

*Topic Expert Group: Nutrition*

**Effective implementation of early parenteral feeding**

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*Target group*

Very preterm infants and parents

*User group*

Healthcare professionals, neonatal units, hospitals, and health services

*Statement of standard*

In very preterm infants (<32 weeks of gestation)/very low birthweight infants (<1500 g birthweight), parenteral nutrition should start on the first day after birth, usually using standard solutions, and should continue until sufficient enteral feeding is established.

*Rationale*

The goal is to provide appropriate nutrient supply and to prevent the early occurrence of nutrient deficits and growth faltering.

Very preterm infants/very low birthweight infants have high nutritional requirements per kilogram body weight but only limited reserves to withstand the interruption of placental nutrient supply at delivery. Establishing full enteral feeding may take many days, especially if the infant is ill. Early commencement of parenteral nutrition (PN) was shown to shorten the time interval until birth weight was regained. (1) PN should commence on the first day, as soon as the infant is admitted to the neonatal unit, to avoid interruption of nutrient supply and accumulation of nutrient deficits whilst enteral feeds are established. (1–5) PN should be continued until an adequate amount of enteral nutrition is established. (6)

PN with amino acids and glucose should be commenced in all very preterm infants and be complemented by intravenous lipid emulsions and micronutrients. (7–9) It is safe to start lipid emulsions on day one.(2,10,11) Attention should be paid to provide enough phosphorus and limit chloride delivery to prevent hypophosphatemia and metabolic acidosis, respectively. The delivery of adequate PN usually requires central venous access, although peripheral venous access may also be used, if a higher fluid intake is tolerated (see Patient safety & hygiene practice). (12)

Standardised PN solutions prepared for preterm infants and most ill term infants were shown to be safe, to contribute to cost savings, and to help to broadly implement initiation of nutrition on the first day. (1,9,13–15)

*Benefits*

*Short-term benefits*

- Reduced time of postnatal interruption of nutrient supply and negative nitrogen balance (2,4)
- Reduced accumulation of nutrient deficits and growth faltering (2–4)
- Facilitated gradual introduction and advancement of enteral feeds (consensus)
- Reduced hypophosphataemia and metabolic acidosis (consensus)
- Reduced risk of prescription errors (2,16)

### *Long-term benefits*

- Possible improved growth and development with optimal provision of nutrients (17,18)

### *Components of the standard*

<b>Component</b>	<b>Grading of evidence</b>	<b>Indicator of meeting the standard</b>
<b>For parents and family</b>		
1. Parents are informed by healthcare professionals about the benefits of early initiation of parenteral nutrition (PN).	B (High quality)	Clinical records, parent information sheet <sup>1</sup>
<b>For healthcare professionals</b>		
2. A unit guideline on infant nutrition, including PN, is adhered to by all healthcare professionals.	B (High quality)	Guideline
3. PN is commenced on the first day, soon after admission. (6)	A (Moderate quality)	Audit report
4. Training on infant nutrition, including the importance of nutrient requirements and early PN, is attended by all healthcare professionals working in the NICU.	B (High quality)	Training documentation
5. PN is carried out in consultation with a specialised nutrition support team.	B (Moderate quality)	Audit report
<b>For neonatal unit</b>		
6. A unit guideline on infant nutrition, including PN, is available and regularly updated.	B (High quality)	Guideline
7. The availability of central (or peripheral) venous access is ensured (see Patient safety & hygiene practice).	B (High quality)	Audit report
<b>For hospital</b>		
8. Training on infant nutrition, including the importance of nutrient requirements and early PN, is ensured.	B (High quality)	Training documentation

<sup>1</sup> The TEG Nutrition very much supports the need of good communication with families and regular sharing of key information, but it is not in favour of sharing information on each standard by a “parent information sheet”, which is term chosen by the Chair Committee. In our view, sharing multiple parent information sheets bears the risk of overloading families with a plethora of written information during a stressful time period, which may not be very helpful. We suggest to consider other means of sharing information.

9. Standardised PN solutions and lipid emulsions are available 24 hours per day 7 days a week, either from the pharmacy or via the use of stored bags kept in the neonatal unit.	A (Low quality) B (Moderate quality)	Audit report
10. A standardised procedure that ensures safe compounding practices and safe delivery of PN is established.	B (High quality)	Guideline
<b>For health service</b>		
11. A national guideline on infant nutrition, including PN, is available and regularly updated.	B (High quality)	Guideline

### *Where to go – further development of care*

<b>Further development</b>	<b>Grading of evidence</b>
For parents and family N/A	
For healthcare professionals N/A	
For neonatal unit N/A	
For hospital N/A	
For health service	
<ul style="list-style-type: none"> <li>Evaluate health economics of neonatal standard solutions produced by hospital pharmacies and by commercial providers. (14,19)</li> </ul>	A (Moderate quality)
<ul style="list-style-type: none"> <li>Invest in research to improve knowledge in and practice of parenteral nutrition (PN).</li> </ul>	B (Moderate quality)

### *Getting started*

<b>Initial steps</b>
For parents and family <ul style="list-style-type: none"> <li>Parents are verbally informed by healthcare professionals about the benefits of early initiation of parenteral nutrition (PN).</li> </ul>
For healthcare professionals <ul style="list-style-type: none"> <li>Attend training on infant nutrition, including the importance of nutrient requirements and early PN.</li> </ul>
For neonatal unit <ul style="list-style-type: none"> <li>Develop and implement a unit guideline on infant nutrition, including PN.</li> <li>Develop information material on PN for parents.</li> </ul>
For hospital <ul style="list-style-type: none"> <li>Source suitable standard solutions.</li> </ul>

- Support healthcare professionals to participate in training on infant nutrition, including the importance of nutrient requirements and early PN.

#### For health service

- Develop and implement a national guideline on infant nutrition, including PN.

### *Description*

PN can be delivered with solutions that are individually tailored for each infant, which may be necessary in infants with special requirements or those requiring long-term PN. Individual prescription and compounding of PN solutions has the major disadvantage that the start of PN is usually delayed by the additional time required to make solutions available, and frequently occurring limitations of availability on weekends and holidays. (1,15) The use of standardised PN solutions tailored to the needs of most preterm or ill term infants that are prepared by hospital pharmacies or commercial providers can enable PN initiation through 24 hours every day and hence improves nutrient delivery and quality of care.

Components of standardised PN solutions are prepared by hospital pharmacies and commercial providers, and hence carry less risk of microbial contamination and infection than mixing PN solutions on the ward. They also reduce the risk of prescription errors.

### *Source*

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### *Lifecycle*

3 years/next revision: 2025

### *Recommended citation*

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