AA 34. What is the recommended enteral nutritional intake by postnatal age of energy, protein, carbohydrates, lipids, sodium, potassium and chloride, calcium, phosphorus and magnesium and trace elements: e.g. iron, selenium, iodine, chromium, copper, manganese, molybdenum, fluoride

Source recommendation	Back to question list
Source guideline title and developer	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
Existing guidelines recommendation	Energy: 115–140 (–160) kcal/kg/day Protein: 3.5–4.0 (–4.5) g/kg/day Carbohydrates: 11–15 (–17) g/kg/day Lipids: 4.8–8.1 g/kg/day Sodium 3.0–5.0 (–8.0) mmol/kg/day Chloride 3.0–5.0 (–8.0) mmol/kg/day Potassium 2.3–4.6 mmol/kg/day Calcium 3.0–5.0 mmol/kg/day Phosphorus 2.2–3.7 mmol/kg/day Magnesium 0.4–0.5 mmol/kg/day Iron 2.0–3.0 (–6.0) mg/kg/day Zinc 2.0–3.0 mg/kg/day Copper 120–230 µg/kg/day Selenium 7–10 µg/kg/day Manganese 1–15 µg/kg/day Iodine 11–55 µg/kg/day Chromium 0.03–2.25 µg/kg/day Molybdenum 0.3–5.0 µg/kg/day Thiamine (B1) 140–290 µg/kg/day Pantothenic acid 0.6–2.2 mg/kg/day Biotin 3.5–15 µg/kg/day Niacin 1100–5700 µg/kg/day Ascorbic acid (vitamin C), 17–43 mg/kg/day Riboflavin (B2) 200–430 µg/kg/day Pyridoxine 70–290 µg/kg/day Folic acid 23–100 µg/kg/day Cobalamin (B12) 0.1–0.6 µg/kg/day Vitamin A 1333–3300 IU/kg/day (400–1000 µg retinol ester/kg/day) Vitamin D 400–700 IU/kg/day (<1000) Vitamin E 2.2–11 mg/kg/day Vitamin K 4.4–28 µg/kg/day
Year published	2022
Search updated/assessment of new evidence	August 2025. No new evidence was identified.

Strength and direction of recommendation	Strong		
GRADE certainty of evidence	Low to moderate depending on nutrient		
Were EtD and SoF available?	Yes 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 AGREE II score: 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?	Yes		
Are any local contextual factors different (e.g. cost, equity, feasibility)?	Yes		
EtD Criterion	**Summary of local evidence or context**	**Judgement**	**Notes**
Problem	Micronutrient deficiencies in preterm infants are common and may impair growth, neurodevelopment and immune function.	Yes	Aotearoa New Zealand soil is low in iodine and selenium.
Desirable effects	Preventing deficiencies supports optimal growth, development and metabolic stability.	Small	
Undesirable effects	Over-supplementation may cause toxicity but can be minimised with monitoring.	Manageable	High serum copper or manganese may occur with excess intake especially in cholestasis.
Certainty of evidence	Based on physiological needs and expert opinion. Few RCTs.	Low to moderate	Most evidence from observational studies or expert panels, not interventional trials.
Values and preferences	Parents and clinicians value strategies that support growth and development safely.	Possibly some variation	Strong preference among clinicians for guidance on dosing ranges for specific trace elements.
Balance of effects	Favourable when standardised and monitored.	Favourable	Net benefit seen with standardised dosing and monitoring protocols across neonatal units.
Resources required	May require specific micronutrient preparations and local compounding.	Trivial	Logistics for acquiring trace elements and ensuring formulations vary by region.
Certainty of resource evidence	No available evidence	Low	Few cost analyses available; most data extrapolated from NICU expenditure reports.
Cost-effectiveness	Cost-effective if complications from nutrient deficiencies are avoided.	Favourable	Trace elements are low-cost; prevent costly complications like anaemia, bone disease.
Equity	Access to trace elements varies regionally in Aotearoa New Zealand.	Concern	Rural and smaller hospitals may lack consistent access to compounded preparations or dietitian input.
Acceptability	Acceptable if dosing is clear and supplies are reliable.	High	Protocols for routine supplementation are

			well-accepted if clear, with audit support.
Feasibility	Feasible with neonatal dietetic support and supply chain availability.	Variable	Practical in tertiary units; may require outreach and upskilling for regional teams.

Judgement criteria for EtD	
Decision Type	☑ Adopt as is ☐ Adapted ☐ De novo recommendation required
Explanation of adaptation	Adopted as is from ESPGHAN 2022 guidelines (excluding fluids, some vitamins and zinc, which are addressed elsewhere in our guideline). Minor local contextual comment added.
Final Recommendation	
Recommendation statement (adopted)	Provide enteral nutrient intakes for preterm infants according to ESPGHAN 2022 guidance. Use individualised plans considering gestational age, tolerance and clinical status. Monitor growth and biochemical markers routinely. As Aotearoa New Zealand soil is deficient in iodine, selenium and zinc, use mid to upper half of the recommended intake. Energy: 115–140 (–160) kcal/kg/day Protein: 3.5–4.0 (–4.5) g/kg/day Carbohydrates: 11–15 (–17) g/kg/day Lipids: 4.8–8.1 g/kg/day Sodium 3.0–5.0 (–8.0) mmol/kg/day Chloride 3.0–5.0 (–8.0) mmol/kg/day Potassium 2.3–4.6 mmol/kg/day Calcium 3.0–5.0 mmol/kg/day Phosphorus 2.2–3.7 mmol/kg/day Magnesium 0.4–0.5 mmol/kg/day Iron 2.0–3.0 (–6.0) mg/kg/day Copper 120–230 µg/kg/day Selenium 7–10 µg/kg/day Manganese 1–15 µg/kg/day Iodine 11–55 µg/kg/day Chromium 0.03–2.25 µg/kg/day Molybdenum 0.3–5.0 µg/kg/day Thiamine (B1) 140–290 µg/kg/day Pantothenic acid 0.6–2.2 mg/kg/day Biotin 3.5–15 µg/kg/day Niacin 1100–5700 µg/kg/day Ascorbic acid (vitamin C), 17–43 mg/kg/day Riboflavin (B2) 200–430 µg/kg/day Pyridoxine 70–290 µg/kg/day Folic acid 23–100 µg/kg/day

	Cobalamin (B12) 0.1–0.6 µg/kg/day Vitamin A 1333–3300 IU/kg/day (400–1000 µg retinol ester/kg/day) Vitamin D 400–700 IU/kg/day (<1000) Vitamin E 2.2–11 mg/kg/day Vitamin K 4.4–28 µg/kg/day
Strength	Conditional
Certainty of evidence	Low to moderate
Basis for decision	European consensus based on evidence available, physiological needs and prevention of known clinical complications
Subgroup Considerations	Infants <28 weeks or with comorbidities may need higher nutrition intakes.
Implementation Considerations	Availability of specific micronutrients and trained staff to support implementation may vary.
Monitoring and Evaluation	Audit nutritional intakes, biochemical and anthropometric outcomes regularly.
Research Priorities	More data needed on long-term outcomes of specific micronutrient intakes and optimal timing, specifically for iodine, selenium and zinc.