*Does a baby born at less than 32 weeks gestational age have their cord clamped at or after one minute?*

Evidence shows that avoiding immediate cord clamping reduces death in preterm babies by nearly a third[8]. Deferred cord clamping has been shown to be incompletely implemented in the UK and is one of the key perinatal care interventions identified by MatNeoSIP. The focus on very preterm infants (those less than 32 weeks gestation) is on account of the higher mortality in this group, and to be confident that all infants delivered within a hospital are admitted to a neonatal unit, and are thus captured within the measure.

Full details of this measure can be found in the NNAP 2020 audit measures guide.

# Results

**Table 18: Time of cord clamping, by neonatal unit level**

| Unit level | Eligible babies | With data entered | Time of cord clamping | | | Total deferred (%) | Missing data (%) |
|---|---|---|---|---|---|---|---|
| | | | Less than 1 minute | Up to 2 minutes | More than 2 minutes | | |
| Other* | 105 | 41 | 20 | 5 | 16 | 21 (51.2%) | 64 (61.0%) |
| SCU | 371 | 281 | 222 | 45 | 14 | 59 (21%) | 95 (24.3%) |
| LNU | 2,394 | 1,964 | 1,485 | 418 | 61 | 479 (24.4%) | 425 (18%) |
| NICU | 3,913 | 3,136 | 2,127 | 795 | 214 | 1,009 (32.2%) | 777 (19.9%) |
| **England & Wales** | **6,783** | **5,422** | **3,854** | **1,263** | **305** | **1,568 (28.9%)** | **1,361 (20.1%)** |

**Delivered at home, in transit, in an unknown location or in a maternity unit not allied to an NNAP participating unit.*

**Table 19: Time of cord clamping, by neonatal network**

| Network | Eligible babies | With data entered | Time of cord clamping | | | Total deferred (%) | Missing data (%) |
|---|---|---|---|---|---|---|---|
| | | | Less than 1 minute | Up to 2 minutes | More than 2 minutes | | |
| East Midlands ODN | 466 | 308 | 244 | 47 | 17 | 64 (20.8%) | 158 (33.9%) |
| East of England Perinatal ODN | 607 | 494 | 360 | 124 | 10 | 134 (27.1%) | 113 (18.6%) |
| Kent, Surrey, Sussex ODN | 504 | 422 | 302 | 70 | 50 | 120 (28.4%) | 82 (16.3%) |
| London ODN - North Central & East | 429 | 369 | 342 | 18 | 9 | 27 (7.3%) | 60 (14.0%) |
| London ODN - North West | 340 | 238 | 183 | 50 | 5 | 55 (23.1%) | 102 (30.0%) |
| London ODN - South | 433 | 360 | 287 | 71 | 2 | 73 (20.3%) | 73 (16.9%) |
| North West ODN | 874 | 691 | 445 | 146 | 100 | 246 (35.6%) | 183 (20.9%) |
| Northern ODN | 339 | 195 | 167 | 23 | 5 | 28 (14.4%) | 144 (42.5%) |
| South West ODN | 419 | 340 | 134 | 188 | 18 | 206 (60.6%) | 79 (18.9%) |
| Thames Valley & Wessex ODN | 558 | 491 | 350 | 133 | 8 | 141 (28.7%) | 67 (12.0%) |
| Wales | 303 | 251 | 192 | 51 | 8 | 59 (23.5%) | 52 (17.2%) |
| West Midlands ODN | 820 | 688 | 498 | 170 | 20 | 190 (27.6%) | 132 (16.1%) |
| Yorkshire & Humber ODN | 664 | 561 | 342 | 167 | 52 | 219 (39.0%) | 103 (15.5%) |
| Other* | 27 | 14 | 8 | 5 | 1 | 6 (42.9%) | 13 (48.1%) |
| **England & Wales** | **6,783** | **5,422** | **3,854** | **1,263** | **305** | **1,568 (28.9%)** | **1,361 (20.1%)** |

**Includes deliveries in an unknown location or in a maternity unit not allied with a NNAP participating unit in the first neonatal unit admission. Deliveries at home or in transit are attributed to the network of first recorded episode of care.*

**Figure 18: Caterpillar plot of the proportions of deferred cord clamping, neonatal units.**

*Unit proportions are represented by dots. The 95% confidence intervals for a unit are shown by a vertical line with each dot. Neonatal units can be identified on NNAP Online.*

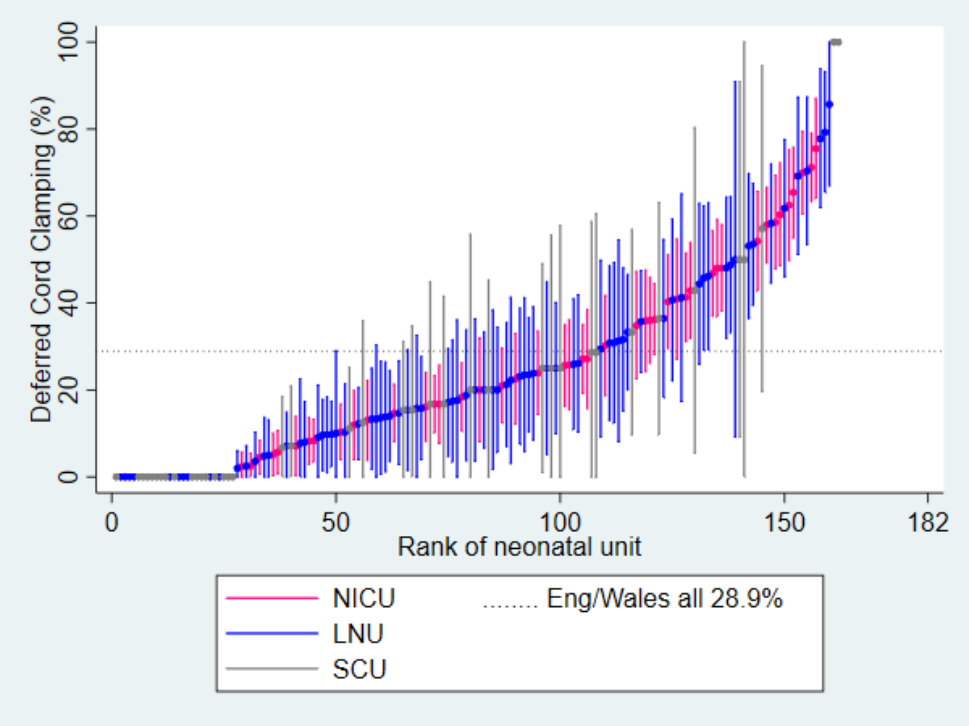
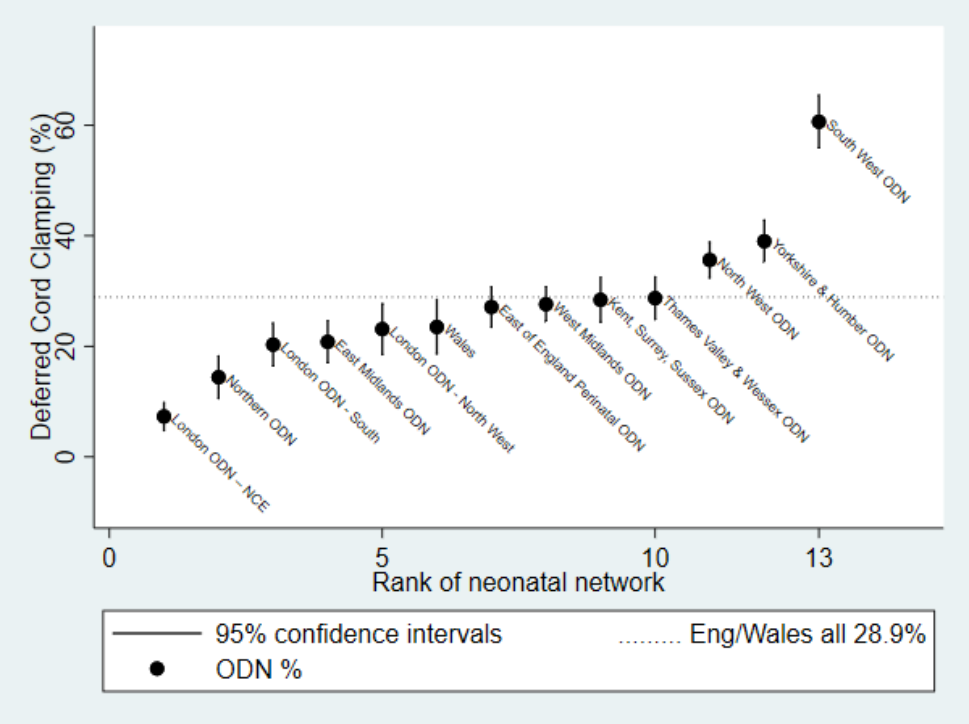



**Figure 19: Caterpillar plot of the proportions of deferred cord clamping, by neonatal network or operational delivery network (ODN).**

*Network proportions are represented by dots. The 95% confidence intervals for a network are shown by a vertical line with each dot.*



# 3.5. Normal temperature on admission

*Does an admitted baby born at less than 32 weeks gestational age have a first temperature on admission which is both between 36.5–37.5°C and measured within one hour of birth?*

Low admission temperature is associated with an increased risk of illness and death in preterm babies. Low temperature (or hypothermia) is a preventable condition in vulnerable newborn babies. Staff on the neonatal unit need to know if a baby is too cold or too hot so they can take appropriate action.

This NNAP measure looks at how successful neonatal units are at achieving a normal first temperature within an hour of birth in very preterm babies. The NNAP developmental standard is that temperature should be taken within an hour of birth for all eligible babies. At least 90% of babies should have a temperature taken within an hour of birth and measuring within the normal range.

Full details of this measure can be found in the NNAP 2020 audit measures guide.

## Results

**Table 20. Temperature on time and within normal range, by neonatal unit level.**

| Unit level | Eligible babies | With data entered | Temperature measurement | | | | | | | Missing data (%) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | On time | | | | | After hour | Not taken | |
| | | | < 32⁰ C | 32 to 35.9⁰ C | 36 to 36.4⁰C | 36.5 to 37.5⁰C | >37.5⁰C | | | |
| Other* | 56 | 56 | 2 | 26 | 8 | 12 (21.4%) | 2 | 6 | 0 | 0 (0%) |
| SCU | 354 | 352 | 0 | 17 | 55 | 236 (67%) | 32 | 12 | 0 | 2 (0.6%) |
| LNU | 2,284 | 2,276 | 1 | 60 | 245 | 1,651 (72.5%) | 262 | 55 | 2 | 8 (0.4%) |
| NICU | 3,830 | 3,817 | 2 | 140 | 402 | 2,718 (71.2%) | 439 | 115 | 1 | 13 (0.3%) |
| **England & Wales** | **6,524** | **6,501** | **5** | **243** | **710** | **4,617 (71.0%)** | **735** | **188** | **3** | **23 (0.4%)** |

**Delivered at home, in transit, in an unknown location or in a maternity unit not allied to an NNAP participating unit.*

**Table 21: Temperature on time and within normal range, by neonatal network**

| Network | Eligible babies | With data entered | Temperature measurement | | | | | | | Missing data (%) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | On time | | | | | After Hour | Not Taken | |
| | | | < 32°C | 32 to 35.9°C | 36 to 36.4°C | 36.5 to 37.5°C (%) | >37.5° C | | | |
| East Midlands ODN | 435 | 432 | 0 | 16 | 43 | 291 (67.4%) | 55 | 27 | 0 | 3 (0.7%) |
| East of England Perinatal ODN | 586 | 586 | 0 | 12 | 63 | 435 (74.2%) | 48 | 28 | 0 | 0 (0%) |
| Kent, Surrey, Sussex ODN | 487 | 486 | 1 | 17 | 42 | 343 (70.6%) | 75 | 7 | 1 | 1 (0.2%) |
| London ODN - North Central & East | 499 | 494 | 0 | 31 | 70 | 334 (67.6%) | 41 | 18 | 0 | 5 (1%) |
| London ODN - North West | 317 | 310 | 1 | 8 | 31 | 224 (72.3%) | 39 | 7 | 0 | 7 (2.2%) |
| London ODN - South | 408 | 408 | 0 | 16 | 48 | 298 (73.0%) | 35 | 11 | 0 | 0 (0%) |
| North West ODN | 834 | 831 | 0 | 37 | 119 | 543 (65.3%) | 114 | 18 | 0 | 3 (0.4%) |
| Northern ODN | 328 | 326 | 0 | 24 | 52 | 202 (62.0%) | 38 | 10 | 0 | 2 (0.6%) |
| South West ODN | 392 | 392 | 2 | 12 | 30 | 275 (70.2%) | 51 | 22 | 0 | 0 (0%) |
| Thames Valley & Wessex ODN | 533 | 533 | 0 | 7 | 35 | 437 (82.0%) | 46 | 6 | 2 | 0 (0%) |
| Wales | 291 | 290 | 0 | 13 | 30 | 219 (75.5%) | 23 | 5 | 0 | 1 (0.3%) |
| West Midlands ODN | 763 | 763 | 1 | 33 | 97 | 547 (71.7%) | 70 | 15 | 0 | 0 (0%) |
| Yorkshire & Humber ODN | 638 | 637 | 0 | 16 | 48 | 462 (72.5%) | 98 | 13 | 0 | 1 (0.2%) |
| Other* | 13 | 13 | 0 | 1 | 2 | 7 (53.8%) | 2 | 1 | 0 | 0 (0%) |
| **England and Wales** | **6,524** | **6,501** | **5** | **243** | **710** | **4,617 (71.0%)** | **735** | **188** | **3** | **23 (0.4%)** |

**Includes deliveries in an unknown location or in a maternity unit not allied with a NNAP participating unit in the first neonatal unit admission. Deliveries at home or in transit are attributed to the network of first recorded episode of care.*

**Figure 20. Caterpillar plot of the proportions of temperature taken on time and within normal range: neonatal units.**

*Unit proportions are represented by dots. The 95% confidence intervals for a unit are shown by a vertical line with each dot. Neonatal units can be identified on NNAP Online.*

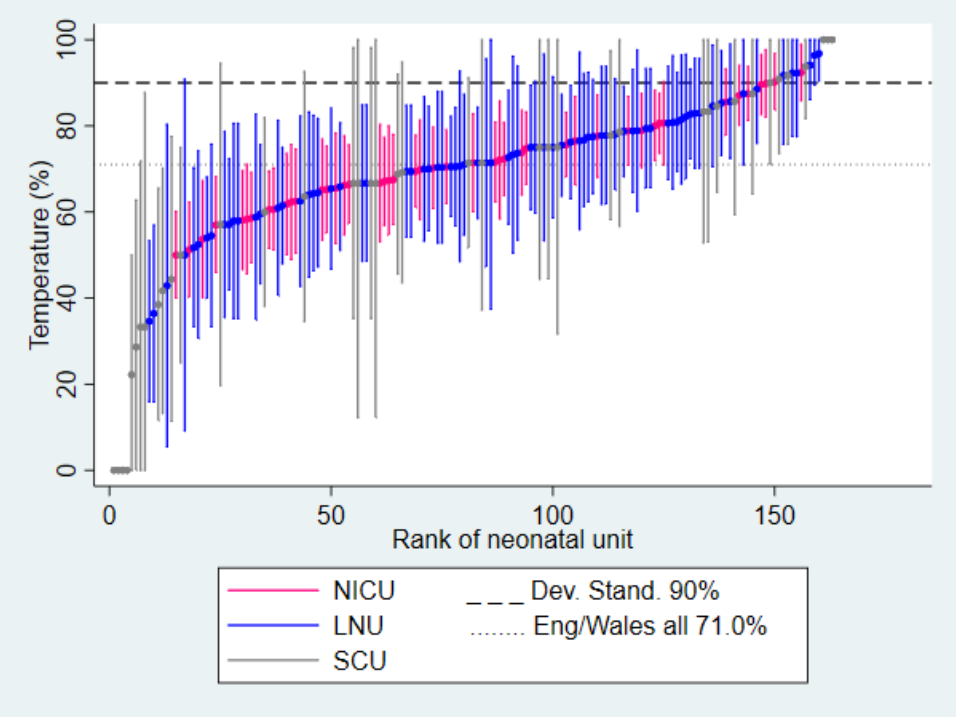



**Figure 21. Caterpillar plot of the proportions of temperature taken on time and within normal range, by neonatal network or operational delivery network (ODN).**

*Network proportions are represented by dots. The 95% confidence intervals for a network are shown by a vertical line with each dot.*

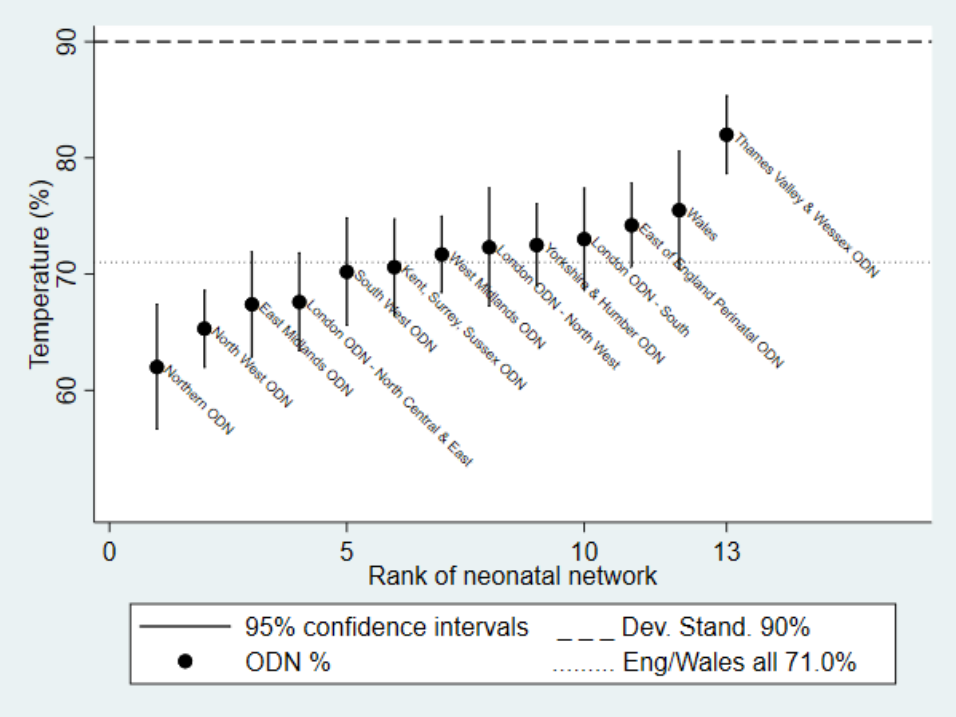
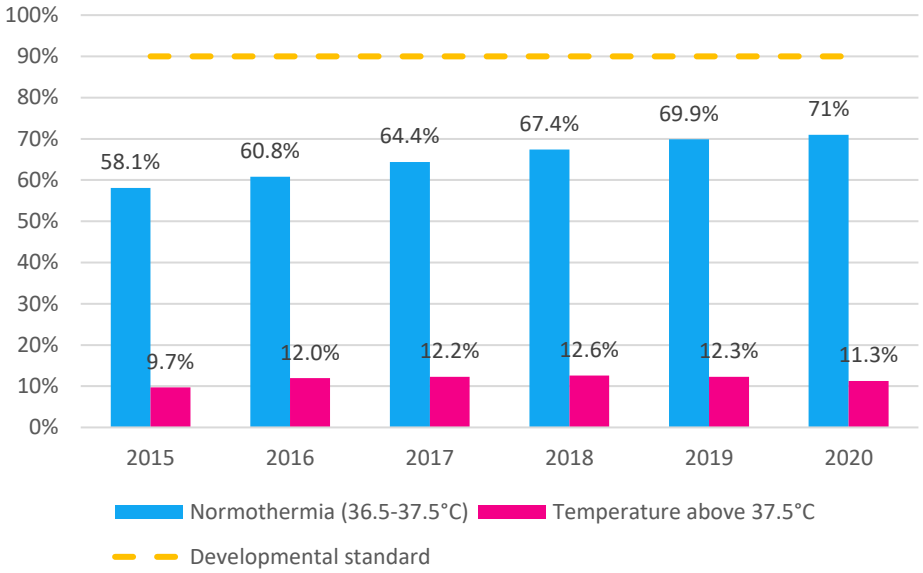


**Figure 22. Temperature on time and within normal range, by NNAP reporting year (2015-2020).**



# 4. Maternal breastmilk feeding

Full details of this measure can be found in the NNAP 2020 audit measures guide.

## 4.1. Early breastmilk feeding

*Does a baby born at less than 32 weeks' gestational age receive any of their own mother's milk on day 14 of life?*

### Result

**Table 22: Breastmilk feeding on day 14 of life, by neonatal unit level.**

| Unit level at 48 hours | Babies | With data entered | Enteral feeds at day 14 | | Missing data (%) |
|---|---|---|---|---|---|
| | | | Any of own mother's milk (%) | None of own mother's milk (%) | |
| SCU | 111 | 106 | 80 (75.5%) | 26 (24.5%) | 5 (4.5%) |
| LNU | 2,107 | 2,078 | 1,718 (82.8%) | 357 (17.2%) | 29 (1.4%) |
| NICU | 4,302 | 4,232 | 3,474 (82.1%) | 758 (17.9%) | 70 (1.6%) |
| **England & Wales** | 6,520 | 6,416 | 5,273 (82.2%) | 1,143 (17.8%) | 104 (1.6%) |

**Table 23: Breastmilk feeding on day 14 of life, by neonatal network.**

| Network | Babies | With data entered | Enteral feeds at day 14 | | Missing (%) |
|---|---|---|---|---|---|
| | | | Any of own mother's milk (%) | None of own mother's milk (%) | |
| East Midlands ODN | 438 | 426 | 321 (75.4%) | 105 (24.6%) | 12 (2.7%) |
| East of England Perinatal ODN | 577 | 567 | 446 (78.7%) | 121 (21.3%) | 10 (1.7%) |
| Kent, Surrey, Sussex ODN | 478 | 470 | 376 (80.0%) | 94 (20.0%) | 8 (1.7%) |
| London ODN - North Central & East | 513 | 485 | 421 (86.8%) | 64 (13.2%) | 28 (5.5%) |
| London ODN - North West | 332 | 328 | 293 (89.3%) | 35 (10.7%) | 4 (1.2%) |
| London ODN - South | 408 | 405 | 353 (87.2%) | 52 (12.8%) | 3 (0.7%) |
| North West ODN | 843 | 834 | 664 (79.6%) | 170 (20.4%) | 9 (1.1%) |
| Northern ODN | 328 | 324 | 251 (77.5%) | 73 (22.5%) | 4 (1.2%) |
| South West ODN | 401 | 400 | 342 (85.5%) | 58 (14.5%) | 1 (0.2%) |
| Thames Valley & Wessex ODN | 534 | 532 | 458 (86.1%) | 74 (13.9%) | 2 (0.4%) |
| Wales | 287 | 284 | 242 (85.2%) | 42 (14.5%) | 3 (1.0%) |
| West Midlands ODN | 753 | 739 | 617 (83.5%) | 122 (16.5%) | 14 (1.9%) |
| Yorkshire & Humber ODN | 628 | 622 | 489 (78.6%) | 133 (21.4%) | 6 (1.0%) |
| **England & Wales** | **6,520** | **6,416** | **5,273 (82.2%)** | **1,143 (17.8%)** | **104 (1.6%)** |

**Figure 23: Caterpillar plot of proportions of any breastmilk feeding on day 14 of life, by neonatal unit.**

*Unit proportions are represented by dots. The 95% confidence intervals for a unit are shown by a vertical line with each dot. Neonatal units can be identified on NNAP Online.*

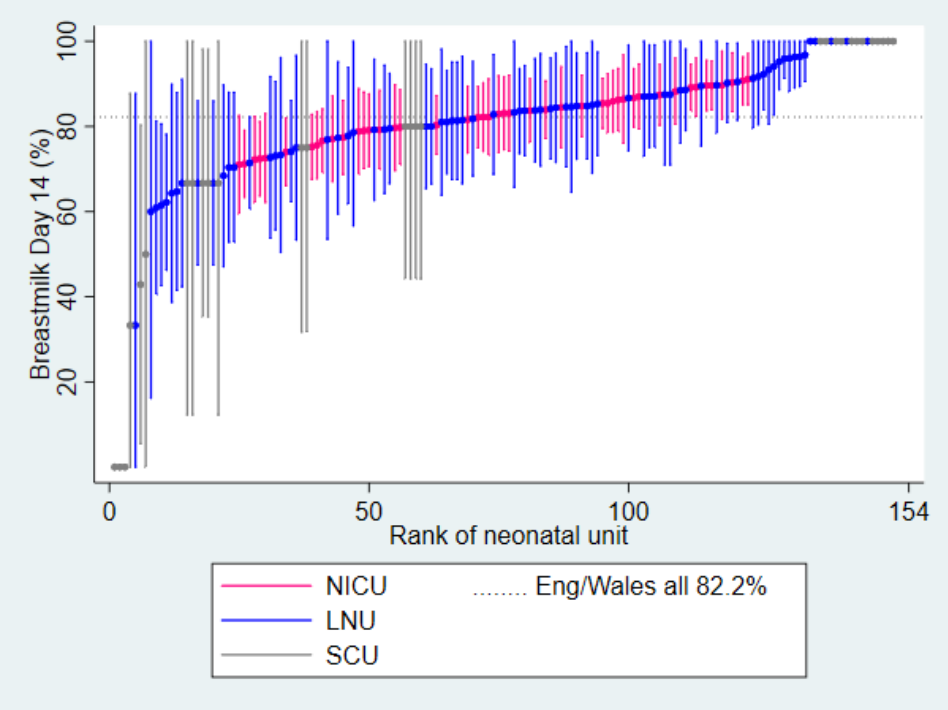
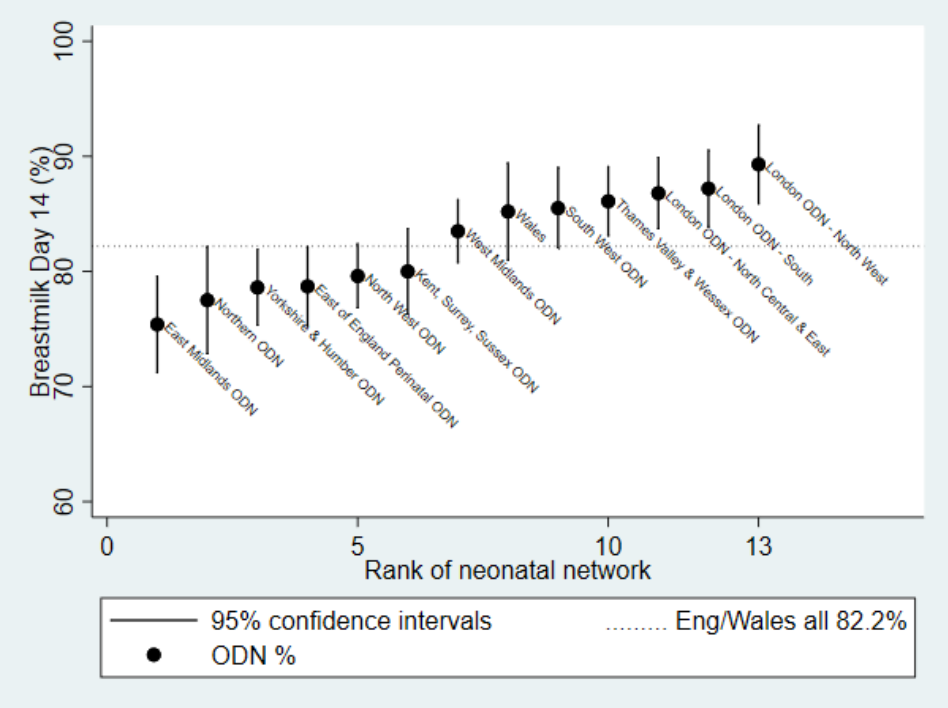



**Figure 24: Caterpillar plot of proportions of any breastmilk feeding on day 14 of life, by neonatal network or operational delivery network (ODN).**

*Network proportions are represented by dots. The 95% confidence intervals for a network are shown by a vertical line with each dot.*



# 4.2. Breastmilk feeding at discharge home

*Does a baby born at less than 32 weeks gestational age receive any of their own mother's milk at discharge to home from a neonatal unit?*

## Results

**Table 24. Breastmilk feeding at discharge home, by neonatal unit level.**

| Unit level | Babies | With data entered | Enteral feeds at the time of discharge | | | Missing data (%) |
|---|---|---|---|---|---|---|
| | | | Exclusive breast milk feeding (%) | Any breast milk (%) | No breast milk (%) | |
| SCU | 734 | 734 | 85 (11.6%) | 388 (52.9%) | 346 (47.1%) | 0 (0.0%) |
| LNU | 2,880 | 2,875 | 397 (13.8%) | 1,790 (62.3%) | 1,085 (37.7%) | 5 (0.2%) |
| NICU | 2,235 | 2,235 | 325 (14.5%) | 1,336 (59.8%) | 899 (40.2%) | 0 (0.0%) |
| **England & Wales** | **5,849** | **5,844** | **807 (13.8%)** | **3,514 (60.1%)** | **2,330 (39.9%)** | **5 (0.1%)** |

**Figure 25: Caterpillar plot of any proportions of breastmilk feeding at discharge home, by neonatal unit.**

*Unit proportions are represented by dots. The 95% confidence intervals for a unit are shown by a vertical line with each dot. Neonatal units can be identified on NNAP Online.*

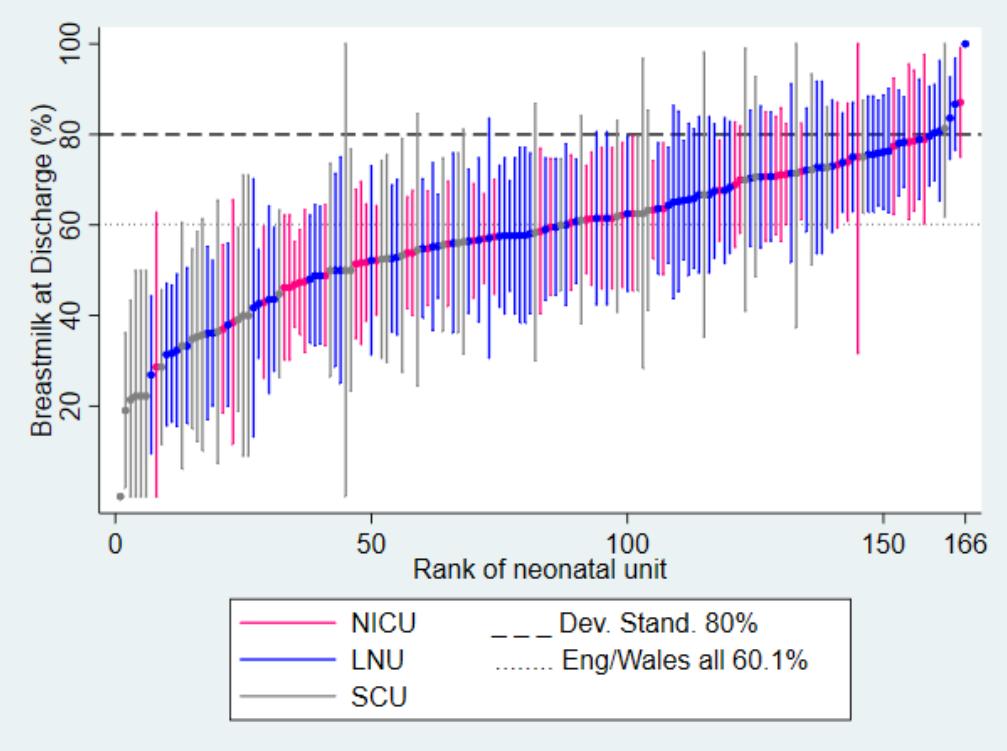


**Table 25: Breastmilk feeding at discharge home, by neonatal network**

| Network | Babies | With data entered | Enteral feeds at time of discharge | | | Missing data (%) |
|---|---|---|---|---|---|---|
| | | | Exclusive breast milk feeding (%) | Any breast milk (%) | No breast milk (%) | |
| East Midlands ODN | 429 | 429 | 68 (15.9%) | 238 (55.5%) | 191 (44.5%) | 0 (0.0%) |
| East of England Perinatal ODN | 548 | 548 | 76 (13.9%) | 335 (61.1%) | 213 (38.9%) | 0 (0.0%) |
| Kent, Surrey, Sussex ODN | 430 | 430 | 48 (11.2%) | 262 (60.9%) | 168 (39.1%) | 0 (0.0%) |
| London ODN - North Central & East | 475 | 472 | 67 (14.2%) | 347 (73.5%) | 125 (26.5%) | 3 (0.6%) |
| London ODN - North West | 270 | 270 | 41 (15.2%) | 201 (74.4%) | 69 (25.6%) | 0 (0.0%) |
| London ODN - South | 343 | 343 | 44 (12.8%) | 260 (75.8%) | 83 (24.2%) | 0 (0.0%) |
| North West ODN | 725 | 723 | 108 (14.9%) | 391 (54.1%) | 332 (45.9%) | 2 (0.3%) |
| Northern ODN | 256 | 256 | 30 (11.7%) | 123 (48.0%) | 133 (52.0%) | 0 (0.0%) |
| South West ODN | 363 | 363 | 76 (20.9%) | 224 (61.7%) | 139 (38.3%) | 0 (0.0%) |
| Thames Valley & Wessex ODN | 478 | 478 | 51 (10.7%) | 311 (65.1%) | 167 (34.9%) | 0 (0.0%) |
| Wales | 289 | 289 | 44 (15.2%) | 143 (49.5%) | 146 (50.5%) | 0 (0.0%) |
| West Midlands ODN | 665 | 665 | 91 (13.7%) | 383 (57.6%) | 282 (42.4%) | 0 (0.0%) |
| Yorkshire & Humber ODN | 578 | 578 | 63 (10.9%) | 296 (51.2%) | 282 (48.8%) | 0 (0.0%) |
| **England and Wales** | **5,849** | **5,844** | **807 (13.8%)** | **3,514 (60.1%)** | **2,330 (39.9%)** | **5 (0.1%)** |

**Figure 26: Caterpillar plot of any breastmilk feeding at discharge home, by neonatal network or operational delivery network (ODN).**

*Network proportions are represented by dots. The 95% confidence intervals for a network are shown by a vertical line with each dot.*

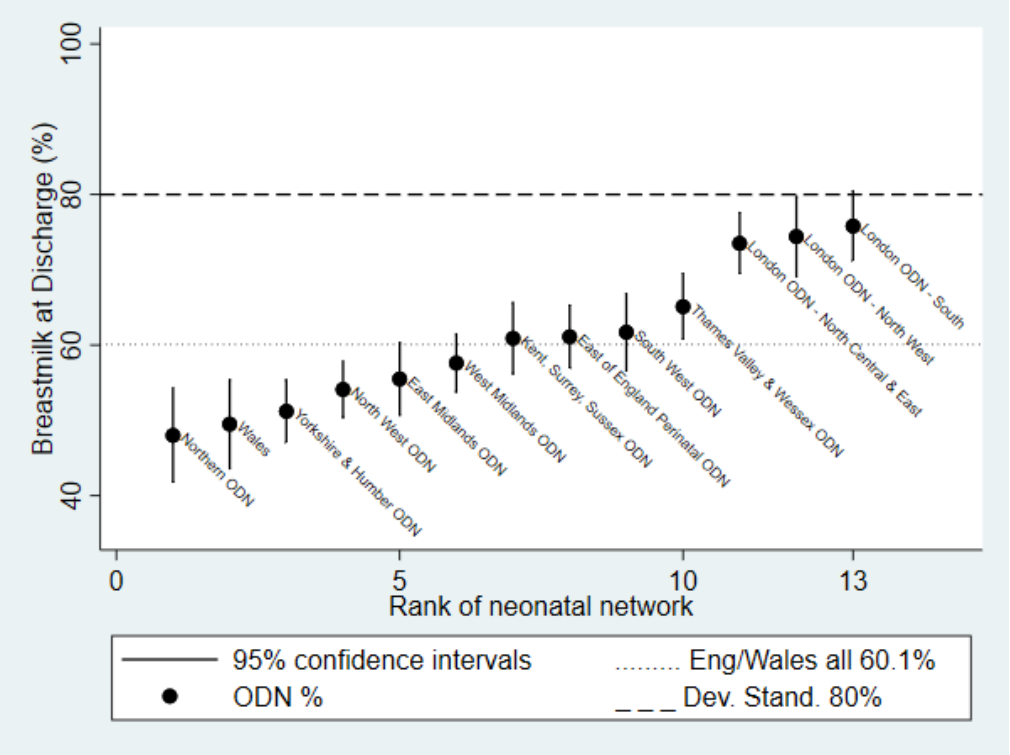
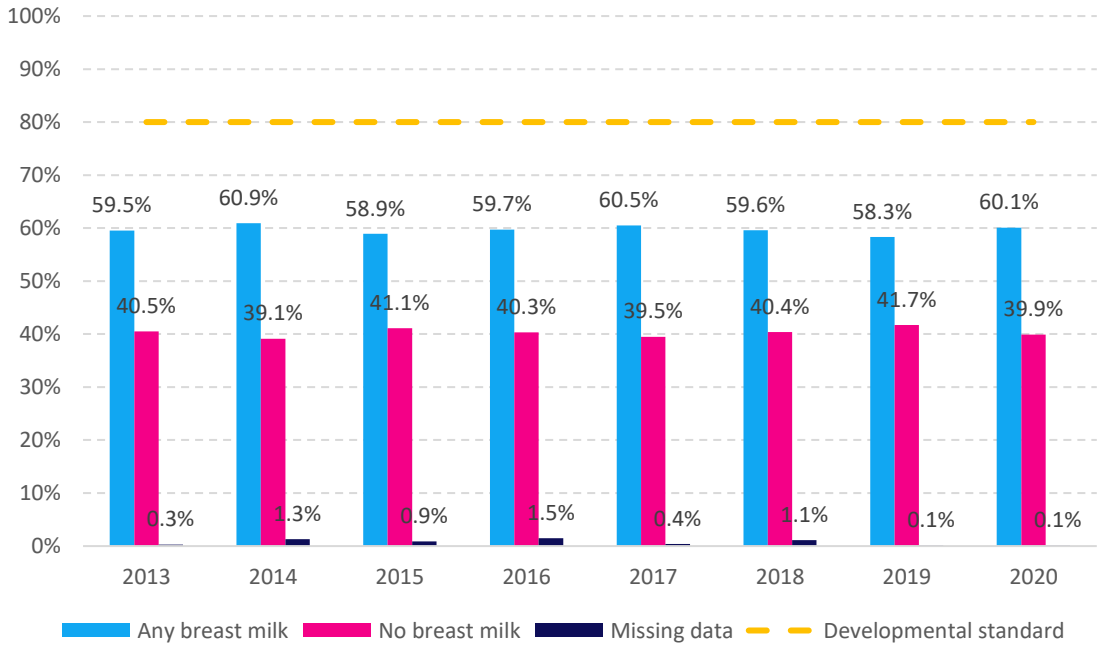



**Figure 27. Breastmilk feeding at discharge home, by NNAP reporting year (2013 to 2020)**




**Note, prior to 2019, the upper gestational age limit was 33 weeks.*

# 5. Parental partnership in care

## 5.1. Parental consultation within 24 hours of admission

*Is there a documented consultation with parents by a senior member of the neonatal team within 24 hours of a baby's first admission?*[9,10,11]

It is important that families understand and are involved in the care of their baby. This first consultation provides an opportunity for the senior staff member to meet the parents, listen to their concerns, explain how their baby is being cared for and respond to any questions. This measure of care looks at whether parents have been spoken to by a senior member of the neonatal team within the first 24 hours of their baby being admitted. It applies for all babies who require care on a neonatal unit. A consultation should take place within 24 hours of admission for every baby, for every admission.

Full details of this measure can be found in the NNAP 2020 audit measures guide.

### Results

**Table 26. Time of first consultation, by neonatal unit level.**

| Unit level | Eligible episodes | With data entered | Time of first consultation | | | No consultation | Missing/ unknown (%) |
|---|---|---|---|---|---|---|---|
| | | | Within 24 hours (%) | Before admission | After 24 hours | | |
| SCU | 6,486 | 6,246 | 5885 (94.2%) | 125 | 161 | 75 | 240 (3.7%) |
| LNU | 23,221 | 22,902 | 22,140 (96.7%) | 217 | 372 | 173 | 319 (1.4%) |
| NICU | 24,748 | 23,831 | 22,551 (94.6%) | 227 | 674 | 379 | 917 (3.7%) |
| **England & Wales** | **54,455** | **52,979** | **50,576 (95.5%)** | **569** | **1,207** | **627** | **1476 (2.7%)** |

**Table 27: Time of first consultation, by neonatal network.**

| Network | Eligible episodes | With data entered | Time of first consultation | | | No consultation | Missing/ unknown (%) |
|---|---|---|---|---|---|---|---|
| | | | Within 24 hours | Before admission | After 24 hours | | |
| East Midlands ODN | 3,280 | 3,071 | 2,823 (91.9%) | 64 | 96 | 88 | 209 (6.4%) |
| East of England Perinatal ODN | 5,859 | 5,777 | 5,599 (96.9%) | 49 | 99 | 30 | 82 (1.4%) |
| Kent, Surrey, Sussex ODN | 3,685 | 3,653 | 3,591 (98.3%) | 16 | 29 | 17 | 32 (0.9%) |
| London ODN - North Central & East | 4,360 | 4,127 | 4,032 (97.7%) | 39 | 34 | 22 | 233 (5.3%) |
| London ODN - North West | 2,462 | 2,400 | 2,282 (95.1%) | 36 | 56 | 26 | 62 (2.5%) |
| London ODN - South | 3,666 | 3,651 | 3,523 (96.5%) | 20 | 48 | 60 | 15 (0.4%) |
| North West ODN | 7,273 | 6,930 | 6,545 (94.4%) | 80 | 206 | 99 | 343 (4.7%) |
| Northern ODN | 2,440 | 2,260 | 2,106 (93.2%) | 53 | 71 | 30 | 180 (7.4%) |
| South West ODN | 3,744 | 3,670 | 3,505 (95.5%) | 48 | 95 | 22 | 74 (2.0%) |
| Thames Valley & Wessex ODN | 4,503 | 4,495 | 4,437 (98.7%) | 14 | 32 | 12 | 8 (0.2%) |
| Wales | 2,777 | 2,711 | 2,610 (96.3%) | 34 | 51 | 16 | 66 (2.4%) |
| West Midlands ODN | 5,512 | 5,419 | 4,988 (92%) | 41 | 237 | 153 | 93 (1.7%) |
| Yorkshire & Humber ODN | 4,894 | 4,815 | 4,535 (94.2%) | 75 | 153 | 52 | 79 (1.6%) |
| **England and Wales** | **54,455** | **52,979** | **50,576 (95.5%)** | **569** | **1,207** | **627** | **1476 (2.7%)** |

**Figure 28. Caterpillar plot of the proportions of first consultation within 24 hours of admission: neonatal units.**

*Unit proportions are represented by dots. The 95% confidence intervals for a unit are shown by a vertical line with each dot. Neonatal units can be identified on NNAP Online.*

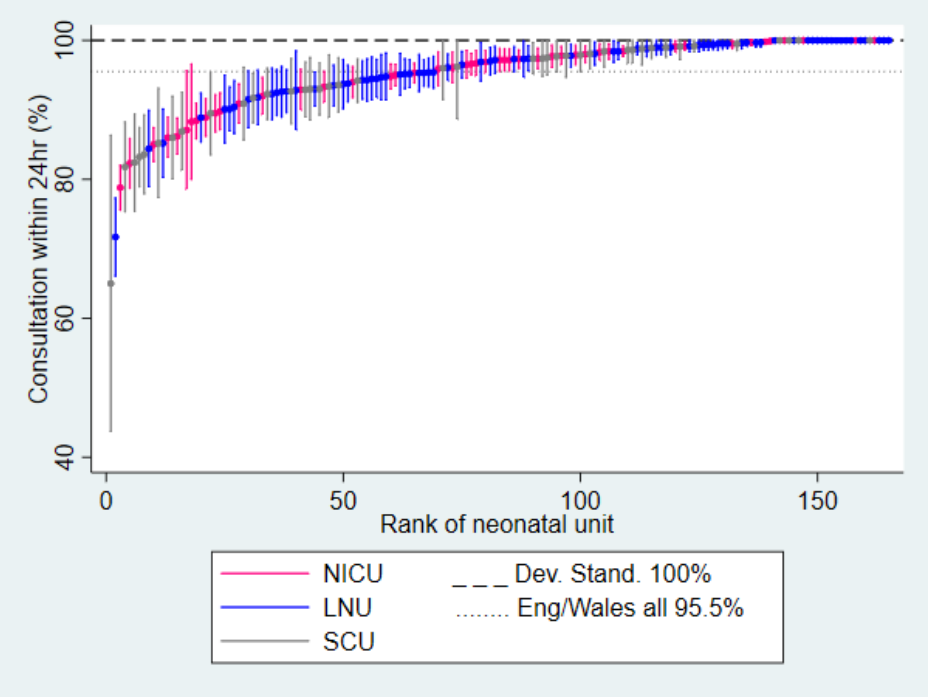



**Figure 29. Caterpillar plot of the proportions of first consultation within 24 hours of admission, by neonatal network or operational delivery network (ODN).**

*Network proportions are represented by dots. The 95% confidence intervals for a network are shown by a vertical line with each dot.*

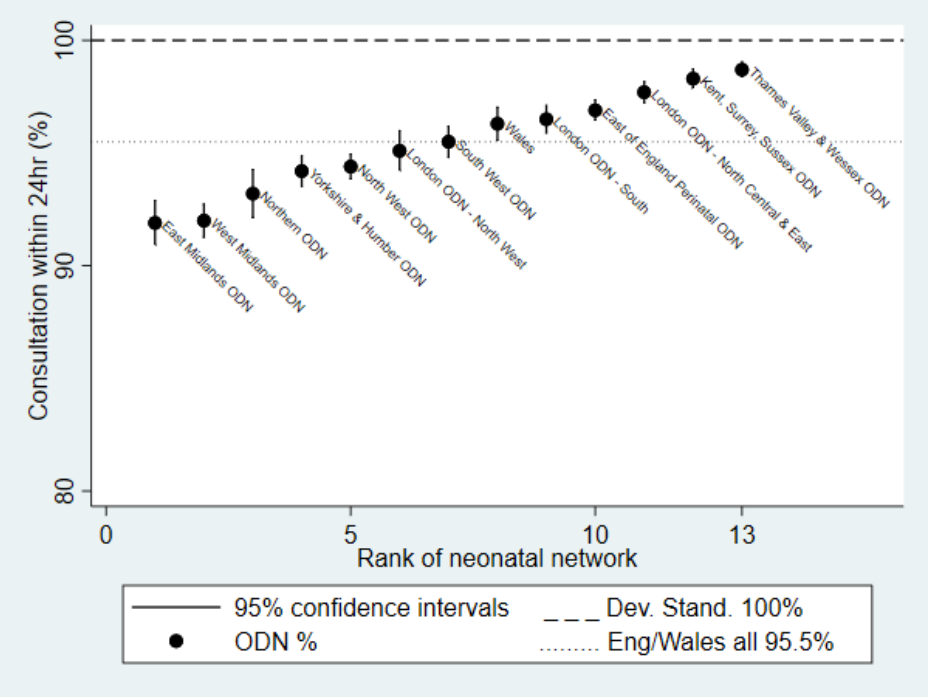
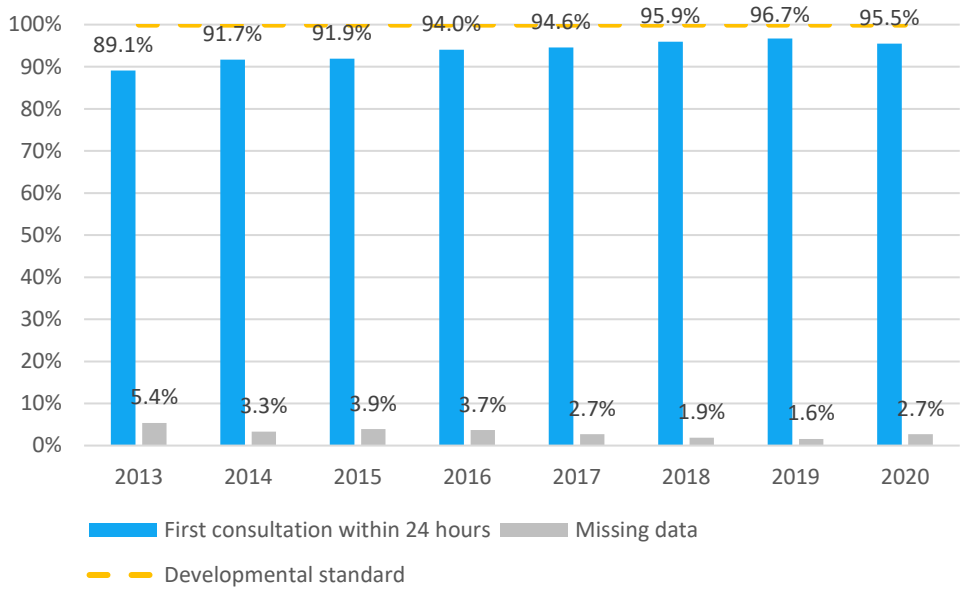


**Figure 30: Time of first consultation, by NNAP reporting year (2013 to 2020).**




*The 2020 data year was the first in which all admissions, rather than just first episodes, were included in this measure.*

# 5.2. Parental presence at consultant ward rounds

*For a baby admitted for more than 24 hours, did at least one parent attend a consultant ward round at any point during the baby's admission?*[9,10,12]

Professionals, parents' advocates, and parents agree that including parents in consultant ward rounds supports parental partnership in care. Consultant ward rounds occur regularly (usually daily, or more often) on neonatal units. This measure looks at the proportion of admissions where parents were present on a consultant ward round on at least one occasion during a baby's stay. We acknowledge that this measure is an imperfect and incomplete description of this element of parental partnership in care, but feel that the measure has potential utility in assessing the spread of shared care planning.

Full details of this measure can be found in the NNAP 2020 audit measures guide.

## Results

**Table 28. Parent present on one or more consultant ward rounds, by length of stay.**

| Length of stay | Eligible admissions | With data entered | Parental presence on one or more consultant ward rounds | | Missing data (%) |
|---|---|---|---|---|---|
| | | | Parent not present on any ward round | Parent present (%) | |
| ≤7 | 29,654 | 26,649 | 5,926 | 20,723 (77.8%) | 3,005 (10.1%) |
| 8-14 | 10,946 | 10,656 | 1,386 | 9,270 (87%) | 290 (2.6%) |
| 15-21 | 5,692 | 5,618 | 571 | 5,047 (89.8%) | 74 (1.3%) |
| 22-28 | 3,255 | 3,225 | 267 | 2,958 (91.7%) | 30 (0.9%) |
| >28 days | 8,083 | 8,058 | 419 | 7,639 (94.8%) | 25 (0.3%) |
| **England & Wales** | **57,630** | **54,206** | **8,569** | **45,637 (84.2%)** | **3,424 (5.9%)** |

**Table 29: Parent present on one or more consultant ward rounds, by neonatal network.**

| Network | Eligible admissions | With data entered | Parental presence on one or more consultant ward rounds | | Missing data |
|---|---|---|---|---|---|
| | | | Parent not present on any ward round | Parent present (%) | |
| East Midlands ODN | 3,491 | 3,230 | 802 | 2,428 (75.2%) | 261 (7.5%) |
| East of England Perinatal ODN | 6,367 | 6,127 | 1,163 | 4,964 (81.0%) | 240 (3.8%) |
| Kent, Surrey, Sussex ODN | 4,036 | 3,885 | 453 | 3,432 (88.3%) | 151 (3.7%) |
| London ODN - North Central & East | 4,581 | 4,194 | 1,154 | 3,040 (72.5%) | 387 (8.4%) |
| London ODN - North West | 2,413 | 2,144 | 300 | 1,844 (86.0%) | 269 (11.1%) |
| London ODN - South | 3,797 | 3,552 | 319 | 3,233 (91.0%) | 245 (6.5%) |
| North West ODN | 7,549 | 6,912 | 568 | 6,344 (91.8%) | 637 (8.4%) |
| Northern ODN | 2,383 | 2,235 | 508 | 1,727 (77.3%) | 148 (6.2%) |
| South West ODN | 4,124 | 3,970 | 441 | 3,529 (88.9%) | 154 (3.7%) |
| Thames Valley & Wessex ODN | 4,582 | 4,531 | 521 | 4,010 (88.5%) | 51 (1.1%) |
| Wales | 2,814 | 2,688 | 398 | 2,290 (85.2%) | 126 (4.5%) |
| West Midlands ODN | 6,179 | 5,773 | 1,024 | 4,749 (82.3%) | 406 (6.6%) |
| Yorkshire & Humber ODN | 5,314 | 4,965 | 918 | 4,047 (81.5%) | 349 (6.6%) |
| **England & Wales** | **57,630** | **54,206** | **8,569** | **45,637 (84.2%)** | **3,424 (5.9%)** |

**Figure 31: Caterpillar plot of proportions of parent present on one or more consultant ward rounds, by neonatal unit.**

*Unit proportions are represented by dots. The 95% confidence intervals for a unit are shown by a vertical line with each dot. Neonatal units can be identified on NNAP Online.*

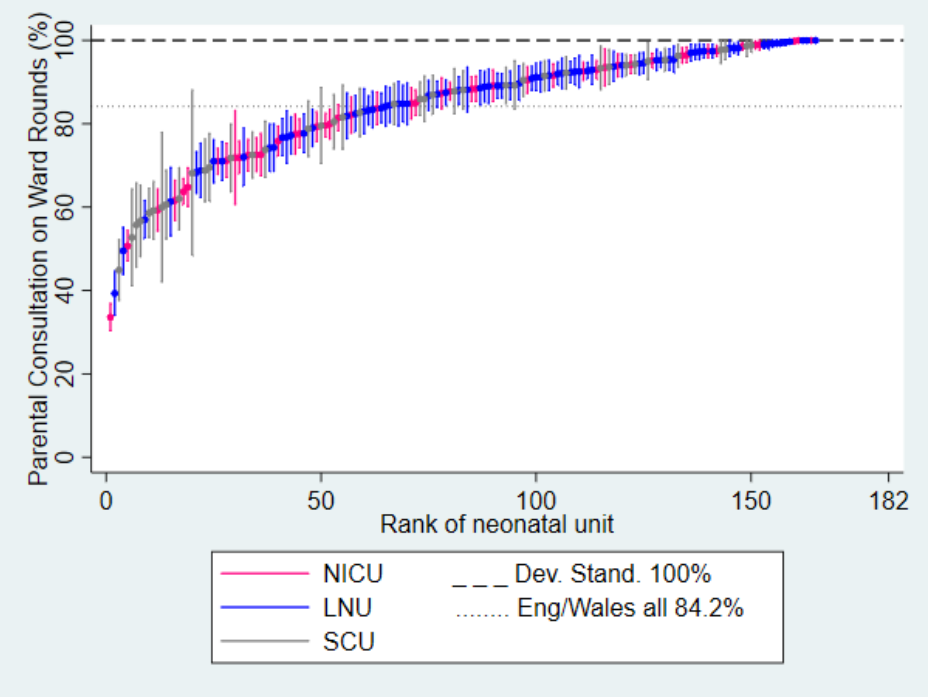



**Figure 32: Caterpillar plot of proportions of parent present on one or more consultant ward rounds, by neonatal network or operational delivery network (ODN).**

*Network proportions are represented by dots. The 95% confidence intervals for a network are shown by a vertical line with each dot.*

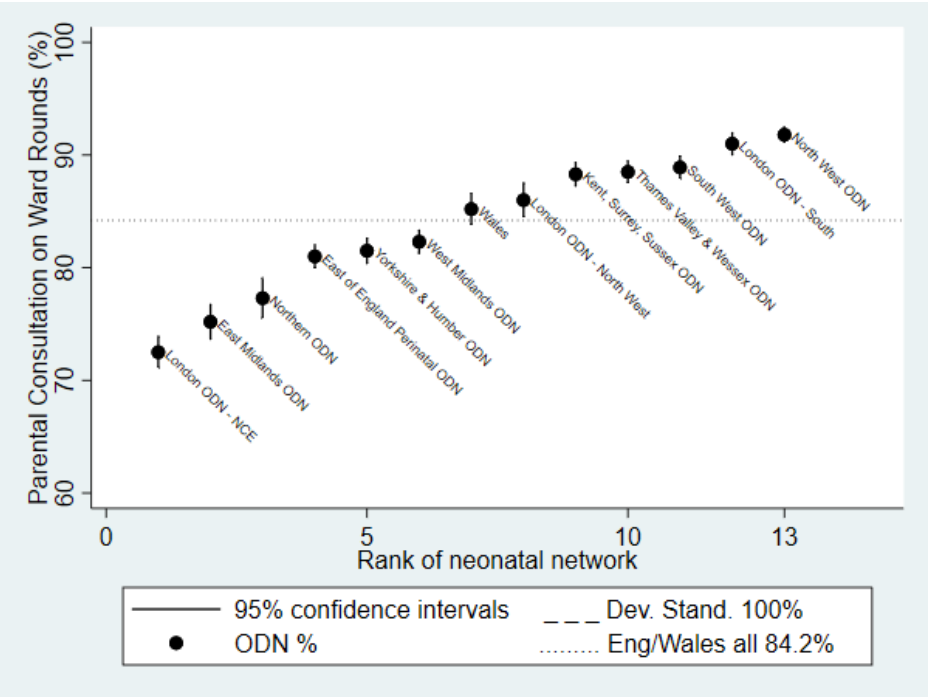


**Table 30: Parent present on one or more consultant ward rounds, 2017-2020.**

| NNAP year | Neonatal units | Eligible admissions | With outcome | Parents attended one or more ward rounds | Missing data (%) |
|---|---|---|---|---|---|
| 2017 | 179 | 71,622 | 58,163 | 43,230 (74.3%) | 3,459 (18.8%) |
| 2018 | 181 | 69,060 | 61,083 | 48,297 (79.1%) | 7,977 (11.6%) |
| 2019 | 181 | 66,577 | 61,374 | 51,050 (83.2%) | 5,203 (7.8%) |
| 2020 | 165 | 57,630 | 54,206 | 45,637 (84.2%) | 3,424 (5.9%) |

# 5.3. Minimising separation of mother and baby (term and late preterm)

1. *For a baby born at gestational age greater than or equal to 37 weeks, who did not have any surgery or a transfer during any admission, how many special care or normal care days were provided when oxygen was not administered?*

2. *For a baby born at 34-36 weeks gestational age, who did not have any surgery or a transfer during any admission, how many special care or normal care days were provided when oxygen was not administered?*

This measure describes the number of separation days for each admission to a neonatal unit. Separation days are defined as days of low dependency care where breathing support was not needed. Even when a neonatal unit admission is unavoidable, there may still be opportunities to reduce separation care days. Average numbers of separation days for a unit or network should be interpreted alongside the rates of admission of term, and late preterm babies per 1,000 live births.

Full details of this measure can be found in the NNAP 2020 audit measures guide.

**Table 31. Term babies spending one or more days in special or normal care, by neonatal unit level.**

| Unit level | Babies | Babies who received one or more eligible days in special or normal care (%) | Number of eligible care days | | | Average number of separation days per baby |
|---|---|---|---|---|---|---|
| | | | Special care | Normal care | Total days | |
| SCU | 3,167 | 2,743 (86.6%) | 5,259 | 2,857 | 8,116 | 2.6 |
| LNU | 11,206 | 9,601 (85.7%) | 20,756 | 10,736 | 31,492 | 2.8 |
| NICU | 11,276 | 9,452 (83.8%) | 23,032 | 8,944 | 31,976 | 2.8 |
| **England & Wales** | **25,649** | **21,796 (85.0%)** | **49,047** | **22,537** | **71,584** | **2.8** |

**Table 32. Late preterm babies spending one or more days in special or normal care, by neonatal unit level.**

| Unit level | Babies | Babies who received one or more eligible days in special or normal care (%) | Number of eligible care days | | | Average number of separation days per baby |
|---|---|---|---|---|---|---|
| | | | Special care | Normal care | Total days | |
| SCU | 1,812 | 1,732 (95.6%) | 9,468 | 3,069 | 12,537 | 6.9 |
| LNU | 5,520 | 5,187 (94.0%) | 27,398 | 8,272 | 35,670 | 6.5 |
| NICU | 4,395 | 3,964 (90.2%) | 20,646 | 5,230 | 25,876 | 5.9 |
| **England & Wales** | **11,727** | **10,883 (92.8%)** | **57,512** | **16,571** | **74,083** | **6.3** |

**Table 33: Term babies spending one or more days in special or normal care, by neonatal network.**

| Network | Babies | Babies who received one or more eligible days in special or normal care (%) | Number of eligible care days | | | Average number of separation days per baby |
|---|---|---|---|---|---|---|
| | | | Special care | Normal care | Total days | |
| East Midlands ODN | 1,357 | 1,164 (85.8%) | 2,479 | 1,170 | 3,649 | 2.7 |
| East of England Perinatal ODN | 3,012 | 2,546 (84.5%) | 5,861 | 2,239 | 8,100 | 2.7 |
| Kent, Surrey, Sussex ODN | 1,763 | 1,480 (83.9%) | 3,068 | 1,296 | 4,364 | 2.5 |
| London ODN - North Central & East | 2,621 | 2,399 (91.5%) | 5,621 | 3,013 | 8,634 | 3.3 |
| London ODN - North West | 1,054 | 861 (81.7%) | 2,048 | 652 | 2,700 | 2.6 |
| London ODN - South | 1,664 | 1,452 (87.3%) | 3,656 | 1,396 | 5,052 | 3 |
| North West ODN | 3,200 | 2,867 (89.6%) | 7,017 | 3,193 | 10,210 | 3.2 |
| Northern ODN | 956 | 827 (86.5%) | 1,559 | 935 | 2,494 | 2.6 |
| South West ODN | 1,864 | 1,474 (79.1%) | 3,054 | 1,717 | 4,771 | 2.6 |
| Thames Valley & Wessex ODN | 2,075 | 1,713 (82.6%) | 3,651 | 1,737 | 5,388 | 2.6 |
| Wales | 1,253 | 1,124 (89.7%) | 2,361 | 1,346 | 3,707 | 3 |
| West Midlands ODN | 2,818 | 2,201 (78.1%) | 4,898 | 1,843 | 6,741 | 2.4 |
| Yorkshire & Humber ODN | 2,012 | 1,688 (83.9%) | 3,774 | 2,000 | 5,774 | 2.9 |
| **England and Wales** | **25,649** | **21,796 (85.0%)** | **49,047** | **22,537** | **71,584** | **2.8** |

**Table 34: Late preterm babies spending one or more days in special or normal care, by neonatal network**

| Network | Babies | Babies who received one or more eligible days in special or normal care (%) | Number of eligible care days | | | Average number of separation days per baby |
|---|---|---|---|---|---|---|
| | | | Special care | Normal care | Total days | |
| East Midlands ODN | 744 | 694 (93.3%) | 3,135 | 825 | 3,960 | 5.3 |
| East of England Perinatal ODN | 1,423 | 1,341 (94.2%) | 6,930 | 1,744 | 8,674 | 6.1 |
| Kent, Surrey, Sussex ODN | 835 | 769 (92.1%) | 3,849 | 1,111 | 4,960 | 5.9 |
| London ODN - North Central & East | 817 | 782 (95.7%) | 4,972 | 1,402 | 6,374 | 7.8 |
| London ODN - North West | 442 | 408 (92.3%) | 2,014 | 456 | 2,470 | 5.6 |
| London ODN - South | 596 | 560 (94.0%) | 3,230 | 918 | 4,148 | 7 |
| North West ODN | 1,520 | 1,448 (95.3%) | 8,126 | 2,582 | 10,708 | 7 |
| Northern ODN | 519 | 485 (93.4%) | 2,676 | 745 | 3,421 | 6.6 |
| South West ODN | 872 | 799 (91.6%) | 4,796 | 1,703 | 6,499 | 7.5 |
| Thames Valley & Wessex ODN | 961 | 871 (90.6%) | 4,501 | 1,081 | 5,582 | 5.8 |
| Wales | 565 | 526 (93.1%) | 2,412 | 784 | 3,196 | 5.7 |
| West Midlands ODN | 1,257 | 1,109 (88.2%) | 5,211 | 1,395 | 6,606 | 5.3 |
| Yorkshire & Humber ODN | 1,176 | 1,091 (92.8%) | 5,660 | 1,825 | 7,485 | 6.4 |
| **England and Wales** | 11,727 | 10,883 (92.8%) | 57,512 | 16,571 | 74,083 | 6.3 |

**Table 35: Average number of separation days per baby, term and moderate to late preterm, by NNAP year (2017-2020)**

| NNAP Year | Mean number of separation days per term baby | Mean number of separation days per moderate and late preterm baby |
|---|---|---|
| 2017 | 3.2 | 6.8 |
| 2018 | 3 | 6.6 |
| 2019 | 2.9 | 6.5 |
| 2020 | 2.8 | 6.3 |

# 6. Neonatal nurse staffing

## 6.1. Nurse staffing on neonatal units

1. *What proportion of nursing shifts are numerically staffed according to guidelines and service specification?*
2. *What proportion of shifts have sufficient staff qualified in speciality (QIS)?*
3. *How many additional nursing shifts are required to be worked to meet guidelines and service specification?*

**Full details of this measure can be found in the NNAP 2020 audit measures guide.**

### Results

**Units where more than 50% of shifts are staffed with three registered nurses or fewer are excluded from the calculation of the number of shifts meeting the qualified in specialty (QIS) element of the service specification. This is because of the challenges of the audit applying the QIS criterion of the recommendations to shifts with small numbers of nurses.**

**Table 36. Adherence to neonatal nurse staffing standards: neonatal unit level.**

| Unit level | Total shifts | Total shifts used to calculate total nurses element | Total shifts used to calculate QIS element | Number (%) of shifts with enough nurses to meet 'total nurses' element of service specification for the babies cared for on that shift | Number (%) of shifts with sufficient staff qualified in speciality (QIS) | Additional number of nursing shifts which would need to be worked to staff all shifts to meet the 'total nurses' element of service specification | Average additional number of nurses per shift required to meet service specification on all shifts |
|---|---|---|---|---|---|---|---|
| SCU | 28,184 | 27,656 | 2,920 | 24,205 (87.5%) | 2,173 (74.4%) | 3,034 | 0.1 |
| LNU | 53,312 | 52,792 | 43,290 | 43,497 (82.4%) | 22,230 (51.4%) | 10,712 | 0.2 |
| NICU | 34,464 | 33,730 | 33,069 | 22,073 (65.4%) | 13,022 (39.4%) | 29,874 | 0.9 |
| **England & Wales** | **115,960** | **114,178** | **79,279** | **89,775 (78.6%)** | **37,425 (47.2%)** | **43,621** | **0.4** |

**Table 37: Adherence to neonatal nurse staffing standards: neonatal network.**

| Network | Total shifts | Total shift used to calculate total nurses element | Total shift used to calculate QIS element | Number (%) of shifts with enough nurses to meet 'total nurses' element of service specification for the babies cared for on that shift | Number (%) of shifts with sufficient staff qualified in speciality (QIS) | Additional number of nursing shifts which would need to be worked to staff all shifts to meet the 'total nurses' element of service specification | Average additional number of nurses per shift required to meet service specification on all shifts |
|---|---|---|---|---|---|---|---|
| East Midlands ODN | 7,320 | 7,229 | 5,040 | 6,168 (85.3%) | 1,183 (23.5%) | 3,162 | 0.4 |
| East of England Perinatal ODN | 12,444 | 12,373 | 8,039 | 10,746 (86.9%) | 4,217 (52.5%) | 1,577 | 0.1 |
| Kent, Surrey, Sussex ODN | 9,516 | 9,268 | 5,797 | 7,930 (85.6%) | 2,033 (35.1%) | 1,930 | 0.2 |
| London ODN - North Central & East | 4,330 | 3,842 | 3,290 | 2,899 (75.5%) | 2,537 (77.1%) | 6,530 | 1.7 |
| London ODN - North West | 3,660 | 3,470 | 3,470 | 2,385 (68.7%) | 1,514 (43.6%) | 3,186 | 0.9 |
| London ODN - South | 6,588 | 6,565 | 5,833 | 4,407 (67.1%) | 3,591 (61.6%) | 3,930 | 0.6 |
| North West ODN | 15,560 | 15,411 | 12,386 | 11,319 (73.4%) | 7,942 (64.1%) | 5,858 | 0.4 |
| Northern ODN | 7,320 | 7,318 | 2,926 | 5,878 (80.3%) | 1,532 (52.4%) | 1,228 | 0.2 |
| South West ODN | 8,660 | 8,562 | 6,412 | 7,115 (83.1%) | 2,754 (43.0%) | 2,127 | 0.2 |
| Thames Valley & Wessex ODN | 10,248 | 10,133 | 5,751 | 7,410 (73.1%) | 2,172 (37.8%) | 4,271 | 0.4 |
| Wales | 7,318 | 7,040 | 4,247 | 6,091 (86.5%) | 1,949 (45.9%) | 2,468 | 0.4 |
| West Midlands ODN | 10,248 | 10,219 | 8,036 | 7,259 (71.0%) | 2,911 (36.2%) | 4,944 | 0.5 |
| Yorkshire & Humber ODN | 12,748 | 12,748 | 8,052 | 10,168 (79.8%) | 3,090 (38.4%) | 2,409 | 0.2 |
| **England & Wales** | **115,960** | **114,178** | **79,279** | **89,775 (78.6%)** | **37,425 (47.2%)** | **43,621** | **0.4** |

**Figure 33: Proportion of nurse shifts sufficiently staffed, by neonatal unit**

*Unit proportions are represented by dots. The 95% confidence intervals for a unit are shown by a vertical line with each dot. Neonatal units can be identified on NNAP Online.*

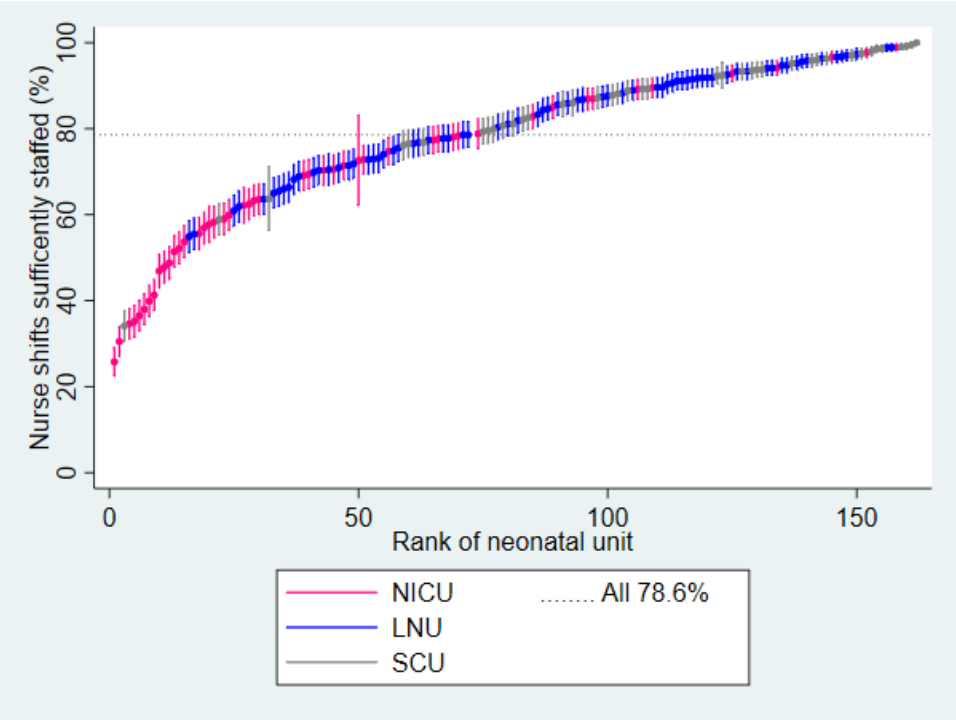



**Figure 34: Proportion of nurse shifts sufficiently staffed, by neonatal network or operational delivery network (ODN).**

*Network proportions are represented by dots. The 95% confidence intervals for a network are shown by a vertical line with each dot.*

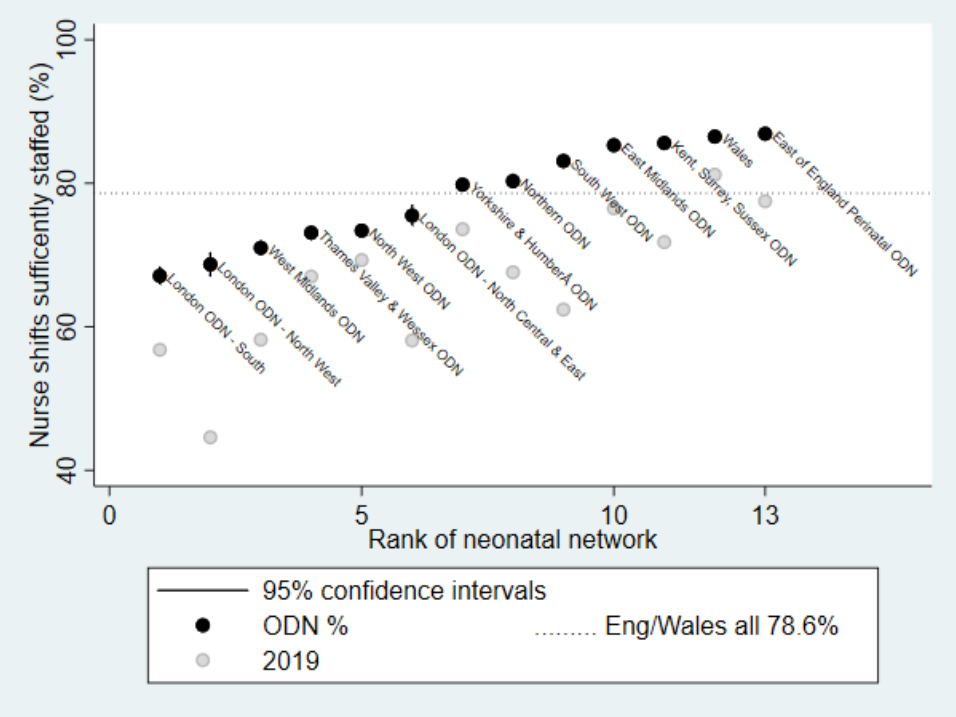


**Figure 35: Proportion of nurse shifts with sufficient staff qualified in specialty, by neonatal network or operational delivery network (ODN).**

*Network proportions are represented by dots. The 95% confidence intervals for a network are shown by a vertical line with each dot.*

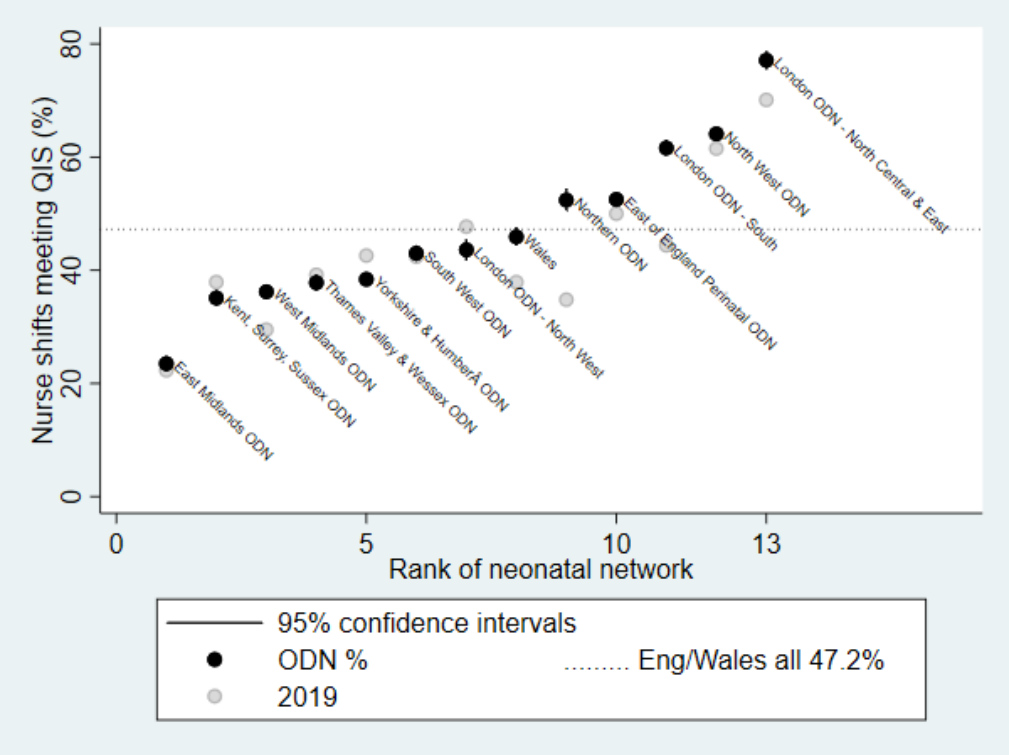
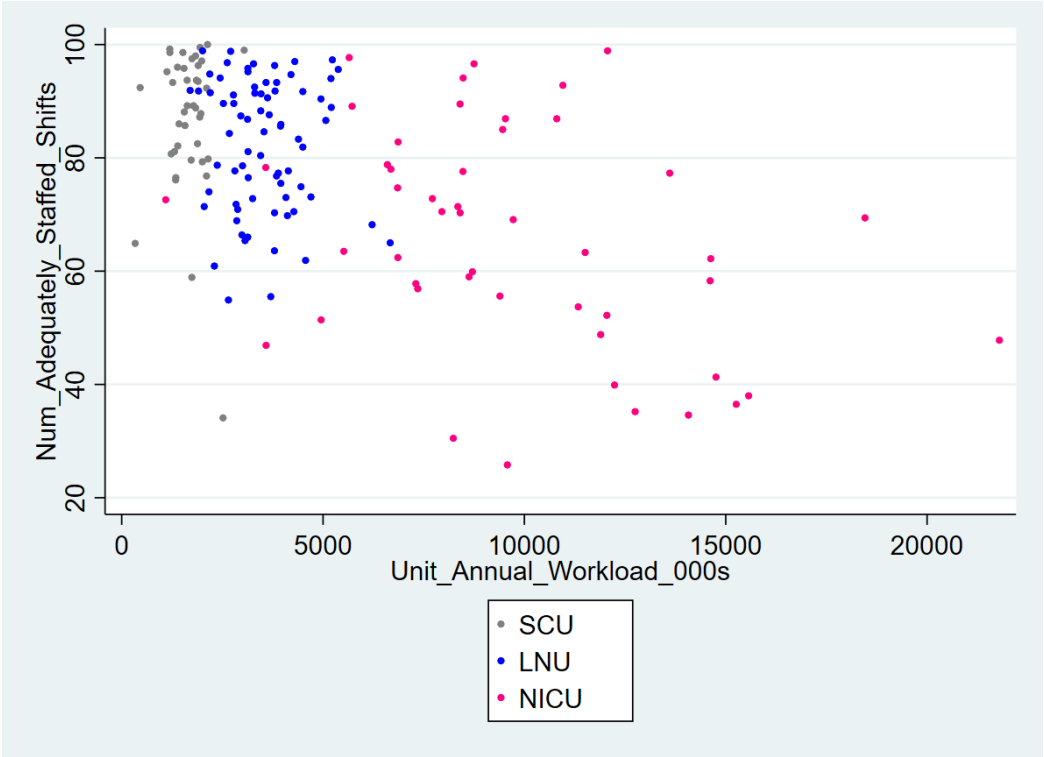


**Figure 36: Adherence to recommended nurse staffing levels. Neonatal units in England and Wales, 2020.**

The number of nurse shifts required to deliver adequate staffing according to the guidelines for all 2020 shifts, based on the babies present on each shift, is shown on the horizontal axis. The vertical axis shows the proportion of these nurse shifts reported to be staffed according to guidelines. A unit's annual workload is defined as the total number of shifts that would have been necessary for adequate staffing over the year. For instance, a unit that required four nurses to care for its babies for every one of its 730 shifts had a workload of 4 x 730 = 2920.



# 7. Care processes

## 7.1. On-time screening for retinopathy of prematurity (ROP)

*Does an admitted baby born weighing less than 1501g, or at gestational age of less than 32 weeks, undergo the first retinopathy of prematurity (ROP) screening in accordance with the NNAP interpretation of the current guideline recommendations?*[13]

**Full details of this measure can be found in the NNAP 2020 audit measures guide.**

### Results

**Table 38. Timing of ROP screening, by neonatal unit level.**

| Unit level | Eligible babies | Any screen | Screened early | Screened on time (%) | Screened late | No screen |
|---|---|---|---|---|---|---|
| SCU | 620 | 597 | 9 | 557 (89.8%) | 31 | 23 |
| LNU | 3,031 | 2,977 | 12 | 2,875 (94.9%) | 90 | 54 |
| NICU | 3,717 | 3,676 | 16 | 3,578 (96.3%) | 82 | 41 |
| **England & Wales** | 7,368 | 7,250 | 37 | 7,010 (95.1%) | 203 | 118 |

**Table 39: Timing of ROP screening, by neonatal network**

| Network | Eligible babies | Any screen | Screened early | Screened on time (%) | Screened late | No screen |
|---|---|---|---|---|---|---|
| East Midlands ODN | 529 | 518 | 3 | 501 (94.7%) | 14 | 11 |
| East of England Perinatal ODN | 651 | 641 | 0 | 633 (97.2%) | 8 | 10 |
| Kent, Surrey, Sussex ODN | 508 | 498 | 0 | 485 (95.5%) | 13 | 10 |
| London ODN - North Central & East | 605 | 595 | 1 | 582 (96.2%) | 12 | 10 |
| London ODN - North West | 347 | 343 | 0 | 335 (96.5%) | 8 | 4 |
| London ODN - South | 483 | 471 | 6 | 456 (94.4%) | 9 | 12 |
| North West ODN | 931 | 922 | 0 | 902 (96.9%) | 20 | 9 |
| Northern ODN | 354 | 343 | 12 | 307 (86.7%) | 24 | 11 |
| South West ODN | 458 | 442 | 1 | 428 (93.4%) | 13 | 16 |
| Thames Valley & Wessex ODN | 609 | 598 | 5 | 564 (92.6%) | 29 | 11 |
| Wales | 338 | 333 | 6 | 312 (92.3%) | 15 | 5 |
| West Midlands ODN | 817 | 814 | 2 | 785 (96.1%) | 27 | 3 |
| Yorkshire & Humber ODN | 738 | 732 | 1 | 720 (97.6%) | 11 | 6 |
| **England and Wales** | **7,368** | **7,250** | **37** | **7,010 (95.1%)** | **203** | **118** |

**Figure 37. Caterpillar plot of the proportions of on-time ROP screening: neonatal units.**

*Unit proportions are represented by dots. The 95% confidence intervals for a unit are shown by a vertical line with each dot. Neonatal units can be identified on NNAP Online.*

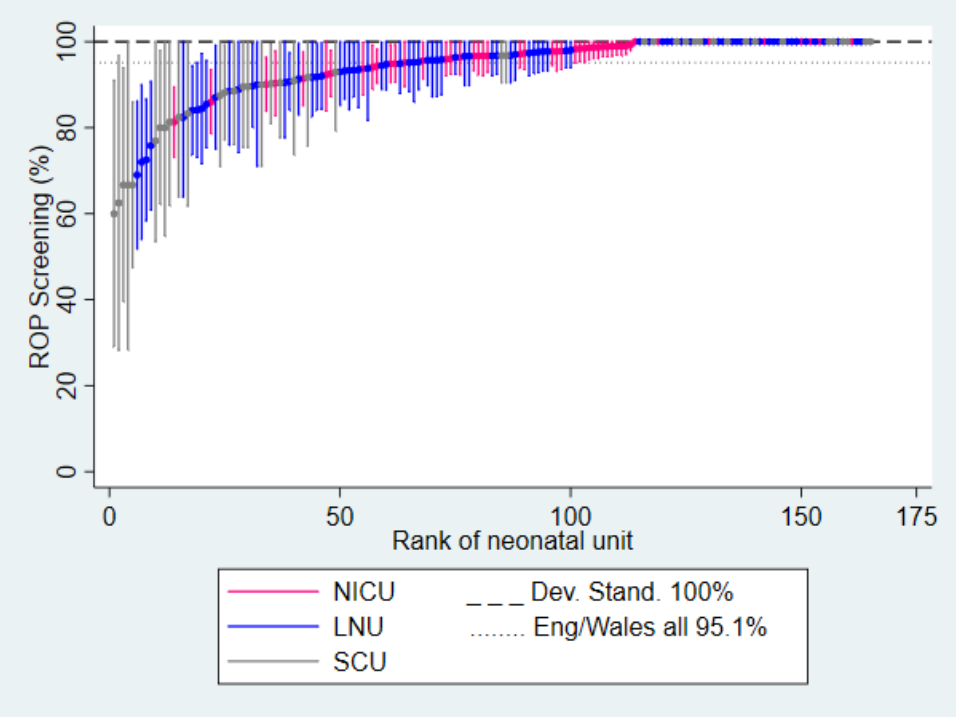



**Figure 38. Caterpillar plot of the proportions of on-time ROP screening, by neonatal network or operational delivery network (ODN).**

*Network proportions are represented by dots. The 95% confidence intervals for a network are shown by a vertical line with each dot.*

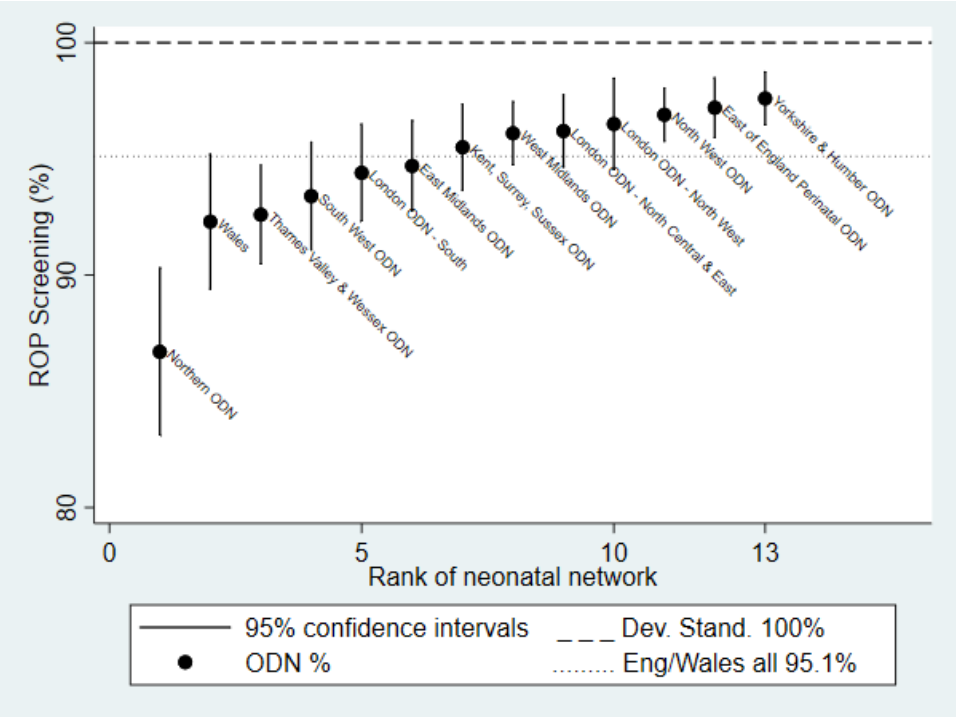
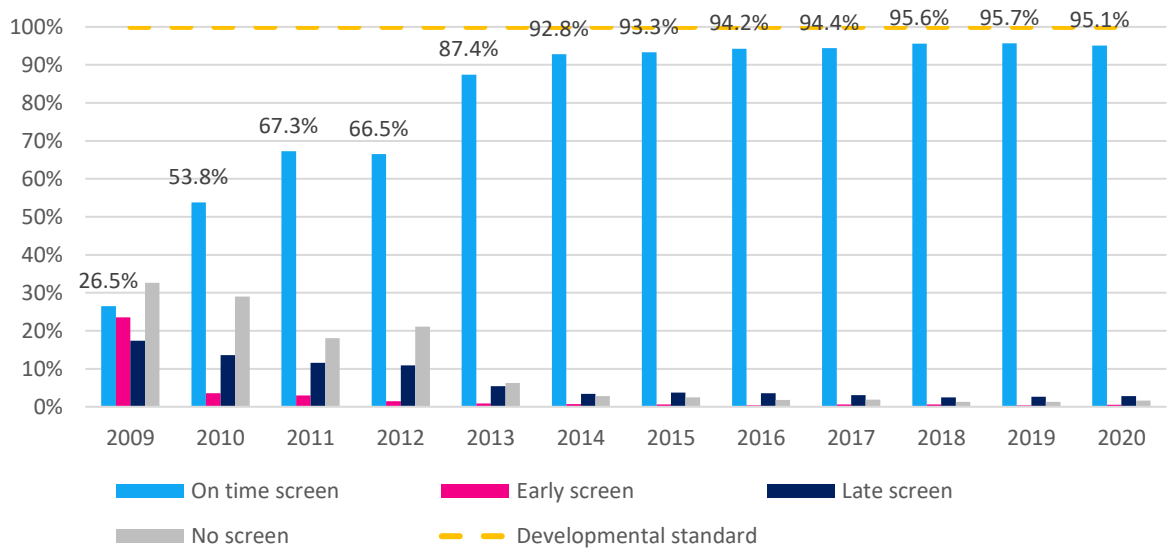


**Figure 39. Timing of ROP screening, by NNAP reporting year (2009-2020).**



# 7.2. Follow-up at two years of age

*Does a baby born at less than 30 weeks gestational age receive medical follow-up at two years corrected age (18-30 months gestationally corrected age)?*

Full details of this measure can be found in the NNAP 2020 audit measures guide.

## Results

**Table 40: Two-year follow up assessment, by neonatal unit level**

| Unit level | Eligible babies | Some health data entered (%) | No health data entered | | | Outside range |
|---|---|---|---|---|---|---|
| | | | Lost to follow-up | Not assessed for other reason | No data entered at all | |
| SCU | 452 | 287 (63.5%) | 5 | 46 | 2 | 112 |
| LNU | 1,765 | 1,158 (65.6%) | 28 | 191 | 2 | 386 |
| NICU | 1,543 | 1,126 (73.0%) | 28 | 204 | 0 | 185 |
| **England & Wales** | **3,760** | **2,571 (68.4%)** | **61** | **441** | **4** | **683** |

**Table 41: Two-year follow up assessment, by neonatal network**

| Network | Eligible babies | Some health data entered (%) | No health data entered | | | Outside range |
|---|---|---|---|---|---|---|
| | | | Lost to follow-up | Not assessed for other reason | No data entered at all | |
| East Midlands ODN | 273 | 231 (84.6%) | 2 | 24 | 0 | 16 |
| East of England Perinatal ODN | 385 | 236 (61.3%) | 10 | 45 | 0 | 95 |
| Kent, Surrey, Sussex ODN | 284 | 192 (67.6%) | 4 | 21 | 0 | 67 |
| London ODN - North Central & East | 311 | 207 (66.6%) | 11 | 50 | 0 | 43 |
| London ODN - North West | 169 | 89 (52.7%) | 1 | 30 | 1 | 48 |
| London ODN - South | 225 | 115 (51.1%) | 2 | 23 | 0 | 85 |
| North West ODN | 455 | 308 (67.7%) | 9 | 66 | 0 | 72 |
| Northern ODN | 167 | 116 (69.5%) | 1 | 23 | 2 | 25 |
| South West ODN | 264 | 163 (61.7%) | 1 | 48 | 0 | 51 |
| Thames Valley & Wessex ODN | 289 | 229 (79.2%) | 2 | 29 | 0 | 29 |
| Wales | 135 | 104 (77.0%) | 2 | 13 | 0 | 16 |
| West Midlands ODN | 396 | 273 (68.9%) | 7 | 37 | 1 | 78 |
| Yorkshire & Humber ODN | 407 | 308 (75.7%) | 9 | 32 | 0 | 58 |
| **England and Wales** | **3,760** | **2,571 (68.4%)** | **61** | **441** | **4** | **683** |

**Figure 40. Caterpillar plot of the proportions of two-year follow-up assessment: neonatal units.**

*Unit proportions are represented by dots. The 95% confidence intervals for a unit are shown by a vertical line with each dot. Neonatal units can be identified on NNAP Online.*

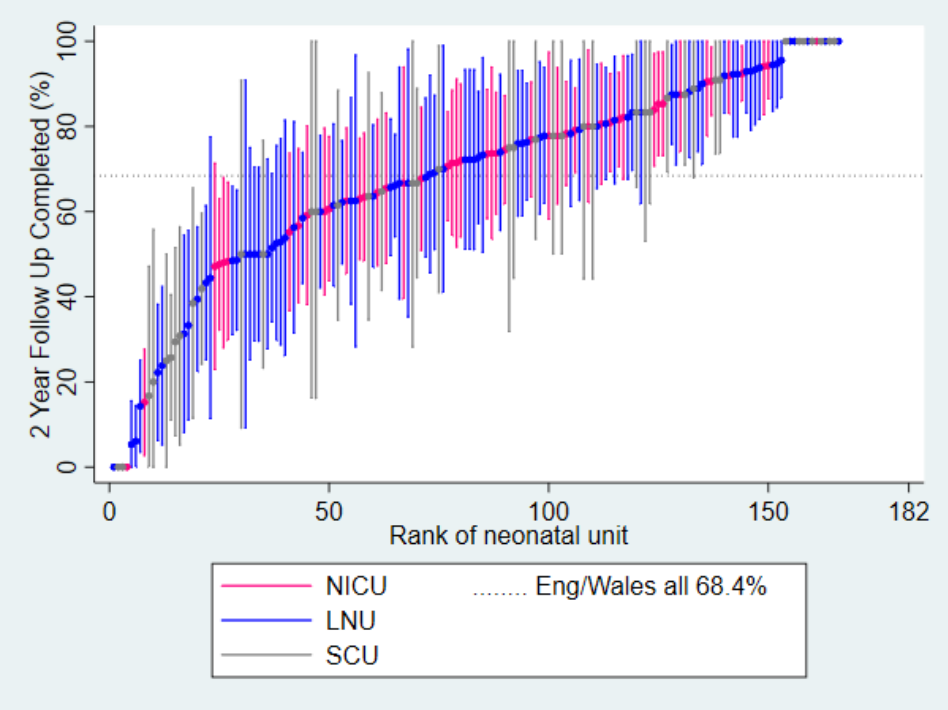



**Figure 41. Caterpillar plot of the proportions of two-year follow-up assessment, by neonatal network or operational delivery network (ODN).**

*Network proportions are represented by dots. The 95% confidence intervals for a network are shown by a vertical line with each dot.*

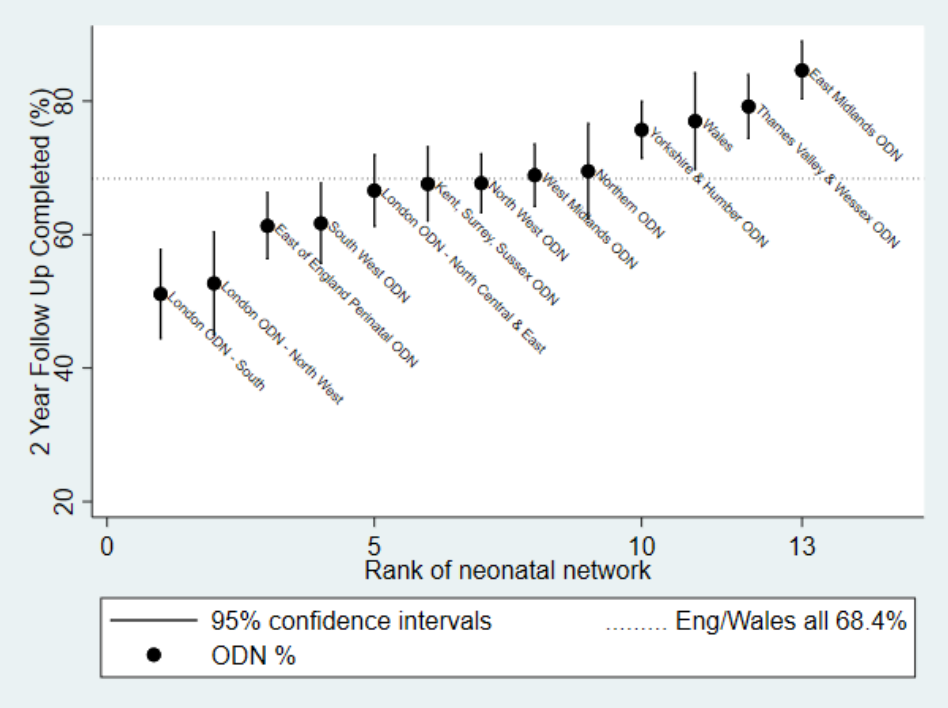
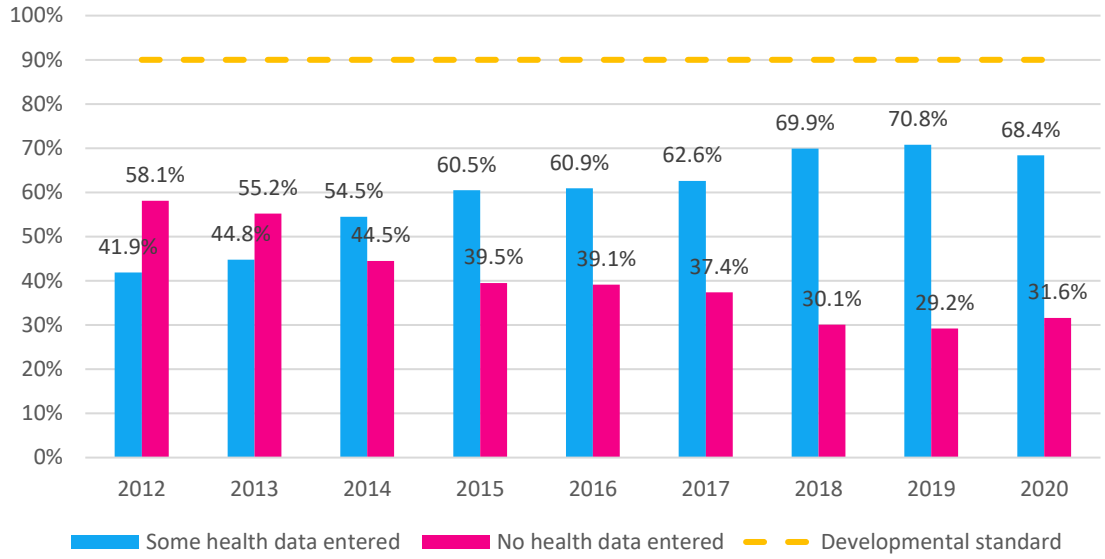


**Figure 42. Two-year follow-up rates, by NNAP reporting year (2012-2020).**



# 8. Methods

## 8.1. Audit measures and measure development

The NNAP has developed the measures reported on in this report with its partners and with input from audit users, professional organisations, parent support organisations, neonatal networks, national initiatives or members of the NNAP Methodology and Dataset Group and Project Board.

Table 8.1 summarises the measures included in the 2020 data report.

The NNAP sets standards for measures included in the audit where it is appropriate to do so. The developmental standard is a long-term goal that units and networks should work towards. Where standards do not already exist as part of national guidelines and guidance, the standard is set by consensus agreement with the NNAP Methodology and Dataset Group, Project Board, and other key stakeholders.

The comparison standard is set at the observed national proportion for the year of analysis. Outlier analysis compares units and networks to this standard to determine whether there is enough evidence to identify them as being different to the rest of the NNAP data.

Full details of NNAP measures by audit year are available in the NNAP measures guides: https://www.rcpch.ac.uk/work-we-do/quality-improvement-patient-safety/national-neonatal-audit-programme-nnap/about

**Table 8.1. NNAP audit questions, standards and associated guidelines – 2020 data year**

| NNAP question | Start year | Cohort | Measure type | Developmental standard | Comparison standard | Associated guidelines |
|---|---|---|---|---|---|---|
| Is a mother who delivers a baby between 23 and 33 weeks gestational age inclusive given at least one dose of antenatal steroids? | 2008 | Final discharge in 2020 | Process | 85% of mothers should receive at least one dose of antenatal steroids. | National rate | NICE guideline [NG25], Preterm Labour and Birth |
| Is a mother who delivers a baby below 30 weeks gestational age given magnesium sulphate in the 24 hours prior to delivery? | 2016 | Final discharge in 2020 | Process | 85% of mothers should be given magnesium sulphate in the 24 hours prior to delivery. | National rate | NICE guideline [NG25], Preterm Labour and Birth |
| Is an admitted baby born at less than 27 weeks gestational age delivered in a maternity service on the same site as a designated NICU? | 2017 | Final discharge in 2020 | Process | 85% of babies born at less than 27 weeks GA should be delivered in a maternity service on the same site as a NICU. | National rate (network only) | NHS England, Neonatal Critical Care Service Specification |
| Does a baby born at less than 32 weeks gestational age have their cord clamped at or after one minute? | 2020 | Final discharge in 2020 | Process | None, benchmarking only | Not applicable, no outlier analysis | WHO. Guideline: Delayed Umbilical Cord Clamping |
| Does an admitted baby born at less than 32 weeks gestational age have its first measured temperature of 36.5–37.5°C within one hour of birth? | 2013 | Final discharge in 2020 | Outcome | The composite measure of timeliness and normal temperature should be met for at least 90% of babies. | National rate (for timeliness and normal temperature) | NHS England, Neonatal Critical Care Service Specification |
| Is there a documented consultation with parents by a senior member of the neonatal team within 24 hours of a baby's first admission? | 2013 | Final discharge in 2020 | Process | A consultation should take place within 24 hours of first admission for every baby. | National rate | Scottish Government, Neonatal Care in Scotland: A Quality Framework<br>NHS Wales. All Wales Neonatal Standards – 2nd Edition.<br>Department of Health. Toolkit for high quality neonatal services |
| For a baby admitted for more than 24 hours, did at least one parent attend a consultant ward round at any point during the baby's admission? | 2017 | Final discharge in 2020 | Process | None, benchmarking only | Not applicable, no outlier analysis. | Scottish Government, Neonatal Care in Scotland: A Quality Framework<br>NHS Wales. All Wales Neonatal Standards – 2nd Edition.<br>Bliss Family Friendly Accreditation Scheme |

| | | | | | | |
|---|---|---|---|---|---|---|
| Does an admitted baby born weighing less than 1501g, or at gestational age of less than 32 weeks, undergo the first ROP screening in accordance with the NNAP interpretation of the current guideline recommendations? | 2009 | Final discharge in 2020 | Process | 100% of eligible babies should receive ROP screening within the recommended time windows for first screening. | National rate | RCPCH, RCOphth, BAPM, BLISS. Guideline for the Screening and Treatment of Retinopathy of Prematurity. |
| Does an admitted baby have one or more episodes of bloodstream infection, characterised by one or more positive blood cultures taken, after 72 hours of age? | 2014-2016 | Final discharge in 2020 | Outcome | None, benchmarking only. | Not applicable, no outlier analysis. | |
| How many babies have a positive blood culture (any species) with a central line present, after the first 72 hours of life, per 1000 central line days? | 2014-2016 | Final discharge in 2020 | Outcome | None, benchmarking only. | Not applicable, no outlier analysis. | |
| Does an admitted baby born at less than 32 weeks develop BPD? | 2013-2015 | Final discharge between 2018 and 2020 | Outcome | None. | National rate | |
| Does an admitted baby born at less than 32 weeks gestational age meet the NNAP surveillance definition for NEC on one or more occasion? | 2017 | Final discharge in 2020 | Outcome | None, benchmarking only. | Not applicable, no outlier analysis. | |
| For a baby born at gestational age greater than or equal to 37 weeks, who did not have any surgery or a transfer during any admission, how many special care(a) or normal care(b) days were provided when oxygen was not administered? | 2017 | Born in 2020 | Process | None, benchmarking only. | Not applicable, no outlier analysis. | |
| For a baby born at 34-36 weeks gestational age, who did not have any surgery or a transfer during any admission, how many special care(a) or normal care(b) days were provided when oxygen was not administered? | 2017 | Born in 2020 | Process | None, benchmarking only. | Not applicable, no outlier analysis. | |
| Does a baby born at less than 32 weeks gestational age receive any of their own mother's milk at day 14 of life? | 2019 | Final discharge in 2020 | Outcome | None, benchmarking only. | Not applicable, no outlier analysis. | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Does a baby born at less than 32 weeks gestational age receive any of their own mother's milk at discharge to home from a neonatal unit? | 2013 | Final discharge in 2020 | Outcome | 80% of babies should receive at least some of their mother's milk at discharge home. | Not applicable, no outlier analysis. | |
| Does a baby born at less than 30 weeks gestational age receive medical follow-up at two years corrected age (18-30 months gestationally corrected age)? | 2012 | Born between July 2017 and June 2018 | Process | 90% of babies with two-year follow-up data entered. | National rate | NICE guideline [NG72], Developmental follow-up of children and young people born preterm. |
| 1. What proportion of nursing shifts are numerically staffed according to guidelines and service specification?<br>2. What proportion of shifts have sufficient staff qualified in speciality (QIS)?<br>3. How many additional nursing shifts are required to be worked to meet guidelines and service specification? | 2018 | NA | Structure | 100% of shifts staffed according to guidelines and service specification. | Not applicable, no outlier analysis. | NHS England. Neonatal Critical Care Service Specification<br>Department of Health. Toolkit for high quality neonatal services<br>BAPM. Service Standards for Hospitals Providing Neonatal Care |
| Does a baby born at less than 32 weeks gestational age die before discharge home, or 44 weeks post-menstrual age (whichever occurs sooner)? | 2018 | Born between 1 July 2018 and 30 June 2020 | Outcome | None | National rate | |

# 8.2. Data flow

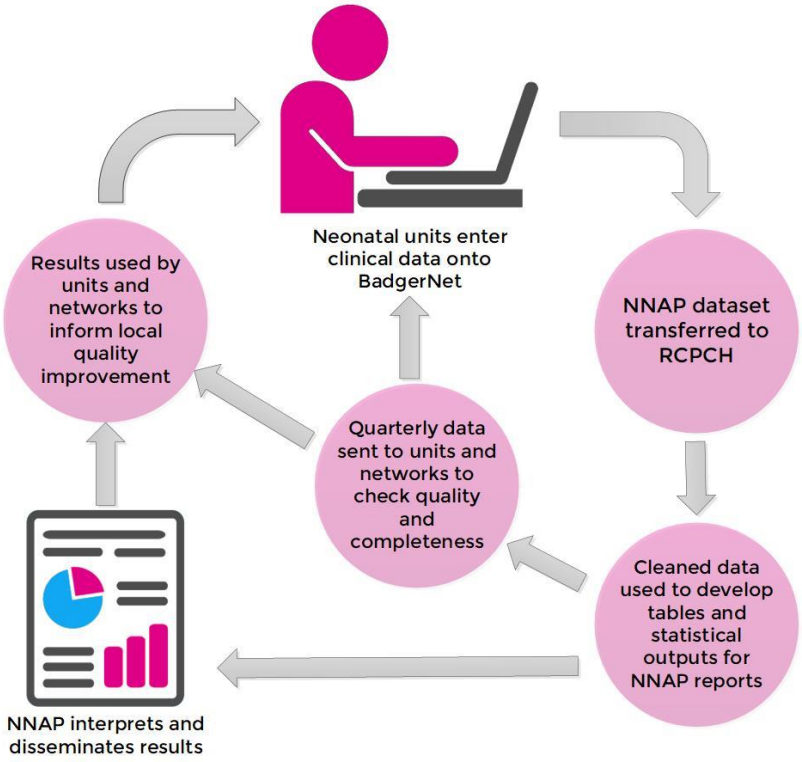
The NNAP is operating under a new data flow methodology, and this is the first report which uses data received directly by the RCPCH for the purpose of the NNAP under that methodology. The RCPCH receives the data contained in the NNAP dataset directly from Clevermed Ltd, provider of the BadgerNet clinical system. The NNAP team processes data that is solely required for care quality and service improvement in relation to the aims and scope of the NNAP. In the longer term, this new methodology will enable the NNAP to provide more timely reporting to neonatal units, which will allow them to understand and respond to their NNAP data and undertake prompt quality improvement interventions in response to their data, to improve the care that they provide to babies and their families.

Due to the implementation of the new data flow, the need to recreate the analysis from earlier years produced via the previous data flow and the application of the National Data Opt-out Message Exchange for Social Care and Health (MESH) to remove data about patients who have opted out of secondary use of their data, there are extremely minor differences in this report with the provisional results provided to neonatal units in March 2021 as part of the data cleaning and validation process.

Neonatal unit staff enter data onto the BadgerNet platform as part of routine care whilst a baby is present on the neonatal unit and stored by Clevermed Ltd. Data items contained within the NNAP dataset are synchronised to an NNAP database hosted by the RCPCH. The MESH mechanism to remove data about patients who have opted out at a national level is applied before the dataset is transferred to the RCPCH. Patient identifiable data is pseudonymised before analysis is conducted by the NNAP team. The RCPCH has approval to receive patient identifiable data without consent for England and Wales under Section 251 of the National Health Service Act 2006' .

Figure **43** describes this data flow and the feedback loop which disseminates results and recommendations to neonatal units, networks and the wider system to inform and promote quality improvement.

**Figure 43: Simplified NNAP data flow diagram**




A full data flow diagram can be found at: https://www.rcpch.ac.uk/resources/national-neonatal-audit-programme-transparency-open-data

The NNAP dataset is defined in the NNAP data dictionary, available at: https://www.rcpch.ac.uk/work-we-do/quality-improvement-patient-safety/national-neonatal-audit-programme-nnap/about#what-we-measure

## 8.3. Case ascertainment and unit participation

In usual practice, every baby admitted to a participating neonatal unit entered on the BadgerNet patient record system is eligible for inclusion in NNAP. The audit therefore achieves 100% case ascertainment in the participating organisations, unless a parent or carer has chosen to opt out of having their baby's information submitted to the audit. Babies receiving special care alongside their mother in transitional care areas or postnatal wards can also be entered, but it is known that some units do not enter data for such babies. For this reason, NNAP's measures do not concentrate on care outside neonatal units.

All neonatal units in England and Wales associated with a delivery unit are eligible to take part, including special care units (SCUs), local neonatal units (LNUs) and neonatal intensive care units (NICUs). All neonatal units in England and Wales participated in the audit in 2020.

For the first time, we include results from Alder Hey Hospital, a neonatal surgical unit, reporting only measures relevant to this service. In future, we aim to include further neonatal surgical units where measures are relevant to the service.

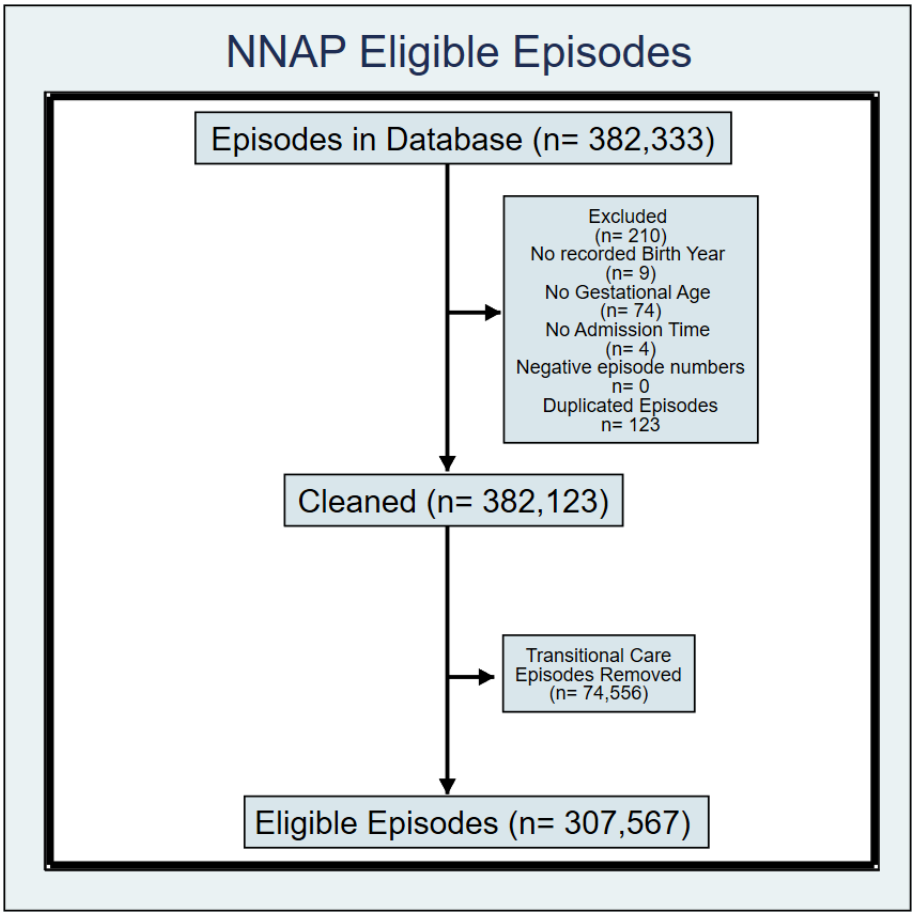
Where there is a change in unit name, unit level or network configuration, the NNAP will apply the status as at the end of the data reporting year. For example, if the configuration of a network changes on 1 April 2020, 2020 data will be presented as per the network configuration on 31 December 2020.

## 8.4. Data quality and completeness

The NNAP project team produces quarterly reports. These are sent to NNAP-participating unit clinical leads and other unit staff involved in the audit, to provide regular updates on their data completeness and measured adherence to the NNAP standards. The reports are a prompt to review data accuracy and completeness. The final quarterly report serves as a summary report of their annual data in January. Following that, there is a final period for units to review and amend their data on the BadgerNet system up until 31 March. The final data download used in the report is extracted from BadgerNet after the review period has closed. Units can also access and review their data in real- time using the BadgerNet system reporting tools.

A data cleaning and validation process is applied to the raw dataset before creating the NNAP dataset used to produce the data included in this report. Figure 44 describes episodes removed from the dataset during the data cleaning process.

**Figure 44. Episodes eligible for NNAP analysis**




Babies who were finally discharged, or die, during the NNAP reporting period of interest form the NNAP dataset. The exceptions to this are the datasets used for Minimising separation of mother and babies, which includes babies born in the reporting period, Bronchopulmonary dysplasia, Two-year follow-up and Mortality until discharge for very preterm babies.

# 8.5. Outlier identification and management

Performance on audit measures are presented using descriptive statistics, and data are available to review on *NNAP Online*. Outliers are identified with funnel plot analysis, using the national rate as the comparison standard. Table 8.1 describes the questions to which outlier identification applies.

The NNAP manages outlier status in line with the NNAP policy *Nation~~o~~al Neonatal Audit Programme: Detection and management of outlier status for 2020 data*, which is aligned with the HQIP guidance on the identification and management of outliers in England and Wales. All neonatal services identified as outliers for one or more NNAP measure were notified according to the policy prior to publication of this report.

As part of a wider discussion among RCPCH audits, funnel plots were amended to capture the most relevant and justified measure of the expected scatter of units/networks, given a particular denominator for an indicator. Where previously, a normal approximation had been used and truncated if it exceeded 0-100%, the Methodology and Dataset Group agreed to use a binomial formula. This linearly interpolates between anticipated counts of babies[14], to obtain monotomically increasing or decreasing funnel curves. We then smooth the funnel curves further for clarity, using local-linear regression via the Stata command 'npregress kernel'.

New for 2020 data, we included overdispersion of the funnels via Spiegelhalter's formula[15]. This can readily be applied to the binomial funnels and has been widely used in other clinical audits.

## 8.6. Managing small numbers in the NNAP

The NNAP considers the risk of disclosure on a measure-by-measure basis from a variety of methods resulting from the publication of results from small numbers of cases. Given the frequent occurrence of small numbers in unit level, annualised reporting, applying blanket masking to all cells would significantly reduce the utility of published NNAP results for improvement purposes. To further minimise the risk, the NNAP does not publish demographic data about the cohort of babies included in the audit, which would have the potential to be used alongside published data for the audit measures to aid identification of a baby.

## 8.7. Risk adjustment of bronchopulmonary dysplasia (BPD) or death and mortality to discharge in very preterm babies

Following the move of data analysis from NDAU to RCPCH, RCPCH used Stata software[16] to implement casemix adjustment, outlier identification and graphical outputs.

We attempted in the first instance to match the previously calculated adjusted proportions and treatment effects[17], by applying our code to 2019 data. However, there were a number of barriers to obtaining a perfect match:

1. There were some minor differences in the 2019 data held by RCPCH due to; recreation of the data cleaning and data validation method, recreation of the care location look-up table, a new data flow process and database, non-inclusion of

Scottish data, and application of MESH to remove data about patients who have opted out of secondary use of their data.

2. We were using nearest-neighbour matching for casemix adjustment, with Abadie-Imbens standard errors, for both units and networks, with the Stata 'teffects' command[16]. We extracted average treatment effects (ATE) and required five matched babies for each in the unit/network in question. Previously, nearest-neighbour matching was used for units, and stratified matching for networks, but we have been advised of statistical problems with estimation of standard errors in stratified matching.

3. Matching is a process involving some use of random numbers in the calculations, in particular selecting a set of matched babies from other units/networks. Re-running it may give slightly different results.

4. Nearest-neighbours matching requires a measure of dissimilarity (or "distance") between any two babies in the dataset. We used a Mahalanobis distance matrix for all input variables. NDAU's SAP describes this distance as desirable, but difficult (for their bespoke R code), but it is available in Stata. NDAU used a weighted and standardised Manhattan distance.

We did not obtain a sufficiently reassuring replication of the NDAU outputs. However, by using multilevel logistic regression instead (with the Stata 'melogit' command[16]), we obtained almost exactly the same results. We therefore decided to return to regression-adjustment, as used in 2019.

All casemix variables identified by the Methodology and Dataset Group were added to the regression formula, without non-linearities or interactions. Those casemix variables are; birthweight; sex; gestation; birth year; maternal age; number of previous pregnancies; maternal ethnicity; multiplicity; maternal smoking; medical problems of pregnancy; placental abruption; onset of labour and children living in low income families. Unit- and network-specific log-odds ratios ("random intercepts") were estimated using BLUPs (best linear unbiased predictors) and their standard errors. These were added to the national log-odds of the outcome, and converted to risks (using the inverse logistic function $\frac{1}{1+e^{-x}}$) to obtain adjusted risks, or proportions. These adjusted proportions can be interpreted as the anticipated outcomes at any given unit/network, if that unit/network were to have casemix equal to the national sample as a whole.

The difference between the adjusted and national average is the treatment effect, a risk difference, as reported by NDAU previously. We considered showing these treatment effects in funnel plots or caterpillar plots, but decided against this because the calculation of the confidence interval, as used for 2019 data, does not hold. This is because, instead of comparing two independent groups (babies at unit/network X versus a matched set of babies from elsewhere), we are now comparing two alternative

calculations from the same data. However, we do report the treatment effect estimates, without confidence intervals.

# 9. Summary of recommendations by audience

## Recommendations for neonatal units and services

**(1) Neonatal units and networks** with high rates of adverse outcomes (bronchopulmonary dysplasia, necrotising enterocolitis and late onset infection) should:

- Identify potentially better practices from neonatal units with lower rates of adverse outcomes.
- Implement identified best practice, including any identified from the NICE guideline [NG124] Specialist neonatal respiratory care for babies born preterm.

**(2) Neonatal networks and their constituent neonatal units** should - following a review of local mortality results, the national neonatal Getting It Right First Time (GIRFT) report and the Neonatal Critical Care Review - take action to:

- Consider whether changes to network structure, clinical flows, guidelines or staffing might be helpful in reducing local mortality rates.
- Consider a quality improvement approach to the delivery of evidence-based strategies in the following areas to reduce mortality: timely antenatal steroids, deferred cord clamping, avoidance of hypothermia and management of respiratory disease. Such quality improvement activity should pay due regard to relevant guidance and resources, such as the NICE guideline for specialist respiratory care and the BAPM and NNAP quality improvement toolkits.
- Ensure that shared learning from locally delivered, externally supported, multidisciplinary reviews of deaths (including data from the local use of the Perinatal Mortality Review Tool) informs network governance and unit level clinical practice.

**(3) Perinatal teams, neonatal units and Local Maternity and Neonatal Systems (in England)** should:

- Identify babies who did not receive delivery in the optimal location, antenatal steroids, antenatal magnesium, deferred cord clamping and/or did not achieve post-delivery normothermia, and review records to identify opportunities for improvement.
- Adopt evidence-based practices, using the following guidance and methodologies to support improvement:
    - Maternity and Neonatal Safety Improvement Programme (MatNeoSIP).
    - BAPM and NNAP quality improvement toolkits, including; Antenatal Optimisation Toolkit, Normothermia Toolkit, and Optimal Cord Management Toolkit.

    - Prevention of Cerebral Palsy in PreTerm Labour (PReCePT) quality improvement programme.
    - Preterm Wellbeing Package, Maternity and Children's QI Collaborative, Scottish Patient Safety Programme.
    - Perinatal Excellence to Reduce Injury in Premature Birth (PERIprem) quality improvement programme.

**(4) Neonatal units and networks** with low rates of breastmilk feeding at 14 days and/or at discharge should introduce focused quality improvement initiatives in these areas, making use of the following tools and resources:

- BAPM and NNAP Maternal Breast Milk Toolkit
- UNICEF Neonatal Baby Friendly Initiative
- Bliss Baby Charter
- Neonatal network Care Coordinators (England).

**(5) Neonatal units** should look for learning from other units and from adaptations made in response to the COVID-19 pandemic to improve opportunities for parental partnership in care and decision making. This may include:

- Using video conference for parental consultation on admission or for attendance on the ward round if it is not possible for parents to attend in person.
- Working with local parent groups, parents, staff and other stakeholders to create a culture which actively promotes parent partnership in care, and to manage barriers to change such as concerns about confidentiality and barriers to parents attending the unit.
- Ensuring that the service is following the latest guidance on parent and family access to the unit and involvement in care and not inappropriately restricting parents' access to their babies.

## Recommendations for neonatal networks

**(1) Neonatal units and networks** with high rates of adverse outcomes (bronchopulmonary dysplasia, necrotising enterocolitis and late onset infection) should:

- Seek to identify potentially better practices from neonatal units with lower rates of adverse outcome.
- Implement identified best practice, including any identified from the NICE guideline [NG124] Specialist neonatal respiratory care for babies born preterm.

**(2) Neonatal networks and their constituent neonatal units** should, following a review of local mortality results, the national neonatal GIRFT report and the Neonatal Critical Care Review, take action to:

- Consider whether changes to network structure, clinical flows, guidelines or staffing might be helpful in reducing local mortality rates.
- Consider a quality improvement approach to the delivery of evidence-based strategies in the following areas to reduce mortality; timely antenatal steroids,

deferred cord clamping, avoidance of hypothermia and management of respiratory disease. Such quality improvement activity should pay due regard to relevant guidance and resources such as the NICE guideline for specialist respiratory care and the BAPM and NNAP quality improvement toolkits.

- Ensure that shared learning from locally delivered, externally supported, multidisciplinary reviews of deaths (including data from the local use of the Perinatal Mortality Review Tool) informs network governance and unit level clinical practice.

**(4) Neonatal units and networks** with low rates of breastmilk feeding at 14 days and/or at discharge should introduce focused quality improvement initiatives in these areas, making use of the following tools and resources:

- BAPM and NNAP Maternal Breast Milk Toolkit;
- UNICEF Neonatal Baby Friendly Initiative;
- Bliss Baby Charter
- Neonatal network Care Coordinators (England).

**(6) Neonatal networks** should:

- Monitor adherence to recommended nurse staffing standards.
- Using findings from Getting It Right First Time and the Neonatal Critical Care Review, develop action plans to address any deficits in nurse staffing and skill mix.
- In England, work with Health Education England to ensure that recommendations from Neonatal Qualified in Specialty Education and Training Review are implemented.

## Recommendations for perinatal services and local maternity and neonatal systems

**(3) Perinatal teams, neonatal units and Local Maternity and Neonatal Systems (in England)** should:

- Identify babies who did not receive delivery in the optimal location, antenatal steroids, antenatal magnesium, deferred cord clamping and/or did not achieve post-delivery normothermia, and review records to identify opportunities for improvement.
- Adopt evidence-based practices, using the following guidance and methodologies to support improvement:
    - Maternity and Neonatal Safety Improvement Programme (MatNeoSIP).
    - BAPM and NNAP quality improvement toolkits, including; Antenatal Optimisation Toolkit, Normothermia Toolkit, and Optimal Cord Management Toolkit.
    - Prevention of Cerebral Palsy in PreTerm Labour (PReCePT) quality improvement programme.

- Preterm Wellbeing Package, Maternity and Children's QI Collaborative, Scottish Patient Safety Programme.
- Perinatal Excellence to Reduce Injury in Premature Birth (PERIprem) quality improvement programme.

## Key actions for the NNAP in the following year

**(1)** To increase the utility of outcomes reporting **the NNAP** should:

- Seek to achieve assurance from 100% of neonatal services that their outcomes data (necrotising enterocolitis, late onset infection and mortality, and the forthcoming measure of preterm brain injury) are complete and accurate.
- Consider case mix adjustment of necrotising enterocolitis, late onset infection and the forthcoming NNAP measure of preterm brain injury as data quality improves.

**(2)** **The NNAP**, in collaboration with appropriate partners such as the National Child Mortality Database (NCMD), should consider whether the observed variation in neonatal unit mortality can be explained by varied implementation of optimal care processes and structures, or if alternative explanations should be sought.

**(3)** **The NNAP** should continue to explore ways of presenting data on optimal perinatal care to best support quality improvement, by:

- Working with partners such as the National Maternity and Perinatal Audit (NMPA) to align reporting of key metrics with the Maternity and Neonatal Safety Improvement Programme (MatNeoSIP) in England.
- Considering reporting the proportion of eligible babies receiving all relevant perinatal interventions.

**(4)** **Based on the information in this and previous NNAP reports, we would like to encourage:**

- The **Office for Health Improvement and Disparities in England** (formerly Public Health England) and **Public Health Wales** to consider the introduction of a public health messaging programme around the importance of breastmilk feeding that is targeted to specific communities with the aim of reducing geographical inequity in rates of breastmilk feeding so that preterm babies may benefit. The RCPCH-hosted National Neonatal Programme Board, with the support of the RCPCH and the NNAP, will aim to start a discussion with the commissioner and funders of the NNAP to agree the best way to progress this.

**(5)** **Based on the information in this and previous NNAP reports, we would like to encourage:**

- If the rate of delivery of medical follow-up at two years does not improve over the next twelve months, **commissioners in England and Wales** to consider introducing

incentives for Trusts and Health Boards to meet the requirements of the NICE guidance Developmental follow-up of children and young people born preterm, to make it more likely that this important review is conducted. The RCPCH-hosted National Neonatal Programme Board, with the support of the RCPCH and the NNAP, will aim to start a discussion with the commissioner and funders of the NNAP to agree the best way to progress this.

## Previous NNAP recommendations (2019 data report)

Previous recommendations made in the NNAP Annual Report on 2019 Data may remain relevant and require improved implementation. They can be found summarised by audience at: https://www.rcpch.ac.uk/sites/default/files/2020-11/appendix_b_-_recommendations_by_audience.pdf

# 10. Unit participation

**Table A: NNAP participating neonatal units**

| Neonatal unit | Unit level |
|---|---|
| **East Midlands Neonatal ODN** | |
| Pilgrim General Hospital | SCU |
| Queen's Hospital, Burton on Trent | SCU |
| Kettering General Hospital | LNU |
| King's Mill Hospital | LNU |
| Lincoln County Hospital | LNU |
| Northampton General Hospital | LNU |
| Royal Derby Hospital | LNU |
| Leicester Neonatal Service[1] | NICU |
| Nottingham City Hospital | NICU |
| Nottingham University Hospital (QMC) | NICU |
| **East of England Neonatal ODN** | |
| Bedford Hospital | SCU |
| Hinchingbrooke Hospital | SCU |
| James Paget Hospital | SCU |
| West Suffolk Hospital | SCU |
| Basildon University Hospital | LNU |
| Broomfield Hospital, Chelmsford | LNU |
| Colchester General Hospital | LNU |
| Ipswich Hospital | LNU |
| Lister Hospital | LNU |
| Peterborough City Hospital | LNU |
| Princess Alexandra Hospital | LNU |
| Queen Elizabeth Hospital, King's Lynn | LNU |
| Southend Hospital | LNU |
| Watford General Hospital | LNU |
| Luton and Dunstable University Hospital | NICU |
| Norfolk & Norwich University Hospital | NICU |
| Rosie Maternity Hospital, Addenbrookes | NICU |
| **North Central & North East London Neonatal ODN** | |
| Royal Free Hospital | SCU |
| Barnet Hospital | LNU |
| Newham University Hospital | LNU |
| North Middlesex University Hospital | LNU |
| Queen's Hospital, Romford | LNU |
| Whipps Cross University Hospital | LNU |
| Whittington Hospital | LNU |
| Homerton University Hospital | NICU |
| The Royal London Hospital | NICU |

[1] Includes Leicester Royal Infirmary and Leicester General Hospital.

| | |
|---|---|
| University College London Hospital[2] | NICU |
| **North West London Neonatal ODN** | |
| West Middlesex University Hospital | SCU |
| Hillingdon Hospital | LNU |
| Northwick Park Hospital | LNU |
| St Mary's Hospital, London | LNU |
| Chelsea & Westminster Hospital | NICU |
| Queen Charlotte and Chelsea Hospital | NICU |
| **North West Neonatal ODN** | |
| Furness General Hospital | SCU |
| Macclesfield District General Hospital | SCU |
| Countess of Chester Hospital | LNU |
| Leighton Hospital | LNU |
| North Manchester General Hospital | LNU |
| Ormskirk District General Hospital | LNU |
| Royal Albert Edward Infirmary | LNU |
| Royal Lancaster Infirmary | LNU |
| Stepping Hill Hospital | LNU |
| Tameside General Hospital | LNU |
| Victoria Hospital, Blackpool | LNU |
| Warrington Hospital | LNU |
| Whiston Hospital | LNU |
| Wythenshawe Hospital | LNU |
| Alder Hey Children's Hospital[3] | NICU |
| Arrowe Park Hospital | NICU |
| Lancashire Women and Newborn Centre, Burnley General Hospital | NICU |
| Liverpool Women's Hospital | NICU |
| Royal Bolton Hospital | NICU |
| Royal Oldham Hospital | NICU |
| Royal Preston Hospital | NICU |
| St Mary's Hospital, Manchester | NICU |
| **Northern Neonatal ODN** | |
| Cumberland Infirmary | SCU |
| Darlington Memorial Hospital | SCU |
| Northumbria Specialist Emergency Care Hospital | SCU |
| Queen Elizabeth Hospital, Gateshead | SCU |
| University Hospital of North Durham | SCU |
| University Hospital of North Tees | SCU |
| West Cumberland Hospital | SCU |
| Royal Victoria Infirmary | NICU |
| Sunderland Royal Hospital | NICU |
| The James Cook University Hospital | NICU |
| **South East Coast Neonatal ODN** | |
| Conquest Hospital | SCU |

[2] Not included in all measures due to data quality issues.
[3] Neonatal surgical unit, not included in all measures.

| | |
|---|---|
| Darent Valley Hospital | SCU |
| Princess Royal Hospital, Haywards Heath | SCU |
| Queen Elizabeth, The Queen Mother Hospital | SCU |
| Royal Surrey County Hospital | SCU |
| Worthing Hospital | SCU |
| East Surrey Hospital | LNU |
| Frimley Park Hospital | LNU |
| Tunbridge Wells Hospital | LNU |
| Medway Maritime Hospital | NICU |
| Royal Sussex County Hospital | NICU |
| St Peter's Hospital | NICU |
| William Harvey Hospital | NICU |
| **South London Neonatal ODN** | |
| Epsom General Hospital | LNU |
| Croydon University Hospital | LNU |
| Kingston Hospital | LNU |
| Princess Royal University Hospital, Farnborough | LNU |
| Queen Elizabeth Hospital, Woolwich | LNU |
| St Helier Hospital | LNU |
| University Hospital Lewisham | LNU |
| Guy's and St Thomas' Hospital (Evelina London) | NICU |
| King's College Hospital | NICU |
| St George's Hospital | NICU |
| **South West Neonatal ODN** | |
| North Devon District Hospital | SCU |
| Torbay Hospital | SCU |
| Yeovil District Hospital | SCU |
| Gloucestershire Royal Hospital | LNU |
| Great Western Hospital | LNU |
| Musgrove Park Hospital | LNU |
| Royal Cornwall Hospital | LNU |
| Royal Devon & Exeter Hospital | LNU |
| Royal United Hospital | LNU |
| Derriford Hospital | NICU |
| Southmead Hospital | NICU |
| St Michael's Hospital | NICU |
| **Southern West Midlands Neonatal ODN** | |
| George Eliot Hospital | SCU |
| Good Hope Hospital | SCU |
| Hereford County Hospital | SCU |
| Warwick Hospital | SCU |
| Birmingham City Hospital | LNU |
| Manor Hospital | LNU |
| Princess Royal Hospital, Telford | LNU |
| Russell's Hall Hospital | LNU |
| Worcestershire Royal Hospital | LNU |
| Birmingham Heartlands Hospital | NICU |

| | |
|---|---|
| Birmingham Women's Hospital | NICU |
| New Cross Hospital | NICU |
| Royal Stoke University Hospital | NICU |
| University Hospital Coventry | NICU |
| **Thames Valley & Wessex ODN** | |
| Dorset County Hospital | SCU |
| St Mary's Hospital, IOW | SCU |
| Basingstoke & North Hampshire Hospital | LNU |
| Milton Keynes University Hospital | LNU |
| Poole General Hospital - University Hospitals Dorset | LNU |
| Royal Berkshire Hospital | LNU |
| Royal Hampshire County Hospital | LNU |
| Salisbury District Hospital | LNU |
| St Richard's Hospital | LNU |
| Stoke Mandeville Hospital | LNU |
| Wexham Park Hospital | LNU |
| John Radcliffe Hospital | NICU |
| Princess Anne Hospital | NICU |
| Queen Alexandra Hospital | NICU |
| **Yorkshire & Humber Neonatal ODN** | |
| Bassetlaw District General Hospital | SCU |
| Harrogate District Hospital | SCU |
| Scarborough General Hospital | SCU |
| Airedale General Hospital | LNU |
| Barnsley District General Hospital | LNU |
| Calderdale Royal Hospital | LNU |
| Chesterfield Royal Hospital | LNU |
| Diana Princess of Wales Hospital | LNU |
| Doncaster Royal Infirmary | LNU |
| Pinderfields General Infirmary (Pontefract) | LNU |
| Rotherham District General Hospital | LNU |
| Scunthorpe General Hospital | LNU |
| York District Hospital | LNU |
| Bradford Royal Infirmary | NICU |
| Hull Royal Infirmary | NICU |
| Jessop Wing, Sheffield | NICU |
| Leeds Neonatal Service[4] | NICU |
| **WALES** | |
| Glangwili General Hospital | SCU |
| Nevill Hall Hospital | SCU |
| Prince Charles Hospital | SCU |
| Princess of Wales Hospital, Bridgend | SCU |
| Royal Glamorgan Hospital | SCU |
| Wrexham Maelor Hospital | SCU |
| Ysbyty Gwynedd | SCU |

[4] Includes Leeds General Infirmary and St James's Hospital.

| | |
|---|---|
| Glan Clwyd Hospital | LNU |
| Royal Gwent Hospital | NICU |
| Singleton Hospital | NICU |
| The Grange University Hospital | NICU |
| University Hospital of Wales | NICU |

# 11. Pathogens in the NNAP

Bacterial, fungal and yeast positive blood cultures reported to the NNAP in 2020 for the Bloodstream infection and Central line associated bloodstream infection measures have been classified as shown below into organisms whose growth would be regarded as indicative of a bloodstream infection without further confirmatory evidence, and into a list of other organisms. This list of organisms included for NNAP reporting is available below. The NNAP are grateful to Dr Jim Gray, Consultant Microbiologist at Birmingham Women's and Children's NHS FT, who kindly reviewed organisms reportedly cultured in blood, and helped classify them into 'clearly pathogenic' and 'other' organisms.

For more information, see Fraser C, Muller-Pebody B, Blackburn R, Gray J, Oddie SJ, Gilbert RE, Harron K. Linking surveillance and clinical data for evaluating trends in bloodstream infection rates in neonatal units in England. PLoS One. 2019 Dec 12;14(12):e0226040. doi: 10.1371/journal.pone.0226040.eCollection 2019.

| **Clearly pathogenic organisms** | | |
|---|---|---|
| Acinetobacter Baumanii | Enterobacter Sakazakii | S. Aureus |
| Acinetobacter Baumannii | Enterobacter Sp | Salmonella Aba |
| Aeromonas Caviae | Enterobacter Sp. | Salmonella Agama |
| Aeromonas Hydrophila | Enterococcus Avium | Salmonella Ajiobo |
| Aeromonas Salmonicida | Enterococcus Casseliflavus | Salmonella Apapa |
| Aeromonas Sobria | Enterococcus Durans | Salmonella Arizonae |
| Aeromonas Sp | Enterococcus Faecalis | Salmonella Brandenburg |
| Anaerococcus Prevotii | Enterococcus Faecalis | Salmonella Colindale |
| Aspergillus | Enterococcus Faecium | Salmonella Cotham |
| Aspergillus Fumigatus | Enterococcus Gallinarum | Salmonella Cubana |
| Aspergillus Niger | Enterococcus Hirae | Salmonella Djugu |
| Aspergillus Sp | Enterococcus Raffinosus | Salmonella Dublin |
| B Haemolytic Streptococci | Enterococcus Sp | Salmonella Enteritidis |
| Bacteroides Capillosus | Enterococcus Sp. | Salmonella Gold-Coast |
| Bacteroides Distasonis | Escherichia | Salmonella Hadar |
| Bacteroides Fragilis | Escherichia Coli | Salmonella Heidelberg |
| Bacteroides Ovatus | Escherichia Hermannii | Salmonella Hofit |
| Bacteroides Sp | Escherichia Sp | Salmonella Hull |
| Bacteroides Uniformis | Escherichia Vulneris | Salmonella Infantis |
| Bacteroides Vulgatus | Fusobacterium Necrophorum | Salmonella Kedougou |
| C. Koseri | Fusobacterium Nucleatum | Salmonella Kiambu |
| Campylobacter Fetus | Fusobacterium Sp | Salmonella Kibusi |
| Campylobacter Jejuni | Gardnerella | Salmonella Kintambo |
| Campylobacter Sp | Gardnerella Vaginalis | Salmonella Kisarawe |
| Campylobacter Ureolyticus | GBS | Salmonella Matopeni |
| Candida | Group B Streptococcus | Salmonella Mississippi |
| Candida Albicans | Group G Streptococcus | Salmonella Monschaui |
| Candida Ciferrii | Haemophilus Influenzae | Salmonella Montevideo |

| | | |
|---|---|---|
| Candida Dubliniensis | Hafnia Alvei | Salmonella Muenchen |
| Candida Fabianii | Hansenula Sp | Salmonella Muenster |
| Candida Famata | Klebsiella | Salmonella Newport |
| Candida Glabrata | Klebsiella Aerogenes | Salmonella Oranienburg |
| Candida Guilliermondii | Klebsiella Ornithnolytica | Salmonella Poona |
| Candida Haemulonis | Klebsiella Oxytoca | Salmonella Reading |
| Candida Krusei | Klebsiella Planticola | Salmonella Saphra |
| Candida Lusitaniae | Klebsiella Pneumoniae | Salmonella Senftenberg |
| Candida Parapsilosis | Klebsiella Pneumoniae Subsp Ozenae | Salmonella Sinstorf |
| Candida Sp | Klebsiella Sp | Salmonella Sp |
| Candida Sp. | Klebsiella Sp. | Salmonella Stanley |
| Candida Tropicalis | Kluyvera Sp | Salmonella Tel-El-Kebir |
| Cedecea Lapagei | Leclercia Adecarboxylata | Salmonella Typhi and Paratyphi |
| Citrobacter | Listeria Monocytogenes | Salmonella Typhimurium |
| Citrobacter Amalonaticus | Listeria Sp | Salmonella Unnamed |
| Citrobacter Braakii | Malassezia Furfur | Salmonella Virchow |
| Citrobacter Diversus | Malassezia Pachydermatis | Salmonella Vitkin |
| Citrobacter Farmeri | Malassezia Sp | Salmonella Wichita |
| Citrobacter Freundii | Morganella Morganii | Serratia Liquefaciens |
| Citrobacter Koseri | MRSA | Serratia Marcescens |
| Citrobacter Sp | Neisseria Meningitidis | Serratia Odorifera |
| Citrobacter Sp. | Pantoea Agglomerans | Serratia Plymuthica |
| Clostridium Beijerinckii | Pantoea Septica | Serratia Proteamaculas |
| Clostridium Bifermentans | Pantoea Sp | Serratia Rubidaea |
| Clostridium Butyricum | Pasteurella | Serratia Sp |
| Clostridium Paraputrificum | Pasteurella Haemolytica | Serratia Sp. |
| Clostridium Perfringens | Pasteurella Multocida | Shigella Flexneri |
| Clostridium Septicum | Pasteurella Pneumotropica | Shigella Sonnei |
| Clostridium Sordelli | Pasteurella Sp | Staphylococcus Aureus |
| Clostridium Sp | Pasteurella Sp. | Stellatoidea |
| Clostridium Sporogenes | Peptostreptococcus | Streptococcus Agalactiae |
| Clostridium Tertium | Peptostreptococcus Asaccharolyticus | Streptococcus Anaerobic |
| Coccidioides Sp | Peptostreptococcus Magnus | Streptococcus Anginosus |
| Coliform | Prevotella Bivia | Streptococcus Bovis |
| Cryptococcus Albidus | Prevotella Buccalis | Streptococcus Constellatus |
| Cryptococcus Sp | Prevotella Oralis | Streptococcus Faecalis |
| E.Coli | Proteus Mirabilis | Streptococcus Group A Stem |
| Enterobacter | Proteus Penneri | Streptococcus Group B Stem |
| Enterobacter Aerogenes | Proteus Sp | Streptococcus Group C Stem |
| Enterobacter Agglomerans | Proteus Vulgaris | Streptococcus Group D Stem |

| | | |
|---|---|---|
| Enterobacter Agglomerans | Providencia Alcalifaciens | Streptococcus Group G Stem |
| Enterobacter Amnigenus | Providencia Stuartii | Streptococcus Milleri |
| Enterobacter Asburiae | Pseudomonas Aeruginosa | Streptococcus Milleri Group |
| Enterobacter Cloacae | Raoultella Planticola | Streptococcus Pneumoniae |
| Enterobacter Cloacae Complex | Raoultella Planticola | Streptococcus Pyogenes |
| Enterobacter Gergoviae | Raoultella Sp | Veillonella Atypica |
| Enterobacter Hormaechei | Raoultella Terrigena | Veillonella Named |
| Enterobacter Intermedium | Rhodotorula | Yeasts |
| Enterobacter Intermedius | Rhodotorula Rubra | Yeasts (Other) |
| Enterobacter Kobei | Rhodotorula Sp | Yersinia Enterocolitica |

| **Other organisms** | | |
|---|---|---|
| Abiotrophia | Corynebacterium Striatum | Ochrobactrum Anthropi |
| Abiotrophia Adiacens | Corynebacterium Xerosis | Ochrobactrum Sp |
| Abiotrophia Adjacens | Coryneform Bacilli | Paenibacillus Amylolyticus |
| Abiotrophia Defectiva | Delftia Acidovorans | Paenibacillus Glucanolyticus |
| Achromobacter Sp | Dermabacter Hominis | Paenibacillus Pabuli |
| Achromobacter Xylosoxidans | Dermacoccus Sp | Paenibacillus Sp |
| Acidovorax Temperans | Diphtheroids | Parabacteroides Distasonis |
| Acinetobacter Anitratus | Eggerthella Lenta | Paracoccus Sp |
| Acinetobacter Calcoaceticus | Eikenella Corrodens | Paracoccus Yeeii |
| Acinetobacter Haemolyticus | Elizabethkingia Miricola | Pediococcus Acidilactici |
| Acinetobacter Johnsonii | Elizabethkingia Sp | Peptococcus Sp |
| Acinetobacter Junii | Eubacterium Lentum | Phialophora |
| Acinetobacter Lwoffii | Exophiala Sp. | Propionibacterium Acnes |
| Acinetobacter Parvus | Flavimonas Oryzihabitans | Propionibacterium Freudenreichii |
| Acinetobacter Radioresistens | Flavobacterium Sp. | Propionibacterium Sp |
| Acinetobacter Sp | Gemella Haemolysans | Proprionebacterium Acnes |
| Acinetobacter Sp. | Gemella Morbilarum | Pseudoclavibacter Sp |
| Acinetobacter Ursingii | Gemella Morbillorum | Pseudomonas Alcaligenes |
| Actinomyces | Geotrichum Sp | Pseudomonas Fluorescens |
| Actinomyces Bovis | Globicatella Sanguis | Pseudomonas Luteola |
| Actinomyces Cardiffensis | Gordonia Bronchialis | Pseudomonas Oleovorans |
| Actinomyces Naeslundii | Gordonia Sp | Pseudomonas Oryzihabitans |
| Actinomyces Neuii | Granulicatella Adiacens | Pseudomonas Paucimobilis |
| Actinomyces Odontolyticus | Granulicatella Elegans | Pseudomonas Putida |
| Actinomyces Oris | Haematobacter Sp | Pseudomonas Sp |
| Actinomyces Sp | Haemophilus | Pseudomonas Sp. |
| Actinomyces Sp. | Haemophilus Aphrophilus | Pseudomonas Stutzeri |
| Actinomyces Viscosus | Haemophilus Haemolyticus | Pseudoxanthomonas Kaohsiungensis |
| Aerococcus Sp | Haemophilus Parahaemolyticus | Psychrobacter Phenylpyruvicus |

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|---|---|---|
| Aerococcus Urinae | Haemophilus Parainfluenzae | Rahnella Named |
| Aerococcus Viridans | Haemophilus Paraphrohaemolyticus | Rahnella Sp |
| Agrobacterium Tumefaciens | Haemophilus Sp | Ralstonia Pickettii |
| Alcaligenes Faecalis | Haemophilus Sp. | Ralstonia Sp. |
| Alcaligenes Sp | Kingella Denitrificans | Rhizobium Radiobacter |
| Alpha Haemolytic Streptococcus | Kingella Kingae | Rhodococcus |
| Anaerobes (Not Specified) | Kingella Sp | Rhodococcus Bronchialis |
| Anitratus | Kocuria Kristinae | Rhodococcus Sp |
| Arcanobacterium Haemolyticum | Kocuria Rhizophila | Roseomonas Gilardii |
| Arthrobacter Sp | Kocuria Rosea | Roseomonas Mucosa |
| Aurantimonas Altamirensis | Kocuria Sp | Roseomonas Sp |
| Bacillus | Kocuria Species | Rothia Aeria |
| Bacillus Cereus | Kocuria Varians | Rothia Dentocariosia |
| Bacillus Circulans | Kytococcus Schroeteri | Rothia Sp |
| Bacillus Licheniformis | Lactobacillus | Rothia Spp |
| Bacillus Pumilus | Lactobacillus Crispatus | Ruminococcus Gnavus |
| Bacillus Silvestris | Lactobacillus Fermentum | Scopulariopsis Brevicaulis |
| Bacillus Sp | Lactobacillus Gasseri | Sphingobacterium Multivorum |
| Bacillus Sp. | Lactobacillus Jensenii | Sphingomonas |
| Bacillus Subtilis | Lactobacillus Lactis | Sphingomonas Paucimobilis |
| Bifidobacterium | Lactobacillus Paracasei | Sphingomonas Sp |
| Bifidobacterium Adolescentis | Lactobacillus Rhamnosus | Staph Saprophyticus |
| Bifidobacterium Breve | Lactobacillus Sp | Staphylococcus Capitis |
| Bifidobacterium Catenulatum | Lactobacillus Sp. | Staphylococcus Coagulase Negative |
| Bifidobacterium Longum | Lactococcus Cremoris | Staphylococcus Epidermidis |
| Bifidobacterium Sp | Lactococcus Garvieae | Staphylococcus Haemolyticus |
| Brevibacillus Parabrevis | Lactococcus Lactis | Staphylococcus Hominis |
| Brevibacterium | Lactococcus Sp | Staphylococcus Lugdunensis |
| Brevibacterium Casei | Lactococcus Sp. | Staphylococcus Pettenkoferi |
| Brevibacterium Sp | Leuconostoc Sp | Staphylococcus Simulans |
| Brevundimonas Diminuta | Lysinibacillus Sp | Staphylococcus Sp |
| Brevundimonas Sp | Mallassezia Furfur | Staphylococcus Sp. |
| Brevundimonas Vesicularis | Massilia Timonae | Staphylococcus Vitulinus |
| Burkholderia Capecia | Methylobacterium Sp | Staphylococcus Warneri |
| Burkholderia Cepacia | Microbacterium Aurum | Stenotrophomonas Acidaminiphila |
| Burkholderia Gladioli | Microbacterium Paraoxydans | Stenotrophomonas Maltophilia |
| Capnocytophaga | Microbacterium Sp | Stenotrophomonas Sp |
| Chryseobacterium Indologenes | Micrococcus | Stephanoascus Ciferrii |
| Chryseobacterium Meningosepticum | Micrococcus Luteus | Stomatococcus Mucilaginosus |

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|---|---|---|
| Chryseobacterium Sp | Micrococcus Lylae | Stomatococcus Sp |
| Chryseobacterium Sp. | Micrococcus Sp | Streptococcus Alactolyticus |
| Chryseomonas Indologenes | Micrococcus Sp. | Streptococcus Alpha And Non-Haemolytic |
| Collinsella Aerofaciens | Micrococcus Varians | Streptococcus Cristatus |
| Comamonas Acidovorans | Microsporum Sp | Streptococcus Gordonii |
| Comamonas Testosteroni | Mixed Growth | Streptococcus Infantarius Subsp Nov |
| Cons | Moraxella Catarrhalis | Streptococcus Infantis |
| Cons (Mixed) | Moraxella Lacunata | Streptococcus Intermedius Group |
| Corynebacterium | Moraxella Nonliquefaciens | Streptococcus Lutetiensis |
| Corynebacterium Afermentans | Moraxella Osloensis | Streptococcus Mitis |
| Corynebacterium Amycolatum | Moraxella Sp | Streptococcus Oralis |
| Corynebacterium Aurimucosum | Moraxella Sp. | Streptococcus Other Group |
| Corynebacterium Auris | Mycobacterium Sp. | Streptococcus Parasinguinis |
| Corynebacterium Coyleae | Neisseria Cinerea | Streptococcus Peroris |
| Corynebacterium Diphtheriae | Neisseria Flavescens | Streptococcus Pseudoporcinus |
| Corynebacterium Imitans | Neisseria Lactamica | Streptococcus Salivarius |
| Corynebacterium Jeikeium | Neisseria Mucosa | Streptococcus Sanguis |
| Corynebacterium Minutissimum | Neisseria Perflava | Streptococcus Sobrinus |
| Corynebacterium Mucifaciens | Neisseria Polysacchareae | Streptococcus Sp |
| Corynebacterium Propinquum | Neisseria Sicca | Streptococcus Sp. |
| Corynebacterium Pseudodiphtheriticum | Neisseria Sp | Streptococcus Thermophilus |
| Corynebacterium Simulans | Neisseria Subflava | Streptococcus Vestibularis |
| Corynebacterium Sp | NHS | Streptococcus Viridans |
| Corynebacterium Sp. | Oceanobacillus Profundus | |

# 12. NNAP governance and delivery

The top-level governance group for this audit is the Maternity, Perinatal and Infant Independent Advisory Group (IAG). The Maternal, Perinatal and Infant IAG provides strategic governance and insight to the Maternal, Perinatal and Infant programmes commissioned and managed by HQIP as part of the NCAPOP. It provides a systematic overview of these programmes, considering opportunities for alignment and collaborative working, and ensuring there is no duplication of effort. Each programme within the remit of the Maternal, Perinatal and Infant IAG has a dedicated subgroup, including NNAP. The role of the NNAP subgroup is to offer strategic oversight, consider progress and outputs from the core work of the programme, review provider performance, consider the strategic context in which the programme operates (e.g. policy, regulation) as well as supporting specification development meetings ahead of re-tenders.

The audit is governed operationally by a Project Board, chaired by the RCPCH Vice President for Science and Research. It comprises members from key stakeholder organisations and groups, including several parent representatives. The Methodology and Dataset Group assists the Project Board with technical matters, such as analysis planning, presentation of results, and development and review of measures. The Project Board is responsible for overseeing the audit and providing oversight and advice to the programme. Clinical accountability is provided by the Vice President for Science and Research. Clinical leadership is provided by the NNAP Clinical Lead and organisational and contractual accountability is provided by the RCPCH Director of Research and Quality Improvement.

## NNAP Clinical Lead

**Dr Sam Oddie**, Consultant Neonatologist and NNAP Clinical Lead, Bradford Teaching Hospitals NHS Foundation Trust

## NNAP Project Board members

**Professor Nick Bishop**, RCPCH Vice President Science and Research, Chair of the NNAP Project Board
**Dr Breidge Boyle**, Neonatal Nurses Association Representative
**Dr Lisa Barker**, Consultant Neonatologist
**Debbie Bezalel**, Head of Services, Bliss (to June 2021)
**Amanda Buck**, NNAP Parent Representative
**Rachel Corry,** NNAP Parent Representative
**Dr Chris Kissack,** Consultant Neonatologist, Scottish Representative
**Dr Helen Mactier**, Consultant Neonatologist, British Association of Perinatal Medicine Representative
**Natalie McGill**, NNAP Parent Representative
**Professor Neena Modi**, Professor of Neonatal Medicine, Neonatal Data Analysis Unit, Imperial College London (to March 2021)
**Chloe Morton**, Bliss Representative (from September 2021)
**Gina Outram,** Neonatal Network Manager Representative
**Dr Colin Peters**, Consultant Neonatologist, Scottish Representative
**Dr Oliver Rackham**, Consultant Neonatologist, Welsh Representative
**Grazia Sinar**, Neonatal Nurses Association Representative
**Mirek Skrypak**, Associate Director for Quality and Development, HQIP
**Dr Aung Soe**, Consultant Neonatologist, Neonatal Critical Care Clinical Reference Group Representative
**Oliver Potter,** Project Manager, HQIP
**Professor Andrew Wilkinson**, Emeritus Professor of Paediatrics and Perinatal Medicine, University of Oxford, Neonatal Society Representative (to November 2021)
**Dr Amy Young**, Trainee in Neonatal Medicine

## NNAP Methodology and Dataset Group members

**Dr Sam Oddie**, Consultant Neonatologist, Chair, NNAP Methodology and Dataset Group
**Dr Eleri Adams**, Consultant Neonatologist
**Dr Julie-Claire Becher**, Consultant Neonatologist
**Dr Kate Blake**, Consultant Neonatologist
**Charlotte Bradford**, Information Manager, Yorkshire and Humber Neonatal Network
**Martyn Boyd**, Network Manager, Northern Neonatal Network
**Dr Breidge Boyle**, Lecturer, Neonatal Nurses Association Representative
**Jo Colliver**, Consultant Neonatal Nurse
**Rachel Corry,** NNAP Parent Representative
**Dr Sanjeev Deshpande**, Consultant Neonatologist
**Elizabeth Gallagher**, Network Manager, Wales Neonatal Network
**Dr Yinru Lim**, Trainee in Neonatal Medicine
**Dr Archana Mishra**, Consultant Neonatologist
**Dr Oliver Rackham**, Consultant Neonatologist
**Dr Ghada Ramadan**, Consultant Neonatologist

## NNAP Project Team

**Rachel Winch**, NNAP Audit Manager, RCPCH
**Jessica Ellis**, NNAP Audit Manager, RCPCH (January 2020 -February 2021)
**Calvin Down,** Head of Audits, RCPCH
**Simon Duncan,** Project Administrator, RCPCH
**Tom Keiller,** Project Administrative Assistant, RCPCH
**Humfrey Legge,** NNAP Data Analyst, RCPCH
**Lucy Adamson**, NNAP Project Coordinator, RCPCH
**Robert Grant,** Statistical consultant to the NNAP
**Kayleigh Ougham**, NNAP Data Analyst, NDAU (to March 2021)
**Dr Nicholas Longford**, NNAP Statistician, NDAU (to March 2021)

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