

ANNEXURE A

TRACE ELEMENTSⁱ

Trace element	Recommended daily allowance	Role	Signs/symptoms of deficiency
Copper	1.5 – 3 mg/day	Component of proteins and enzymes	<ul style="list-style-type: none"> • Pancytopenia • Skeletal abnormalities • Myocardial disease • Depigmentation of hair • Neurologic abnormalities
Chromium	20 – 50 mcg/day	Maintaining normal glucose metabolism Acts as a cofactor for insulin	<ul style="list-style-type: none"> • Glucose intolerance (may be refractory to insulin) • Hyperlipidaemia • Elevated plasma free fatty acids • Weight loss • Peripheral neuropathy
Zinc	Men: 15 mg/day Women 12 mg/day	Component of enzymes involved in most major metabolic pathways.	<ul style="list-style-type: none"> • Eye and skin lesions • Growth retardation • Alopecia • Diarrhoea
Selenium	Men: 70mcg/day Women: 55mcg/day	Antioxidant Regulation of thyroid hormone action	<ul style="list-style-type: none"> • Cardiomyopathy • Skeletal muscle myopathy • Macrocytic anaemia • Abnormalities in skin and nails
Manganese	2-5 mg	Component of certain enzymes	<ul style="list-style-type: none"> • Not well documented

VITAMINSⁱⁱ

	Required daily supplementation	Role	Conditions where higher supplementation may be needed
Vitamin A	3500 IU	Needed for vision, healthy skin and mucous membranes, bone and tooth growth, immune system health	<ul style="list-style-type: none"> • Fat malabsorption • SBS • Chronic alcohol
Vitamin D	200 IU	Needed for proper absorption of calcium; stored in bones	
Vitamin E	10 mg	Antioxidant; protects cell walls	<ul style="list-style-type: none"> • SBS • Critically ill • SIRS
Vitamin K		Needed for proper blood clotting	<ul style="list-style-type: none"> • SBS in the absence of a colon • Primary biliary sclerosis • During pregnancy • Reduced BMD
Vitamin B1	3 mg	Part of an enzyme needed for energy metabolism; important to nerve function	<ul style="list-style-type: none"> • Alcohol dependence • Dialysis • HIV/AIDS • Malnutrition • Malabsorption • Hypermetabolism
Vitamin B2	4-5 mg	Part of an enzyme needed for energy metabolism; important for normal vision and skin health	<ul style="list-style-type: none"> • Nil
Vitamin B3	40-47 mg	Part of an enzyme needed for energy metabolism; important for nervous	<ul style="list-style-type: none"> • Malabsorption

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	Required daily supplementation	Role	Conditions where higher supplementation may be needed
		system, digestive system, and skin health	<ul style="list-style-type: none"> • Large effluent losses via dialysis • Alcohol
Vitamin B5	16-17 mg	component of coenzyme A (CoA), which plays a critical role in the utilization of fats and carbohydrates in energy production, as well as in the manufacture of adrenal hormones and red blood cells.	<ul style="list-style-type: none"> • Nil
Vitamin B6	3 mg	Part of an enzyme needed for protein metabolism; helps make red blood cells	<ul style="list-style-type: none"> • Pregnancy • Autoimmune disorders • Coeliac disease • IBD • Malabsorption • Alcohol • Renal impairment
Vitamin B12	5-6 mg	Part of an enzyme needed for making new cells; important to nerve function	<ul style="list-style-type: none"> • Gastric resection • Older age • Atrophic gastritis • Pernicious anaemia • Chronic pancreatitis • Cystic fibrosis • Bacterial overgrowth • Ileal resection
Folate	400 mcg	Part of an enzyme needed for making DNA and new cells, especially red blood cells	<ul style="list-style-type: none"> • Pregnancy • Malabsorption • Alcohol
Vitamin C	110-150 mg	Antioxidant; part of an enzyme needed for protein metabolism; important for immune system health; aids in iron absorption	<ul style="list-style-type: none"> • Oxidative stress • 3rd trimester of pregnancy • Malabsorption • Haemodialysis • Burns • Trauma • Critically ill
Biotin	60 mcg	Part of an enzyme needed for energy metabolism	<ul style="list-style-type: none"> • Nil
Carnitine		plays a critical role in energy production. It transports long-chain fatty acids into the mitochondria so they can be oxidized (“burned”) to produce energy.	<ul style="list-style-type: none"> • Liver disease, +/- SBS or ECF • CKD • Malnutrition
Choline		needed for neurotransmitter synthesis (acetylcholine), cell-membrane signaling (phospholipids), lipid transport (lipoproteins), and methyl-group metabolism (homocysteine reduction).	<ul style="list-style-type: none"> • Pregnancy • Possibly on PNALD/IFALD

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ⁱ Jin J, Mulesa L, Rouillet MC. Trace Elements in Parenteral Nutrition: Considerations for the Prescribing Clinician *Nutrients* 2017, 9, 440; doi:10.3390/nu9050440.

ⁱⁱ 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(3):636-650.