

Proposed NNAP Measure: Probiotic use

What proportion of babies at highest risk of NEC receive probiotics for one or more days during their stay in a neonatal unit?

Rationale

NEC is a devastating complication of prematurity. Breastmilk use is known to be protective.¹ Probiotic use has been shown in multiple randomised controlled trials and meta-analyses to reduce the risk of NEC in preterm infants by approximately 30-45%.² Further, the use of probiotics has been shown to reduce mortality.^{2,3} Neonatal intensive care units in the UK have been using probiotics as a matter of routine since 2011, and their use is now widespread, but not universal.^{4,5} International guidance supports their use, and makes suggestions guiding product choice.³ Observational data from the US shows that, when probiotic use dropped from high levels due to regulatory changes affecting product availability, rates of NEC in affected units increased.⁶

More widespread use of probiotics has the potential to enable units to affect the proportion of babies affected by NEC. Both randomised trial data, and observational data suggest that this effect will be observed. Probiotics are comparatively cheap.

The measure seeks to support quality improvement by allowing units and networks to understand the extent to which eligible babies have received probiotics in the period under review.

The risk of NEC is higher at lower gestations. NNAP data show that the risk of NEC is approximately 1 in 30 (3.4%) at 29 weeks gestation, but under 1 in 50 at 30 weeks (1.9%) and 31 weeks (1.3%) gestation.⁷

Inclusion criteria

Denominator: Number of episodes for babies whose gestation at birth was less than 30 weeks who were nursed in a neonatal unit for more than 3 days, prior to 32 weeks gestationally corrected age. Babies whose admission days in a neonatal unit were at or after 32 weeks gestationally corrected age, or whose admission numbered 3 days or fewer are excluded from the denominator.

Numerator: Number of episodes forming part of the denominator where babies received probiotic products on one or more days.

Cohort: Babies discharged in the calendar year of analysis. This cohort aligns with the cohort used for the NNAP NEC measure.

Attribution

Babies will be attributed to any unit where they had an admission that is described in the denominator. Short admissions may be for acute surgical or other specialist review and may not be representative of routine care where prophylactic therapy such as probiotics should be considered.

Data will be reported annually, with frequent reporting of provisional data on the NNAP Restricted Access Dashboard.

Deriving outcomes

The unit of analysis will be the neonatal unit, and also of the network of which a unit forms part. NNAP recognises that a single baby, who was transferred between two units prior to 32 weeks gestation, may therefore contribute to reporting on probiotic use for more than one unit, and count more than once in the network level analysis.

Cases mix adjustment is not anticipated in the initial running of this measure.

Data source

Probiotic use will be described according to whether a product is described as administered according to the drugs administered fields in the BadgerNet system.

Relevant products are:

- Proprems
- Infloran
- Labinic

This list will be supplemented according to any products that meet the ESPGHAN definition of a probiotic.³

Stakeholder consultation

NNAP Methodology and Dataset Group, Neonatal Nutrition Network

Version history

Drafted by Sam Oddie, 05/11/2025

Minor revisions accounting for MADG feedback, 19/12/2025

Minor edits by Rachel Winch to clarify denominator, cohort and derivation of outcomes, 06/01/2026.

¹ Quigley M, Embleton ND, Meader N, McGuire W. Donor human milk for preventing necrotising enterocolitis in very preterm or very low-birthweight infants. Cochrane Database of Systematic Reviews 2024, Issue 9. Art. No.: CD002971. DOI: 10.1002/14651858.CD002971.pub6. Accessed 05 November 2025.

² Sharif S, Meader N, Oddie SJ, Rojas-Reyes MX, McGuire W. Probiotics to prevent necrotising enterocolitis in very preterm or very low birth weight infants. Cochrane Database of Systematic Reviews 2020, Issue 10. Art. No.: CD005496. DOI: 10.1002/14651858.CD005496.pub5. Accessed 05 November 2025.

³ van den Akker CHP, van Goudoever JB, Shamir R, Domellöf M, Embleton ND, Hojsak I, Lapillonne A, Mihatsch WA, Berni Canani R, Bronsky J, Campoy C, Fewtrell MS, Fidler Mis N, Guarino A, Hulst JM, Indrio F, Kolaček S, Orel R, Vandenplas Y, Weizman Z, Szajewska H. Probiotics and Preterm Infants: A Position Paper by the European Society for Paediatric Gastroenterology Hepatology and Nutrition Committee on Nutrition and the European Society for Paediatric Gastroenterology Hepatology and Nutrition Working Group for Probiotics and Prebiotics. *J Pediatr Gastroenterol Nutr.* 2020 May;70(5):664-680. doi: 10.1097/MPG.0000000000002655. PMID: 32332478.

⁴ Personal communication from Dr Sam Wallis sam.wallis@bthft.nhs.uk

⁵ Patel N, Evans K, Berrington J, Szatkowski L, Costeloe K, Ojha S, et al. How frequent is routine use of probiotics in UK neonatal units?. *BMJ Paediatrics Open.* 2023;7:e002012. <https://doi.org/10.1136/bmjpo-2023-002012>

⁶ Wala, S.J., Ragan, M.V., Pryor, E. et al. Contemporary use of prophylactic probiotics in NICUs in the United States: a survey update. *J Perinatol* **44**, 739–744 (2024). <https://doi.org/10.1038/s41372-024-01952-0>

⁷ National Neonatal Audit Programme 2023 Data: Extended Analysis Report. RCPCH: London. <https://www.rcpch.ac.uk/sites/default/files/2026-07/NNAP%20extended%20analysis%20report%20on%202023%20data.pdf>