

Intakes and sources of Vitamin K₁ in Irish pre-school children aged 1–4 years

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Vitamin K₁ has a key role in blood coagulation, bone metabolism and the regulation of calcification⁽¹⁾. There are currently insufficient data available to set an average requirement for vitamin K₁ for children however the European Food Safety Authority (EFSA) has recently proposed an Adequate Intake (AI) of 1.0 µg/kg bodyweight per day based on observed intakes⁽¹⁾. Few data are available on vitamin K₁ intakes in young children. The objective of this analysis was to estimate the intake and sources of vitamin K₁ in Irish pre-school children aged 1–4 years (n = 500) using data from the Irish National Pre-School Nutrition Survey (2010–2011) (www.iuna.net). Dietary intake data were collected using a 4d weighed food record and the vitamin K₁ content of foods was primarily determined using data from the UK food composition tables (COFID)⁽²⁾. For certain foods where vitamin K₁ values were not available in COFID, the US⁽³⁾ and Danish food composition tables⁽⁴⁾ and published papers were used to assign suitable vitamin K₁ values. The vitamin K₁ content of composite dishes and retail products were calculated based on their ingredients. Usual intakes of vitamin K₁ were calculated via the NCI-method⁽⁵⁾ using SAS Enterprise Guide. Body weight (kg) was measured in the participants' homes by trained researchers. Differences in vitamin K₁ intakes were assessed using a Kruskal-Wallis test (for non-normal data) and a Wilcoxon two sample test was used for post-hoc analysis. The mean daily intakes of vitamin K₁ were 33, 30, 28 and 32 µg for 1, 2, 3 and 4 year olds, respectively. Adjusted for bodyweight, intakes (µg/kg/d) were 2.9, 2.1, 1.8 and 1.8 respectively showing a decrease (p < 0.001) with increasing age from age 1y to 3–4y respectively. Approximately 82 % of children had intakes above the AI of 1.0 µg/kg bodyweight per day. The table below reports the contribution (%) of food groups to vitamin K₁ intake in Irish children aged 1–4 years, by age.

Food group	1 year olds (n = 126)	2 year olds (n = 124)	3 year olds (n = 126)	4 year olds (n = 124)
	%			
Veg & veg dishes	26.0	24.0	26.2	31.9
Green vegetables	14.7	12.5	15.7	20.1
Other vegetables	11.4	11.5	10.6	11.8
Fruit & fruit juices	15.7	17.4	17.1	15.1
Apples & Pears	3.1	6.7	5.9	6.8
Grapes	3.1	3.9	3.9	2.6
Fruit purees & smoothies	3.4	2.8	2.8	1.9
Fruit juices	0.4	0.3	0.6	0.6
Other fruits	5.7	3.8	3.9	3.2
Milk & yogurt	24.8	14.4	8.1	5.7
Fortified infant and child formula	15.7	7.9	2.0	0.8
Milk	8.3	5.9	5.4	4.3
Yogurt	0.8	0.6	0.7	0.7
Meat & meat products	10.4	11.3	10.9	10.2
Potatoes & potato products	4.1	5.4	7.2	6.3
Biscuits cakes & pastries	3.9	4.7	5.7	6.4
Butter, spreading fats & oils	2.7	5.2	5.1	5.1
Other	12.4	17.5	19.7	19.3

The main source of vitamin K₁ for all ages was 'vegetable and vegetable dishes' (24–32 %, range across age), of which 13–20 % came from green vegetables. Other important sources were fruit & fruit juices (15–17 %), meat (10–11 %) and milk (6–25 %). The contribution from milk decreased significantly (p < 0.001) with increasing age from age 1y to age 3–4y primarily due to consumption of fortified infant and child formula in the earlier years⁽⁶⁾. Overall, these findings suggest that intakes of vitamin K₁ are adequate for Irish pre-school children.

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