NNAP Quality Improvement Strategy

The overarching aim of the NNAP Quality Improvement Strategy is to assess whether babies admitted to neonatal units in England, Scotland, Wales and the Isle of Man receive consistent, high-quality care in relation to the NNAP audit measures that are aligned to a set of professionally agreed guidelines and standards, to identify areas for improvement and to empower stakeholders to use audit data to stimulate improvement in care delivery and outcomes.

To achieve this, the NNAP sets out four approaches to stimulating improvement:

1. High quality data outputs that identify areas for action and support stakeholders' improvement initiatives
2. Sharing of best practice and quality improvement resources
3. Collaboration and engagement with regional and national initiatives
4. Parent and public engagement

NNAP improvement goals and supporting objectives

The overall success of the strategy will be monitored against identified improvement goals which reflect existing national priorities and are consistent with quality improvement ambitions. These goals are described over a ten-year time frame (2022-2032), with specified year-on-year ambitions. This time frame is selected based on a realistic assessment of how easy it is to affect change in multifactorial clinical outcomes, which are fortunately rare. These goals will be subject to periodic revision by the NNAP Board.

Progress against these goals and objectives will be reported annually to the Project Board, HQIP and in the public domain.

The goals and supporting objectives set out in this document are supported by the following organisations:

- Bliss
- The Neonatal Society
- The Maternity and Neonatal Safety Improvement Programme, NHS England
- British Association of Perinatal Medicine (BAPM)
- Neonatal Nurses Association
- Scottish Patient Safety Programme (SPSP) Perinatal

Progress report: 2022-2025

Improvement goal 1:

Reduce the difference between the networks with the most negative and most positive treatment effect[1] for mortality until discharge home (3.8% based on 2021 results) by 0.3% per year over a 10-year period, with no associated increase in mortality in the network with the lowest observed mortality rate.

Important notes for interpretation:

1. The NNAP uses a case mix/risk adjustment method which gives a "treatment effect" for a neonatal network. A negative treatment effect suggests that the babies were more likely to survive in the network than elsewhere in the country, and a positive treatment effect suggests that the babies would have been more likely to survive had they been born and treated elsewhere.
2. The observed mortality rate is the actual proportion of babies, overall or in each network, who died.
3. Here we consider the variation between networks, and not the overall observed mortality. It is possible, but unlikely, that overall mortality could worsen, while variation between networks reduces. Absolutely mortality will remain under review.
4. We consider the difference between the best and the worst performing network; those will each be subject to statistical variation from the fact that, in any given period, they are assessed on the babies they encountered. These babies might by chance have been healthier or less healthy in ways that we do not and perhaps cannot measure; therefore, small changes in this metric should not be taken as evidence of changes in NHS neonatal care.

Rationale: In 2015, the Government announced an ambition to reduce the rate of stillbirths, neonatal and maternal deaths and brain injuries in England by 50% by 2025[1], based on 2010 rates. In 2021, the NNAP reported rates and treatment effect of mortality until discharge from neonatal care (or 44 weeks post menstrual age) in babies born at less than 32 weeks, between the period July 2017 to June 2020. Treatment effect is the difference between the observed rate of mortality and a matched rate, which is the rate of mortality in a matched group of babies with similar baseline characteristics to those in the network of interest. There was a difference of 3.8% between the neonatal network with the most negative and most positive treatment effect. The NNAP ambition is to reduce the difference in treatment effect between the networks without an associated increase in mortality in the network with the lowest observed rate.

This improvement goal focuses on driving down regional inequalities, by reducing mortality in networks reporting the highest rates and ensuring optimal perinatal care for all babies. NNAP has a central role to play in highlighting variation between, across and within the regions in which perinatal and neonatal care is organised. This geographical variation includes associated economic deprivation. Variation in outcomes, or the processes and structures that drive these outcomes will be key in facilitating improvement to equity, as well as ongoing improvement at national level

Progress update 2022-2025:

In 2023, the difference in mortality treatment effect was 3.9%, compared to 3.8% in 2022 and 2021. In 2024, provisional results indicate that the difference in mortality treatment

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[1] https://www.england.nhs.uk/mat-transformation/saving-babies/

effect is 3.4%. The lowest observed neonatal network mortality rate is as follows; 2024 (provisional) – 4.1%, 2023 – 3.3%, 2022 – 4.8%, 2021 – 4.0%. Overall mortality has remained relatively stable over this time; 2024 (provisional) – 6.4%, 2023 – 6.4%, 2022 – 6.5%, 2021 – 6.6%. Annual variation is expected, and there is no clear trend towards improvement in the overall mortality rate or in terms of a reduction in variation.

Improvement goal 2:

For babies born at less than 34 weeks gestation, increase the proportion receiving all measured elements of the MatNeoSIP perinatal optimisation plan by 2% per year over a ten-year period based on an estimated baseline proportion of 7.7% observed in the NNAP 2021 data.*

*2021 proportion updated based on data available in April 2025.

Rationale: The Maternity and Neonatal Safety Improvement Programme (MatNeoSIP)[2] has identified optimisation and stabilisation of the very preterm infant as one of five drivers to achieving the national ambition of reduced neonatal deaths, stillbirths and brain injuries and improving the safety and outcomes of neonatal care. Optimal perinatal care and outcomes for preterm infants is a key focus area for the Scottish Patient Safety Programme (SPSP) through its preterm perinatal wellbeing package[3]. The NNAP already reports on a number of the elements of optimal care identified by MatNeoSIP and SPSP; antenatal steroid administration, antenatal magnesium sulphate administration, birth in the right place, temperature on admission, delayed cord clamping and early breastmilk feeding. Based on NNAP 2021 data, we estimate that only 7.7% of infants received all measured appropriate elements of optimal care. There is a significant improvement opportunity to both drive towards achieving the developmental standards set for each intervention, and to increase the proportion of babies receiving all of them, and therefore improving overall outcomes.

Progress update 2022-2025:

Using an updated baseline of 7.7% of babies achieving all appropriate elements in 2021; between 2021 and 2024, there has been a 14.2 percentage point increase in the proportion of babies receiving optimal perinatal care (based on provisional, unpublished 2024 results). The neonatal community is currently exceeding the original NNAP healthcare improvement goal to increase the proportion by 2% per year, however only 1 in 5 babies (21.9% - provisional 2024 result) are currently receiving a complete optimal perinatal care journey. We propose setting a new goal to increase the proportion by 3% per year.

The following supporting objectives have been achieved:

- Introduce reporting of the proportion of babies born at less than 34 weeks gestational age who receive all of the relevant following care interventions; antenatal steroid administration, antenatal magnesium sulphate administration, birth in the right place, temperature on admission, deferred cord clamping and early breastmilk feeding.

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[2] https://www.england.nhs.uk/mat-transformation/maternal-and-neonatal-safety-collaborative/
[3] https://ihub.archive.nhsscotland.net/improvement-programmes/scottish-patient-safety-programme-spsp/spsp-perinatal-programme/

- Over 85% of mothers who deliver a baby at less than 30 weeks gestational age receive magnesium sulphate in the 24 hours prior to delivery. This standard has been achieved in 2021, 2022 and 2023, and is expected to be achieved in 2024.
- For the measure "Does a baby born at less than 34 weeks gestational age have their cord clamped at or after one minute?", the developmental standard was set at 60% for 2022, and 75% for 2023 and 2024, in line with improvements in the delivery of this intervention.
- A measure of breastmilk feeding by day two has been introduced to the NNAP, in line with MatNeoSIP.

Improvement goal 3:

For babies born at less than 32 weeks gestation, increase the proportion discharged home from neonatal care having experienced no serious complication of prematurity (late onset bloodstream infection, NEC, BPD and serious preterm brain injury and mortality) by 1% per year over a ten-year period based on an estimated baseline proportion of 49.7% observed in the NNAP 2021 data.*

*2021 proportion updated based on data available in April 2025.

Rationale: Serious complications of prematurity are not rare. Such complications increase costs, adversely affect baby and parental experience and are associated with long term disability with presumed causality. Increasing the proportion of babies unaffected by any serious complication is therefore economic, compassionate and to the long-term advantage of babies born preterm.

Progress update 2022-2025:

Using an updated baseline of 49.7% of babies discharged from neonatal care having experienced no serious complication of prematurity in 2021; between 2021 and 2024 there has been a 7-percentage point increase (based on provisional, unpublished 2024 results); currently exceeding the 1% per year improvement goal. However, this trend may well be a result of improving data quality rather than a change in the underlying rates of complications; there has been no clear reduction in incidence of the outcomes included in this measure.

Progress against the original supporting objectives:

- The proportion of neonatal units able to provide assurance that all required data relating to key complications of prematurity were submitted to the audit has increased year on year. In 2024; 90% of units assured their bloodstream infection data, 92% their necrotising enterocolitis data, and 89% their preterm brain injury data.
- Adjustment for background variables is applied to all outcome measures where data quality is considered good enough. The completeness of preterm brain injury data improves year on year, however in 2024, two networks had missing data rates over 20% for all types of brain injury. The quality of preterm brain injury data is not yet judged of sufficient completeness and quality to justify undertaking adjustment.

- The public facing NNAP Data Dashboard, introduced in August 2023, presents results for each of the 10 key performance metrics as annual rolling averages, updated monthly. Results can be displayed for neonatal units, Integrated Care Systems (England) and Health Boards (Wales and Scotland), and by neonatal network.
- The NNAP Restricted Access Dashboard (RAD), introduced in May 2024 provides NNAP neonatal unit and network participants with more granular access to their NNAP results to support data cleaning and early quality improvement interventions.

NNAP Quality Improvement Strategy 2025-2027, updated June 2025

Improvement goal 1:

Reduce the difference between the networks with the most negative and most positive treatment effect[1] for mortality until discharge home (3.8% based on 2021 results) by 0.3% per year over 10 years period, without increasing mortality in the network with the lowest observed rate.

Important notes for interpretation:

1. The NNAP uses a case mix/risk adjustment method which gives a "treatment effect" for a neonatal network. A negative treatment effect suggests that the babies were more likely to survive in the network than elsewhere in the country, and a positive treatment effect suggests that the babies would have been more likely to survive had they been born and treated elsewhere.
2. The observed mortality rate is the actual proportion of babies, overall or in each network, who died.
3. Here we consider the variation between networks, and not the overall observed mortality. It is possible, but unlikely, that overall mortality could worsen, while variation between networks reduces. Absolutely mortality will remain under review.
4. We consider the difference between the best and the worst performing network; those will each be subject to statistical variation from the fact that, in any given period, they are assessed on the babies they encountered. These babies might by chance have been healthier or less healthy in ways that we do not and perhaps cannot measure; therefore, small changes in this metric should not be taken as evidence of changes in NHS neonatal care.

Supporting objectives:

Mortality is arguably the most important adverse outcome of preterm birth, meriting its own improvement goal for that reason. Objectives for improving mortality rates are similar to those of improvement goals 2 and 3, as described below.

Improvement goal 2:

For babies born at less than 34 weeks gestation, increase the proportion receiving all reported perinatal optimisation measures (appropriate to their gestational age at birth) by 3% per year over a ten-year period based on an estimated baseline proportion of 7.7% observed in the NNAP 2021 data.*

*2021 proportion updated based on data available in April 2025.

Supporting objectives (2025-2027):

a. Work towards achieving the following developmental standards at a national level:
  - 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.
  - 90% of babies born at less than 34 weeks gestational age should have a first measured temperature of 36.5-37.5°C within one hour of birth.

b. Set developmental standards for the following process measures:
  - Does a baby born at less than 34 weeks gestational age receive any of their mother's own milk at day 14 of life?
  - Missing brain scan data to support reporting rates of IVH 3 and 4, cPVL and PHVD – target of 0%.

- Missing ethnicity and postcode – target of 0%.

Improvement goal 3:

For babies born at less than 32 weeks gestation, increase the proportion discharged home from neonatal care having experienced no serious complication of prematurity (late onset bloodstream infection, NEC, BPD and serious preterm brain injury and mortality) by 1% per year over a ten-year period based on an estimated baseline proportion of 49.7% observed in the NNAP 2021 data.*

*2021 proportion updated based on data available in April 2025.

Supporting objectives (2025-2027)

a. Achieve 100% of units self-validating completeness of their necrotising enterocolitis, bloodstream infection and serious preterm brain injury data.
b. Extend adjustment for background variables to preterm brain injury if data completeness and quality justify this extension.
c. In the NNAP dashboards, introduce benchmarking against this improvement goal to facilitate improvement efforts and reduce variation.

Improvement goal 4:

By 2032, to eliminate statistically significant case mix adjusted differences in the delivery of the following neonatal care process between ethnicities[4]:

- *Proportion of babies born at less than 34 weeks gestational age (GA)who have their cord clamped at or after one minute.*
- *Proportion of babies born at less than 34 weeks GA with normal temperature on admission taken within an hour of birth.*
- *Proportion of admissions where there is a documented consultation with parents by a senior member of the neonatal team within 24 hours.*

Compliance for each ethnic group should be within a 95% confidence interval of the national mean.

Rationale: This is a new improvement goal introduced in June 2025. Analysis of NNAP data for the period 2017-2023 shows that, after adjustment for case mix, white babies were more likely to receive deferred cord clamping than babies in all other ethnic groups. Black, Asian and mixed ethnicity babies were more likely to have an abnormal temperature on admission to the neonatal unit than White babies. Parental consultations

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[4] Ethnicity as per the Office of National Statistics classification: White (British, Irish, Gypsy or Irish Traveler, Roma, any other White background), Black (African, Caribbean, or any other Black background), Asian (Bangladeshi, Chinese, Indian, Pakistani, or any other Asian background), Mixed or multiple ethnic groups (White and Asian, White and Black African, White and Black Caribbean, Other Mixed or Multiple ethnic groups) and other (Arab or any other racial or ethnic group).

within 24 hours were less common with ethnic minority groups when compared to white.[5]

Supporting objectives:

- In NNAP annual reporting, to assess progress against the improvement goal, present national care process metric results by ethnicity, adjusted for case mix.
- Using the NNAP RAD, present care process metric results by ethnicity at unit and network levels, so that neonatal services can understand how well NNAP process measures are delivered locally, and whether this differs by ethnicity.

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[5] Pettinger, K. et al, (2024) Does neonatal care delivery vary by deprivation and ethnicity: a retrospective cohort study. Neonatal Society Spring Meeting. 13 March 2025; London. Available at: https://www.neonatalsociety.ac.uk/wp-content/uploads/2025/03/Neonatal-Society-Spring-Meeting-2025-Abstract-Book.pdf.

Stimulating healthcare improvement

1. High quality data outputs that identify areas for action and support stakeholders' improvement initiatives.

The NNAP will deliver high quality performance measures at unit level, reported in a timely fashion, to both facilitate and drive local benchmarking and quality improvement. Reporting outputs designed to support neonatal services will include:

- Data quality and completeness reporting back to neonatal services and networks which is refreshed monthly.
- Results reported on the NNAP Online interactive reporting tool at unit, network and overall, with unit and network level comparisons. Interactive reporting will explicitly benchmark unit, networks and national results against the goals and developmental standards associated with process measures.
- Monthly reporting of NNAP key performance indicator results at network level so network leads can monitor and support their neonatal units, with data quality and completeness outputs to inform QI interventions.
- An annual "state of the nation" report will provide high level key findings and recommendations, signposting to interactive online reporting and resources to support improvement initiatives.

2. Sharing best practice and quality improvement resources

The NNAP will promote best practice and quality improvement resources to support stakeholders' improvement initiatives by:

- Promoting existing Quality Improvement Toolkits produced by BAPM in collaboration with the NNAP[6],
- Using the RCPCH's QI Central platform to host resources, tools, case studies, posters and presentations to support improvement and ensure NNAP resources are available to a wide audience,
- Signposting to resources produced by other national initiatives (e.g. MatNeoSIP, SPSP Perinatal, GIRFT, NMPA, MBBRACE, Bliss and RCPCH&Us), and
- Sharing learning from engagement work undertaken by RCPCH&Us with audit participants, commissioners and other key stakeholders.

3. Collaboration and engagement with regional and national initiatives

The NNAP will ensure effective communication, engagement and collaboration with regional and national initiatives working towards improving neonatal care through:

- Key national stakeholders, regional representatives and parent representatives directly involved in developing improvement goals and objectives and aligning the

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[6] https://www.bapm.org/pages/104-qi-toolkits

activities of the programme with those goals through representation on the NNAP Project Board.
- Extend access to the NNAP Restricted Access Dashboard to Local Maternity and Neonatal Systems (LMNS) ensure that NNAP reporting provides an evidence base to support their improvement interventions.
- Support the strategic aims set out in the BAPM Strategy 2025-2028. Specifically, through membership on the BAPM Data and Informatics Steering Group, BAPM QI Steering Group, and continued collaboration on the development of QI toolkits.
- Aligning improvement goals to those of MatNeoSIP, SPSP Perinatal, GIRFT neonatal workstream and other national initiatives. Engage directly with them to consider how the NNAP can best support and complement these initiatives.
- Be proactive in responding to regional and national inquiries which make recommendations relating to measurement of the quality and outcomes of neonatal care and maternal outcomes of neonatal care.
- Making specific, targeted recommendations in annual reporting that clearly link back to the improvement goals.
- Continuing to provide data to support national initiatives, e.g. National Clinical Audit Benchmarking (NCAB), CQC and GIRFT, and the Specialised Services Quality Dashboard (SSQD).

4. Parent and public engagement

Parent views are represented at Board level in the NNAP by parent and Bliss representatives. Bliss and parent representatives will be involved in developing, reviewing and signing off future changes to improvement goals and objectives, and monitoring progress against the goals. They will continue to help define audit measures and developmental standards, and advise on the format and content of reports, tools and resources. The parent representatives help the NNAP team to focus on what is important to measure, what we should aim for, and how we should communicate. A wider Parent Partnership Group has also been set up to provide a broader parent perspective around measurement, communication, use of personal and clinical information, and to support development of resources for families and the public.

RCPCH &Us is the voice of children, young people, parents and carers and was created to actively seek and share their views to influence and shape policy and practice. RCPCH&Us provide support and advice to the audit around engagement with parents and families, and with recruitment and training of parent representatives on the Board. Tools and resources developed by RCPCH&Us are available to support healthcare professionals undertaking service improvement.

As part of this Strategy, the NNAP will continue to strengthen its parent and public engagement using the following approaches:

- Work with the RCPCH&Us engagement team to:
    - Seek diverse and representative views from parents and families to establish what good partnership in care looks like to them.

  - Consider whether and how those views can be translated into NNAP audit measures for which data can be collected by neonatal teams as part of routine data collection during a baby's neonatal stay.
  - Use findings to inform future development of the NNAP and share learning with audit participants, commissioners and other key stakeholders.
- Actively promote resources from the RCPCH&Us Engagement Collaborative to NNAP users to support their engagement work.
- Building on the success of parent facing unit level communications, develop outputs to integrate lay communication within other outputs currently aimed at professional audiences.
- Reach a wider audience through enhanced engagement with relevant charities and parent groups. This will be achieved through enhanced dissemination of key messages and other NNAP outputs to key groups and a social media engagement plan, aligning with relevant national awareness days.
- Run an annual photo competition to raise awareness of the audit with service users and reflect families' experiences in reporting.

Evaluating healthcare improvement impact

The primary measure of the impact will be progress against the improvement goals, and the objectives and developmental standards underpinning the goals. Progress will be reported annually to members of the NNAP Project Board, commissioners of NHS neonatal services and in the public domain, primarily through an annual impact report. The improvement strategy, and underpinning objectives and metrics, will be adjusted as required in line with new and emerging evidence and quality improvement priorities.

Year-on-year improvement will be demonstrated through annual reporting and through interactive online reporting.

Additionally, the audit will monitor the number of; audit users engaging with workshops, accessing online reporting, downloading resources and interacting with social media posts.

As well as informal feedback sought and received, the audit will annually survey audit users to seek views on the healthcare improvement strategy alongside feedback on all other aspects of the audit.

It should be noted that the improvement goals and objectives set out in this strategy, although specific and measurable, are aspirational in nature and achieving them is contingent on many factors outside of the control of the audit and neonatal services.