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## Low prevalence of vitamin D deficiency in Irish preschoolers despite northerly latitude and high prevalence of inadequate intakes

C. ní Chaoimh<sup>1,2</sup>, E.K. McCarthy<sup>1,2</sup>, D.M. Murray<sup>2,3</sup>, L.C. Kenny<sup>2,4</sup>, A.D. Irvine<sup>5</sup>,  
J.O'B. Hourihane<sup>3</sup> and M. Kiely<sup>1,2</sup>

<sup>1</sup>Cork Centre for Vitamin D and Nutrition Research, School of Food and Nutritional Sciences, <sup>2</sup>The Irish Centre for Fetal and Neonatal Translational Research (INFANT), <sup>3</sup>Department of Paediatrics and Child Health, <sup>4</sup>Department of Obstetrics and Gynaecology, University College Cork and <sup>5</sup>Department of Clinical Medicine, Trinity College Dublin, Ireland

While reports of inadequate vitamin D intakes among young children are widespread<sup>(1–3)</sup>, data on the prevalence of vitamin D inadequacy and deficiency are inconsistent. To date, there are few data on vitamin D status in young Irish children. We aimed to quantify vitamin D intake and serum 25-hydroxyvitamin D [25(OH)D] concentrations in children aged 2 years living in Ireland (51°N).

Serum 25(OH)D<sub>3</sub>, 25(OH)D<sub>2</sub> and 3-*epi*-25(OH)D<sub>3</sub> were analysed using UPLC-MS/MS in 742 children participating in the Cork BASELINE Birth Cohort Study. Non-consecutive, two-day weighed food diaries were collected in 468 children and 295 children had both a food diary and their 25(OH)D concentrations measured.

Mean (SD) total 25(OH)D concentrations were 63.4 (20.4) nmol/L [54.6 (20.0) in winter and 71.2 (17.5) nmol/L in summer]. During winter (Nov–Apr), 45.1 % were < 50 nmol/L, which decreased to 10.4 % in summer. The prevalence of vitamin D deficiency (< 30 nmol/L) was 4.6 % (8.6 % in winter, 1.0 % in summer). The C-3 epimer was present in all samples. The majority (98.9 %) of mothers were Caucasian and almost all (96.7 %) mothers reported applying sunscreen to their child's skin when they go out during the summer. With a mean daily vitamin D intake (MDI) of 3.5 µg/d, 96 % had intakes below the Estimated Average Requirement [EAR] of 10 µg/d<sup>(4)</sup>, 78 % were < 5 µg/d and 13 % were < 1 µg/d. Children who did not use a supplement or consume a vitamin D-fortified food had an MDI of 1.2 µg/d. The highest intakes were among consumers of vitamin D-fortified formula (7.2 µg/d) and users of vitamin D-containing supplements (8.1 µg/d). While 94 % of children sampled during winter had intakes below the EAR, the corresponding prevalence < 40 nmol/L was 24 %, which is the threshold on which the EAR is based<sup>(4)</sup>.

In conclusion, we show a low prevalence of vitamin D deficiency among Irish 2-year olds despite a high prevalence of inadequate vitamin D intakes, a high latitude and self-reported adherence to sun-safe recommendations. The current EAR may be too high for young children. Nevertheless, almost half of children had a 25(OH)D concentration < 50 nmol/L during winter, indicating the need for strategies to improve vitamin D intakes in this age-group.

This work was supported by the National Children's Research Centre. Ethical approval was granted by the Clinical Research Ethics Committee of the Cork Teaching Hospitals, ref ECM 5 (9) 01/07/2008 and the study is registered with the United States National Institutes of Health Clinical Trials Registry (<http://www.clinicaltrials.gov>), ID: NCT01498965. The study was conducted according to the guidelines laid down in the Declaration of Helsinki.

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