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## Vitamin K<sub>1</sub> intakes and adequacy in 18–64-year-old Irish adults over a recent decade

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Vitamin K has important physiological functions which relate to coagulation, bone turnover, and regulation of calcification<sup>(1)</sup>. We had previously shown that 52 % of a nationally representative sample of the adult Irish population from 1997–1999 had vitamin K<sub>1</sub> intakes below the 1 µg/kg body weight required for coagulation, and only 17 % and 27 % of men and women, respectively met the current US adequate intakes for vitamin K (120 and 90 µg/d, respectively)<sup>(2)</sup>. The objective of this analysis is to measure the intake and adequacy of vitamin K<sub>1</sub> intake in the most recent nationally representative sample of Irish adults (National Adult Nutrition Survey 2008–2010) (www.iuna.net). This survey also had blood sampling which allowed us measure a biochemical measure of vitamin K status (serum %ucOC by immunoassay) for the first time in a representative sample. A 4-day semi-weighed food diary was used to collect food intake data of 1500 adults aged 18 and over, but for comparison with the 1997–1999 survey, this analysis was limited to those adults aged 18–64 years. Analysis of dietary intake data was carried out using WISP<sup>®</sup> based on McCance and Widdowson's The Composition of Foods<sup>(3)</sup>. The mean daily intake of vitamin K<sub>1</sub> only increased very modestly from 79.5 to 88.6 µg/d over the ten year window, and over half (52 %) of the current mean daily intake came from vegetables and vegetable dishes (similar to the 48 % in 1999). The degree of inadequacy of intake of vitamin K<sub>1</sub> (i.e., intakes <1 µg/kg body weight) has also remained relatively static at about 52 %. Only 21 % and 35 % of men and women, respectively, had intakes below the US adequate intake estimates<sup>(1)</sup>. Vitamin K<sub>1</sub> intake was negatively, albeit weakly, correlated with serum %ucOC ( $R = -0.122$ ;  $P < 0.001$ ;  $n = 691$ ). The mean serum %ucOC was 40.9 and the reference interval for Irish adults was 12.9–77.1 %.

	National Nutrition Survey					
	1997–1999			2008–2010		
	All	Men	Women	All	Men	Women
Vitamin K <sub>1</sub> intake (µg/d):						
<i>n</i>	1379	662	717	1274	634	640
Mean	79.5	84.2	75.2	88.6	90.8	86.5
SD	44.2	48.7	39.1	58.5	58.2	58.8
Median	70.9	73.7	68.6	75.1	78.3	71.7
5 <sup>th</sup> Percentile	28.5	30.0	27.9	27.1	27.9	26.6
95 <sup>th</sup> Percentile	157.2	162.2	146.0	201.0	195.9	204.6
Serum %ucOC:						
Mean	–	–	–	40.9*	40.4	41.4
Reference interval	–	–	–	12.9–77.1	12.4–76.5	14.2–77.4

%ucOC, percentage of serum osteocalcin in undercarboxylated form; index of vitamin K status

\*Based on an *n* of 691, 339, and 352 for All, Men and Women, respectively.

The mean daily intake of Irish adults seems to be relatively static over time, but a significant number of men and women have intakes which are likely inadequate. Strategies to improve vitamin K intakes by the adult Irish population should be further explored.

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1. Institute of Medicine (2001) *Dietary Reference Intakes for Vitamin A, Vitamin K, Arsenic, Boron, Chromium, Copper, Iodine, Iron, Manganese, Molybdenum, Nickel, Silicon, Vanadium, and Zinc* Washington DC: National Academies Press.
2. Duggan P, Cashman KD, Flynn A, *et al.* (2004) *Br J Nutr* **92**, 151–158.
3. Food Standards Agency (2002) *McCance and Widdowson's The Composition of Foods, Fifth & Sixth Editions, including supplemental volumes*. Cambridge: Royal Society of Chemistry.

