AA 10. Is there evidence for addition of specific fatty acids?

Source recommendation	Back to question list
Source guideline title and developer	**ESPGHAN 2018** https://www.espen.org/files/ESPEN-Guidelines/Pediatrics/ESPGHAN_ESPEN_ESPR_CSPEN-guidelines-on-pediatric-parenteral-nutrition-Lipids.pdf **NICE 2020** https://www.nice.org.uk/guidance/ng154/chapter/Recommendations#constituents-of-neonatal-parenteral-nutrition **ESPGHAN 2022** Enteral Nutrition in Preterm Infants: ESPGHAN/ESPEN/ESPR/CSPEN Guidelines 2022, Koletzko et al. https://onlinelibrary.wiley.com/doi/10.1097/MPG.0000000000003642
Year published	2020
Search updated/assessment of new evidence	August 2025. No new evidence was identified.
Existing guidelines recommendation	**ESPGHAN 2018** In order to prevent essential fatty acid deficiency in preterm infants a lipid emulsion dosage providing a minimum linoleic acid intake of 0.25 g/kg/day can be given. This lipid emulsion dosage ensures an adequate intake of linolenic acid with all lipid emulsions currently registered for paediatric use. ESPGHAN recommends supplementation of long-chain polyunsaturated fatty acids (LC-PUFAs), especially DHA, in parenteral and enteral nutrition, although based on limited evidence. **NICE 2020** For preterm and term babies with parenteral nutrition-associated liver disease, consider giving a composite lipid emulsion rather than a pure soy lipid emulsion. **ESPGHAN (Enteral) 2022** Linoleic acid 385–1540 mg/kg/day α-Linolenic acid >55 mg/kg/day DHA 30–65 mg/kg/day ARA 30–100 mg/kg/day EPA <20 mg/kg/day
Strength of recommendation	Conditional
GRADE certainty of evidence	Low
EtD and SoF available	Yes NICE 2020 https://www.nice.org.uk/guidance/ng154/evidence/d4-lipid-emulsions-pdf-7083230948 ESPGHAN 2018

	Lapillonne A, et al., ESPGHAN/ESPEN/ESPR/CSPEN guidelines on pediatric parenteral nutrition: Lipids, Clinical Nutrition (2018), https://doi.org/10.1016/j.clnu.2018.06.94 https://www.espen.org/files/ESPEN-Guidelines/Pediatrics/ESPGHAN_ESPEN_ESPR_CSPEN-guidelines-on-pediatric-parenteral-nutrition-Lipids.pdf ESPGHAN 2022 https://cdn-links.lww.com/permalink/mpg/c/mpg_1_1_2022_11_28_embleton_228_sdc1.pdf
Is the recommendation recent and credible	Yes (chosen over ESPGHAN 2018 as more recent and EtD/SoF available) AGREE II score: Nice 2020 - 88% ESPGHAN 2018 - 79% ESPGHAN 2022 - 67%
Assessment of suitability for adolopment	
Is the recommendation relevant to local setting (population/ intervention/comparator)?	Yes
Are the judgements in the source EtD acceptable without modification?	No. The DINO (https://jamanetwork.com/journals/jama/fullarticle/183204 and https://pubmed.ncbi.nlm.nih.gov/25787990/), N3RO https://www.nejm.org/doi/10.1056/NEJMoa1611942?url_ver=Z39.88-2003&rfr_id=ori:rid:crossref.org&rfr_dat=cr_pub%20%200www.ncbi.nlm.nih.gov) and MOBYDIck (https://jamanetwork.com/journals/jama/fullarticle/2768134) trials conducted in Australia showed that for preterm infants, enteral DHA supplementation did not demonstrate consistent clinical benefits and may lead to harm highlighting a need for more rigorous, long-term research before definitive DHA supplementation recommendations for can be made.
Are any local contextual factors different (e.g. cost, equity, feasibility)?	Yes. An enteral DHA supplement is not currently available.

EtD Criterion	Summary of local evidence or context	Judgement	Notes
Problem	Suboptimal clinical and neurodevelopmental outcomes and inflammation in preterm infants may be linked to low levels of LC-PUFAs.	Priority	Early DHA provision may be important
Desirable effects	Potential benefit of LC-PUFAs on retinopathy of prematurity, vision and brain development.	Moderate	Potentially beneficial, especially in very preterm infants.
Undesirable effects	Decreased executive function and increased conduct problems in girls who received high dose DHA supplementation (DINO trial). BPD or death increased in the DHA supplemental group (N3RO and MOBYDIck trials)	Moderate	The DINO, N3RO and MOBYDIck trials showed that DHA enteral supplementation for preterm infants had no clinical benefits and may lead to potential harm.
Certainty of evidence	Very low certainty for LC-PUFAs, based on inconsistent and limited trials.	Very low	Based on observational data, small studies and expert consensus.
Values and preferences	Clinicians value neurodevelopmental outcomes but are cautious about adding components without strong evidence.	Possibly major variability	No known conflict between clinicians or families about desirability.
Balance of	Currently uncertain; possible benefit of LC-PUFAs.	Uncertain	Evidence for LC-PUFAs promising but uncertain.

effects			
Resources required	May increase cost of parenteral lipid emulsions or enteral supplements.	Moderate	Costs relate to choice of lipid emulsions
Certainty of resource evidence	Limited; pricing of LC-PUFA-enriched products is available, but outcome-based costing is lacking.	Low	Uncertainty due to lack of formal economic evaluations.
Cost-effectiveness	Not established for either intervention.	Uncertain	Further modelling studies required.
Equity	Routine supplementation could exacerbate inequity unless universally available.	Probably reduced	Access to enriched products varies between centres.
Acceptability	Likely acceptable if recommended in guidelines but requires careful communication with families.	Yes	Parental support likely if explained clearly and benefits made evident.
Feasibility	Feasible with commercial LC-PUFA lipid emulsions.	Yes	Commercial LC-PUFA emulsions are available.

Judgement criteria for EtD	
Decision Type	☐ Adopted as is ☑ Adapted ☐ De novo recommendation required
Explanation of adaptation	Adapted to reflect current prescribing practices, updated evidence from local RCTs and current lipid emulsions.
Final Recommendation	
Recommendation statement (adapted)	To prevent essential fatty acids deficiency a lipid emulsion dose providing a minimum linoleic acid intake of 0.25 g/kg/day should be given (~1.5 g/kg/day SMOFLipid). Parenteral LC-PUFA supplementation is recommended where LC-PUFA containing lipid emulsion products are available and cost-effective, e.g. SMOFLipid. Routine enteral long chain polyunsaturated fatty acid supplementation is not recommended.
Strength	Conditional
Certainty of evidence	Very low
Basis for decision	Based on ESPGHAN and local high quality RCTs. The N3RO and MOBYDIck trials reinforce that DHA-centric enteral supplementation for preterm infants does not demonstrate clinical benefits, may lead to potential harm and should be avoided.
Subgroup Considerations	Extremely preterm infants at risk of retinopathy of prematurity may benefit more from LC-PUFAs.
Implementation Considerations	~1.5 g/kg/day SMOFLipid ensures an adequate intake of linolenic acid. Standardisation of parenteral lipid emulsions across units would be beneficial.
Monitoring and Evaluation	Track clinical use and any adverse effects related to LC-PUFA products.
Research Priorities	High-quality trials of LC-PUFA supplementation in very preterm infants.