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Nutrient Reference Values for Australia and New Zealand
Including Recommended Dietary Intakes

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POTASSIUM

BACKGROUND

Potassium is the major cation of intracellular fluid and an almost constant component of lean body tissues. A high intracellular concentration of potassium is maintained by the Na^+/K^+-ATPase pump. The movements of potassium out of cells and sodium into cells changes the electrical potential during depolarisation and repolarisation of nerve and muscle cells.

Leafy green vegetables, vine fruit such as tomatoes, cucumbers, zucchini, eggplant and pumpkin, and root vegetables are particularly good sources of potassium. It is also moderately abundant in beans and peas, tree fruits such as apples, oranges and bananas, milks and yoghurts and meats. In unprocessed foods, potassium occurs mainly with bicarbonate-generators like citrate. Potassium added during processing is generally as potassium chloride. About 85% of potassium is absorbed (Holbrook et al 1984).

Most of the ingested potassium (80–90%) is excreted in urine, the rest being excreted in faeces and sweat (Holbrook et al 1984, Pietinen 1982). Potassium filtered in the glomeruli of the kidney is mostly reabsorbed. The potassium in urine results from secretion into the cortical collecting duct under control of the hormone, aldosterone. High plasma levels of potassium stimulate release of aldosterone to increase the secretion of potassium.

Potassium requirements can be affected by climate and physical activity, the use of diuretics, and the intake of other electrolytes, notably sodium. Potassium blunts the effect of sodium chloride on blood pressure, mitigating salt sensitivity and lowering urinary calcium excretion (Whelton et al 1997). Given this interrelatedness, requirement for potassium depends to some extent on dietary sodium, however, the ideal sodium:potassium intake ratio is not sufficiently established to use in setting requirements.

It has been hypothesised that high protein-low potassium diets could induce a low-grade metabolic acidosis that could induce demineralisation of bone, osteoporosis and kidney stones (Barzel 1995, Lemann et al 1999) and epidemiological and metabolic studies have supported this suggestion (Maurer et al 2003, Morris et al 2001, New et al 1997, Sebastian et al 1994, Tucker et al 1999).

Potential indicators for potassium requirements include potassium balance, serum potassium and clinical endpoints, such as the levels required to avoid hypokalemia, high blood pressure, cardiovascular disease, bone demineralisation or kidney stones. However, dose-response trials are either not available for many of these endpoints, or are insufficient to estimate average requirements.

1 mmol potassium = 39 mg potassium

RECOMMENDATIONS BY LIFE STAGE AND GENDER

Infants	**AI**	**Potassium**
0–6 months	**400 mg/day**	**(10 mmol)**
7–12 months	**700 mg/day**	**(18 mmol)**

***Rationale*:** The AI for 0–6 months was calculated by multiplying the average intake of breast milk (0.78 L/day) by the average concentration of potassium (500 mg/L), and rounding. For 7–12 months, an average breast milk volume of 0.6 L/day and concentration of 500 mg/L give an intake of 300 mg/day, to which is added 440 mg/day from complementary foods as determined by the US CSFII survey (FNB:IOM 2004).

Children & adolescents	AI	Potassium
All		
1–3 yr	**2,000 mg/day**	**(50 mmol)**
4–8 yr	**2,300 mg/day**	**(60 mmol)**
Boys		
9–13 yr	**3,000 mg/day**	**(76 mmol)**
14–18 yr	**3,600 mg/day**	**(92 mmol)**
Girls		
9–13 yr	**2,500 mg/day**	**(64 mmol)**
14–18 yr	**2,600 mg/day**	**(66 mmol)**

***Rationale*:** There is very little evidence about requirements in children. The recommendations are derived from the intakes from the appropriate age group data from the Australian (ABS 1998) and New Zealand (MOH 2003) National Nutrition Surveys on a population-weighted basis.

Adults	AI	Potassium
Men		
19–30 yr	**3,800 mg/day**	**(100 mmol)**
31–50 yr	**3,800 mg/day**	**(100 mmol)**
51–70 yr	**3,800 mg/day**	**(100 mmol)**
>70 yr	**3,800 mg/day**	**(100 mmol)**
Women		
19–30 yr	**2,800 mg/day**	**(72 mmol)**
31–50 yr	**2,800 mg/day**	**(72 mmol)**
51–70 yr	**2,800 mg/day**	**(72 mmol)**
>70 yr	**2,800 mg/day**	**(72 mmol)**

***Rationale*:** Whilst there are some experimental data on potassium intakes in relation to blunting of salt sensitivity (Morris et al 1999b) and some supportive epidemiological evidence on renal stones (Curhan et al 1993, 1997, Hirvonen et al 1999) these were considered insufficient basis for setting an AI as the sodium blunting experiment was carried out in males only and much of the key data related to salt sensitive African American males. The AI was therefore set at the highest median intake for the various age categories of adult males and females.

Pregnancy	AI	Potassium
14–18 yr	**2,800 mg/day**	**(72 mmol)**
19–30 yr	**2,800 mg/day**	**(72 mmol)**
31–50 yr	**2,800 mg/day**	**(72 mmol)**

***Rationale*:** Potassium accretion in pregnancy is small, so the AI is set at the same level as that for adult females.

Lactation	AI	Potassium
14–18 yr	**3,200 mg/day**	**(82 mmol)**
19–30 yr	**3,200 mg/day**	**(82 mmol)**
31–50 yr	**3,200 mg/day**	**(82 mmol)**

***Rationale*:** The lactation AI is set at that for adult females plus an allowance for potassium secreted in breast milk.

UPPER LEVEL OF INTAKE - POTASSIUM

No ULs have been set for potassium from dietary sources.

For infants 0–12 months, the source of intake should be breast milk, formula and food only. For children, adolescents and adults, including pregnant and lactating women, supplements should be taken only under medical supervision.

***Rationale*:** High potassium intakes can cause gastrointestinal discomfort and stress that may include ulceration and perforation (Lambert & Newman 1980, Leijonmarck & Raf 1985, Pietro & Davidson 1990, Sinar et al 1986). Arrhythmia can also arise from the resulting hyperkalaemia (Haddad & Strong 1975, Kallen et al 1976, Snyder et al 1975, Su et al 2001, Ray et al 1999, Wetli & Davis 1978).

However, in otherwise healthy people, there have been no reports of hyperkalaemia from acute or chronic ingestion of potassium naturally occurring in food, so a UL for foods has not been set.

Because of its well-documented potential for toxicity, supplemental potassium should only be provided under medical supervision. For infants, intake should be limited to potassium occurring in breast milk, formula and complementary foods.

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