AA 13. What is the recommended parenteral energy and macronutrient intake by postnatal age?

Source recommendation	Back to question list
Source guideline title and developer	NICE 2020 (chosen over ESPGHAN 2018 as more recent and EtD/SoF available) https://www.nice.org.uk/guidance/ng154/chapter/Recommendations#indications-for-and-timing-of-neonatal-parenteral-nutrition
Existing guidelines recommendation **Energy** https://www.nice.org.uk/guidance/ng154/evidence/c-energy-needs-pdf-7083230944 **Carbohydrate** https://www.nice.org.uk/guidance/ng154/evidence/d1-glucose-pdf-7083230945 **Protein** https://www.nice.org.uk/guidance/ng154/evidence/d2-amino-acids-pdf-7083230946 **Protein:Energy ratio** https://www.nice.org.uk/guidance/ng154/evidence/d7-ratio-of-nonnitrogen-energy-to-nitrogen-pdf-254996313877 **Lipid** https://www.nice.org.uk/guidance/ng154/evidence/d3-lipids-pdf-7083230947	**Energy** NICE (Consistent with ESPGHAN): If starting parenteral nutrition in the first 4 days after birth: give a starting range of 40 to 60 kcal/kg/day gradually increase (for example, over 4 days) to a maintenance range of 75 to 120 kcal/kg/day. If starting parenteral nutrition more than 4 days after birth give a range of 75 to 120 kcal/kg/day. **Carbohydrate** If starting parenteral nutrition in the first 4 days after birth: give a starting range of 6 to 9 g/kg/day glucose gradually increase (for example, over 4 days) to a maintenance range of 9 to 16 g/kg/day. If starting parenteral nutrition more than 4 days after birth give a range of 9 to 16 g/kg/day. **Protein** If starting parenteral nutrition in the first 4 days after birth: give a starting range of 1.5 to 2 g/kg/day amino acid and gradually increase (for example, over 4 days) to a maintenance range of 3 to 4 g/kg/day. If starting parenteral nutrition more than 4 days after birth: give a range of 3 to 4 g/kg/day. **Protein:Energy ratio** 23 to 34 kcal of total energy per g amino acid **Lipid** If starting parenteral nutrition in the first 4 days after birth give a starting range of 1 to 2 g/kg/day and gradually increase (for example, in daily increments of 0.5 to 1 g/kg/day) to a maintenance range of 3 to 4 g/kg/day. If starting parenteral nutrition more than 4 days after birth give a range of 3 to 4 g/kg/day.
Year published	2020 (NICE)
Search updated/assessment of new evidence	August 2025
GRADE certainty of evidence	Very low to high quality

EtD and SoF available	Yes (chosen over ESPGHAN 2018 as more recent and EtD/SoF available)		
Is the recommendation recent and credible	Yes AGREE II score 88%		
Assessment of suitability for adolopment			
Relevant to local setting?	Yes		
Acceptable without modification?	Yes		
Contextual factors different?	No		
EtD Criterion	**Summary of Local Evidence or Context**	**Judgement**	**Notes**
Problem	Suboptimal energy delivery in early neonatal care is associated with faltering growth and adverse neurodevelopment.	Priority	Standardised targets needed to avoid under- or overfeeding.
Desirable effects	Provides fuel for growth, organ function and metabolism.	Large	Essential for survival and development of very preterm infants.
Undesirable effects	Excessive energy can increase carbon dioxide production and risk hepatic steatosis.	Small	Dose titration and monitoring help mitigate risks.
Certainty of evidence	Guidelines based on physiology and clinical practice consensus; no RCTs.	Very low	Derived from indirect evidence and expert opinion.
Values and preferences	Clinicians and families value growth, survival, and development.	Possibly major variability	Widely accepted target ranges.
Balance of effects	Clear benefits with minimal harms when energy provision is appropriately titrated.	Favours intervention	No major safety concerns with recommended ranges.
Resources required	Requires compounding of parenteral nutrition with energy targets; standard practice.	Low	Readily feasible in neonatal units.
Certainty of resource evidence	Reliable cost and feasibility data from routine practice.	High	Consistent with established protocols.
Cost-effectiveness	No available studies	Favours intervention	Adequate early nutrition reduces long-term cost from complications and faltering growth.
Equity	Standardising energy delivery helps reduce variation in practice.	Probably increased	Supports standard care across units.
Acceptability	Acceptable to clinicians; supports clinical workflow and growth monitoring.	Yes	Forms part of nutrition protocols.
Feasibility	Easily implemented through standard intravenous nutrition formulations.	Yes	No additional resources required.
Judgement criteria for EtD			
Decision Type	☐ Adopted as is ☑ Adapted ☐ De novo recommendation required		
Explanation of adaptation	Wording adapted to reflect local parenteral nutrition practices, i.e. less gradual grading up over several days of protein and lipid and		

	to ensure alignment with recommended protein:energy ratio.
Final Recommendation	
Recommendation statement (adapted)	Initiate parenteral nutrition on day 1 and adjust for tolerance and clinical condition. **Energy** Give a starting range of 40 to 60 kcal/kg/day Gradually increase to a maintenance range of 75 to 120 kcal/kg/day If starting parenteral nutrition more than 4 days after birth give 75 to 120 kcal/kg/day. **Carbohydrate** Give a starting range of 6 to 9 g/kg/day (equivalent to ~4 to 6 mg/kg/min) glucose Gradually increase to a maintenance range of 9 to 16 g/kg/day (6 to 11 mg/kg/min) If starting parenteral nutrition more than 4 days after birth give 9 to 16 g/kg/day (6–11 mg/kg/min). **Protein** Give a starting range of 1.5 to 2 g/kg/day amino acid Increase to a maintenance range of 3 to 4 g/kg/day. If starting parenteral nutrition more than 4 days after birth give 3 to 4 g/kg/day. **Protein:Energy ratio** Ensure protein:energy ratio is 23 to 34 kcal of total energy per g amino acid **Lipid** Give a starting range of 1 to 2 g/kg/day and increase to 3 to 4 g/kg/day If starting parenteral nutrition more than 4 days after birth give a range of 3 to 4 g/kg/day.
Strength	Conditional
Certainty of evidence	Certainty: Very low
Basis for decision	Extremely preterm or growth-restricted infants may require closer monitoring and tailored progression.
Subgroup Considerations	Protocols for energy targets should be standardised.
Implementation Considerations	Ensure standard parenteral nutrition solutions that meet these recommendations are available.
Monitoring and Evaluation	Audit energy and macronutrient delivery vs. recommendations
Research Priorities	Early vs. delayed energy escalation Determine optimal energy and macronutrient intake for survival, growth and long-term development