

Stories

Giving preterm babies the best start from birth

29 April 2024 3 min read

Poor nutrition linked to life-long health problems

More than 8,000 babies are born extremely preterm (before 31 weeks' gestation) every year in the UK. Good nutrition from birth can prevent life-long problems linked to prematurity, such as growth disorders and learning difficulties. However, feeding such young babies is challenging.

While milk feeds are being established, nutrients to support their growth are provided via a fluid injected directly into a vein (parenteral nutrition).

Despite doctors' efforts, extremely preterm babies tend to grow more slowly than full-term babies. A lack of evidence meant that doctors didn't know the ideal formulation or approach for their parenteral nutrition.

A £740,000 NIHR award enabled researchers from Imperial College London to develop the [Nutritional Evaluation and Optimisation in Neonate \(NEON\) trial](#)

(<https://fundingawards.nihr.ac.uk/award/08/99/04>) to investigate. They aimed to provide much-needed evidence for safe and effective feeding, and inform consistent practice across the country.

Promoting a standard approach to clinical practice

Led by Dr Sabita Uthaya, Consultant and Professor of Practice in Neonatal Medicine, the NEON researchers worked with neonatal units in London and south-east England. They investigated two key uncertainties around protein levels and the types of fat used in parenteral feeds.

For this, they randomly assigned 168 very premature newborn babies to receive either the full amount or gradually increasing levels of protein. They also received either the usual or a new, more expensive mixture of fats.

They found that giving the full amount of protein from birth didn't improve babies' growth and may not be as safe as a gradual increase in protein. In addition, the new type of fat did not show any benefit over the usual type.

Published in the [American Journal of Clinical Nutrition](https://ajcn.nutrition.org/article/S0002-9165(23)04171-0/fulltext) ([https://ajcn.nutrition.org/article/S0002-9165\(23\)04171-0/fulltext](https://ajcn.nutrition.org/article/S0002-9165(23)04171-0/fulltext)), the researchers additionally concluded that a standard formulation could safely be used instead of individually made-up formulations, as was the practice at the time.

Creating a standard, safe approach to clinical practice

Informed by NEON's evidence, the [British Association of Perinatal Medicine's 2016 Framework for Practice](https://www.bapm.org/resources/42-the-provision-of-parenteral-nutrition-within-neonatal-services-a-framework-for-practice-2016) (<https://www.bapm.org/resources/42-the-provision-of-parenteral-nutrition-within-neonatal-services-a-framework-for-practice-2016>) and the 2020 [NICE guideline](https://www.nice.org.uk/guidance/ng194) (<https://www.bapm.org/resources/42-the-provision-of-parenteral-nutrition-within-neonatal-services-a-framework-for-practice-2016>) on neonatal parenteral feeding made practice-changing recommendations.

“Our trial delivered evidence that has improved the safety and consistency of care for very young, vulnerable babies. Furthermore, using a standard approach makes prescribing errors during feeding less likely, reduces variation in practice across units and delivers cost savings for the NHS.” Dr Sabita Uthaya, lead researcher for the NEON trial

The new recommendations led to all neonatal units in the London Operational Delivery Network switching to one of two standardised formulations (NEON or one containing more nutrients). Using standard formulations has already saved the NHS £150,000 per year in London alone. NICE's recommendations for their use across England will drive further savings for the NHS.

NEON's results were also included in two Cochrane reviews, providing evidence on the use of [lipid emulsions](https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD013163.pub2/full) (<https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD013163.pub2/full>) and [protein intake](https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD005949.pub2/full#CD005949-sec-0127) (<https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD005949.pub2/full#CD005949-sec-0127>) for parenterally fed preterm infants.

Following the NEON trial, a [separate](https://fundingawards.nihr.ac.uk/award/NIHR153935) (<https://fundingawards.nihr.ac.uk/award/NIHR153935>) study supported by the [Imperial NIHR Biomedical Research Centre](https://imperialbrc.nihr.ac.uk/) (<https://imperialbrc.nihr.ac.uk/>) was published in the [Archives of Diseases in Childhood, Fetal Neonatal Edition](https://fn.bmj.com/content/109/6/616) (<https://fn.bmj.com/content/109/6/616>).

It showed that using NEON's formulation didn't alter how many babies survived without major health problems, while more did suffer ill health when given the alternative, higher-nutrient

formulation. As such, NEON is providing doctors with the means to support the earliest days of premature babies' lives.

The study was funded by the [NIHR Efficacy and Mechanism Evaluation \(EME\) Programme](https://www.nihr.ac.uk/research-funding/funding-programmes/efficacy-and-mechanism-evaluation) (<https://www.nihr.ac.uk/research-funding/funding-programmes/efficacy-and-mechanism-evaluation>).

More information about the study is available on the [NIHR's Funding & Awards website](https://www.nihr.ac.uk/research-funding/funding-programmes/efficacy-and-mechanism-evaluation) (<https://www.nihr.ac.uk/research-funding/funding-programmes/efficacy-and-mechanism-evaluation>).

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