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Adolescent boys and protein: a first cut at developing environmentally sustainable foodbased dietary guidelines

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Male adolescence (10–19 years), is a critical life-stage for adequate nutrition due to the rapid growth and development that occurs during this period. Additionally, this population sub-group may begin to engage in muscle-building exercises due to socially established body image ideals⁽¹⁾, which fuel their desire to increase protein consumption. Currently, Irish diets are not sustainable, and exceed all planetary boundaries apart from freshwater use⁽²⁾. Thus, there is a need to incorporate sustainability into Ireland's food-based dietary guidelines (FBDG). The aim of this study was to develop FBDG for adolescent males to meet their nutritional needs more sustainably, whilst exploring protein intakes.

Commonly consumed foods ($\geq 10\%$ of consumers) and patterns of consumption were identified from secondary analysis of the National Children's Food Survey II and the National Teens' Food Survey II⁽³⁾. Using the Henry equation⁽⁴⁾, energy requirements were calculated, informed by actual height and weight data. Following the food consumption patterns and using foods commonly eaten, four-day omnivore meal patterns (including one lacto-ovo-vegetarian day) were developed within energy requirements for males at nine age-points (9y, 10y, 11y, 12y, 13y, 14y, 15y, 16y, 17–18y), covering five UK90 growth percentiles (5th, 25th, 50th, 75th, 95th), and four physical activity levels (PAL) (1.4, 1.6, 1.8, 2.0). To improve environmental sustainability, diet modelling reduced current FBDG recommendations on meat and dairy for adolescent males. The nutritional composition of modelled meal patterns was assessed using Nutritics software. Nutritional intakes provided by diet modelling were compared with macronutrient and 13 key micronutrient intake goals. The protein digestibility-corrected amino acid score (PDCAAS) was used to record the proportion of highquality protein foods contributing to protein intake.

A total of 180 four-day meal patterns were developed in the diet modelling process, which included vitamin D supplementation. Regardless of variations in energy requirements due to body size and PAL, modelled diets met all macronutrient and micronutrient goals (exceeding target intake levels for calcium, Dietary Folate Equivalents, and vitamin C). Inadequate modelled vitamin D provided from foods only (median 4.8 μ g/day; range 9–11 years 1.7–6.5 μ g/day; range 12–18 years 1.814.0 μ g/day) were resolved by existing 10–15 μ g supplement recommendations⁽⁵⁾. Protein intakes (g/kg body weight) were 316% above recommendations, despite the reduction of red meat and dairy in modelled meal patterns. Examination of foods in modelled meal patterns showed that 49–76% of protein food sources were high-quality (PDCAAS ≥ 60), and 48–76% of calcium food sources were bioavailable dairy products.

In conclusion, FBDG for male adolescents in Ireland have been developed considering environmental sustainability, whilst keeping nutritional requirements at the forefront. This study shows lower dairy and red meat intakes than currently recommended, combined with extra lactoovo-vegetarian days, provide adolescent males with nutritionally adequate, high protein (quality and quantity) diets.

References

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