



CONSENSUS RECOMMENDATIONS FOR MICRONUTRIENT ADMINISTRATION TO PARENTERAL NUTRITION

Evidence-based documents published by ASPEN¹, AuSPEN^{2,3} and ESPEN⁴ highlight the need to provide micronutrients daily in conjunction with Parenteral Nutrition to prevent the development of deficiencies.



INTERNATIONAL GUIDELINES ALL AGREE ON KEY FACTORS⁵



Micronutrients are essential components of PN, without which the nutrition provided is metabolically incomplete.



Micronutrient prescriptions should be individualized to the clinical requirement of the patient.



Micronutrient status should be monitored in long-term PN patients.

COMPARISON OF CONSENSUS RECOMMENDATIONS FOR DAILY MICRONUTRIENT ADMINISTRATION

	2012 ASPEN consensus statement ¹ North America	2016 AuSPEN vitamin guidelines ³ 2014 AuSPEN trace element guidelines ² Australia and New Zealand	2016 ESPEN CIF guidelines ⁶ Europe	Consensus recommendation
Vitamin A/retinol	3300 IU (990 µg RE)	3500 IU (1050 µg RE)	No recommendation	3300–3500 IU (990–1050 µg RE)
Vitamin D/cholecalciferol	200 IU (5µg)	200 IU (5 µg)	No recommendation	200 IU (5µg)
Vitamin E/alpha tocopherol	10 mg	10 mg	No recommendation	10 mg
Vitamin K/phytomenadione	150 µg	No recommendation made: Individual assessment recommended	No recommendation	Individual assessment
Vitamin B1 /thiamin	6 mg	3 mg	No recommendation	3–6 mg
Vitamin B2 /riboflavin	3.6 mg	4–5 mg	No recommendation	3.6–5 mg
Vitamin B3 /niacin	40 mg	40–47 mg	No recommendation	40–47 mg
Vitamin B5 /pantothenic acid	15 mg	16–17 mg	No recommendation	15–17 mg
Vitamin B6 /pyridoxine	6 mg	3 mg	No recommendation	3–6 mg
Vitamin B12 /cobalamin	5 µg	5–6 µg	No recommendation	5–6 µg
Vitamin B9 /folic acid	600 µg	400 µg	No recommendation	400–600 µg
Vitamin C/ascorbic acid	200 mg	110–150 mg	No recommendation	110–200 mg
Biotin	60 µg	60 µg	No recommendation	60 µg
Zinc (Zn)	39–76 µmol (2.5–5 mg)	50–100 µmol (3.2–6.5mg)	38–61 µmol (2.5–4mg)	39–100 µmol (2.5–6.5 mg)
Copper (Cu)	4.7–7.8 µmol (300–500 µg)	5–8 µmol (317–508 µg)	4.7–9.6 µmol (0.3–0.5mg)	4.7–9.6 µmol (300–610µg)
Selenium (Se)	0.75–1.25 µmol (60–100 µg)	0.75–1.25 µmol (60–100 µg)	0.2–0.8 µmol (16–63 µg)	0.25–1.25 µmol (20–100 µg)
Manganese (Mn)	1 µmol (55 µg)	1 µmol (55 µg)	1.1–1.8 µmol (60–100 µg)	1–1.8 µmol (55–100 µg)
Iron (Fe)	No routine recommendation in the United States	20 µmol (1.1 mg) may not be necessary	17.9 mmol (1 mg)	1–1.2mg in those recommending Fe
Chromium (Cr)	0.2–0.3 µmol (10–15 µg)	0.2–0.3µmol (10–15 µg) may not be necessary	No recommendation	0.2–0.3µmol (10–15 µg)
Molybdenum (Mo)	No routine recommendation in the United States	0.2 µmol (19 µg) probably not necessary	No recommendation	No recommendation
Iodine (I)	No routine recommendation in the United States	1 µmol (126 µg)	0.5–1.2 µmol (70–150 µg)	0.5–1.2 µmol (70–150 µg) in those recommending it

TABLE HIGHLIGHTS⁵



Consensus recommendations for routine micronutrient administration via PN formulations from table are largely consistent with previous recommendations.



Toxicity can occur due to increased administration of fat-soluble vitamins provided by nutrition support. Resolution of micronutrient derangements can be resolved with more modest replacement in the majority of clinical cases.



Doses provided at significantly higher than routine maintenance doses outlined in the consensus recommendations should be considered as a short-term intervention, the results of which should be monitored.

1. Vanek VW, Borum P, Buchman A, et al. A.S.P.E.N. position paper: recommendations for changes in commercially available parenteral multivitamin and multi-trace element products. *Nutr Clin Pr.* 2012;27:440-491. 2. Osland EJ, Ali A, Isenring E, Ball P, Davis M, Gillanders L. Australasian Society for Parenteral and Enteral Nutrition guidelines for supplementation of trace elements during parenteral nutrition. *Asia Pac J Clin Nutr.* 2014;23(August):545-554. 3. Osland EJ, Ali A, Nguyen T, Davis M, Gillanders L. Australasian Society for Parenteral and Enteral Nutrition (AuSPEN) adult vitamin guidelines for parenteral nutrition. *Asia Pac J Clin Nutr.* 2016;25:636-650. 4. Singer P, et al., *Clin Nutr* 2019;38(1):48-79. 5. Blaauw R, Osland E, Sriram K, et al. Parenteral Provision of Micronutrients to Adult Patients: An Expert Consensus Paper. *JPEN* 2019;43:S5-S23. 6. Pieroni L, et al., *Clinical Nutrition* 35 (2016) 247e307.

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