

Dietary intake of vitamin D amongst UK adolescents

J. J. See¹, L. Edwards², M. D. Farrar², R. Kift³, A. R. Webb³, J. L. Berry⁴, M. Z. Mughal⁵
and L. E. Rhodes²

¹Manchester Medical School, University of Manchester, Manchester M13 9PL, UK, ²Photobiology Unit, Dermatology Centre, University of Manchester, Salford Royal NHS Foundation Hospital, Salford M6 8HD, UK, ³School of Earth, Atmospheric and Environmental Sciences, University of Manchester, Manchester M13 9PL, UK, ⁴Vitamin D Research Laboratory, Institute of Human Development, University of Manchester, Manchester Royal Infirmary, Manchester M13 9WL, UK and ⁵Department of Paediatric Endocrinology, Royal Manchester Children's Hospital, Manchester M13 9WL, UK

Vitamin D is important during the adolescent bone growth spurt, when ~50% of bone mineral accrual occurs, influencing present and future bone health⁽¹⁾. Commonly known as the 'sunshine vitamin', vitamin D is predominately obtained through cutaneous synthesis after exposure to ultraviolet B (UVB) radiation in sunlight, whilst a smaller percentage is obtained via the diet⁽²⁾. However, at northerly latitudes, UVB is scarce during the winter months, and there is little information focusing on the oral vitamin D intake of adolescents. The main objectives of this study were to estimate dietary vitamin D intake in UK white Caucasian adolescents, and to determine whether the values meet the World Health Organisation (WHO) recommendation of 5 µg/day⁽³⁾ or the more recent Institute of Medicine (IOM) guidance of 15 µg/day⁽⁴⁾. A further aim was to compare adolescent intake with that of previously collected data from an adult white Caucasian sample.

This was a 1 year observational study of 124 healthy white Caucasian adolescents aged 12–15 years recruited from six schools in Greater Manchester. Adolescents completed a daily dietary record of seven vitamin D-containing food categories and intake of supplements for one week in each season and the average daily vitamin D intake data was estimated. The vitamin D content of foodstuffs was determined from the 6th edition of McCance and Widdowson's *The Composition of Foods*⁽⁵⁾ and from food package labelling. Data were compared with those similarly obtained from the 4-season daily dietary records of an adult sample (20–60 years, *n* = 109 completed) in Greater Manchester⁽²⁾. Adolescents (*n* = 110 completed) showed little variation in vitamin D intake across the seasons. Their overall median (range) intake was only 1.92 (0.01–22.15) µg/day compared with 3.27 (0.02–27.38) µg/day in adults (*P* < 0.01). As in the adult sample, oily fish was the main food contributor and vitamin D supplements were taken by a minority (25%) of adolescents.

We conclude that dietary vitamin D intake is very low amongst UK white adolescents and does not meet WHO recommendations⁽³⁾. It is much lower than specified in the recent IOM guidance for US and Canadian citizens⁽⁴⁾. Sun exposure levels and impact on vitamin D status are under study in this population, while the current data supports that within the adolescent population there is a risk that vitamin D requirements may not be met. This may have consequences for bone mineral accrual and subsequent bone health in later life.

1. Bailey DA, Faulkner RA & McKay HA (1996) *Exerc Sport Sci Rev* **24**, 233–266.

2. Webb AR, Kift R, Durkin MT *et al.* (2010) *Br J Dermatol* **163**, 1050–1055.

3. World Health Organization (2004) *Vitamin and mineral requirements in human nutrition*. 2nd ed., Geneva: WHO.

4. Institute of Medicine (2011) *Dietary reference intakes for calcium and vitamin D*. Washington, DC: The National Academies Press.

5. Food Standards Agency (2002) *McCance and Widdowson's The Composition of Foods*, 6th ed., Cambridge: Royal Society of Chemistry.