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Energy density of the Scottish diet: analysis from the Expenditure and Food Survey

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The regular consumption of energy dense foods has been linked to weight gain and obesity. The World Cancer Research Fund (WCRF)⁽¹⁾ suggests a population level energy density (ED) goal for diets equivalent to 523 kJ/100 g (stated as 125 kcal/100 g) not including drinks. In 2010, the Scottish Government⁽²⁾ highlighted the importance of consuming a less energy dense diet in the Obesity Route Map with an explicit commitment to support consumers to make more nutrient dense food choices.

Household food purchase data for Scotland from the UK Expenditure and Food Survey was pooled from 2001 to 2008 and analysed to estimate the ED of the Scottish diet. In addition, data were examined for differences by socio-economic status measured by the Scottish Index of Multiple Deprivation (SIMD), and whether households met the dietary targets for fat and fruit and vegetables. Adjustments were made for waste^(3,4), and for weight increase or loss due to cooking or dilution. ED was calculated for food and milk to reflect the definition used in setting the WCRF public health goal (Wiseman, personal communication). Data were analysed using general linear models within the complex samples module of SPSS (SPSS Inc., Chicago, IL, USA) weighting to the Scottish population and taking account of sampling methods. Results are presented as population means with 95% CI (i.e. includes consumers and non-consumers) for household and eating out foods combined.

		SIMD Quintile					Average
		1*	2	3	4	5*	
		(n 872)	(n 919)	(n 904)	(n 874)	(n 906)	(n 4477)
		(wt n 7369)	(wt n 7687)	(wt n 7889)	(wt n 8021)	(wt n 8928)	(wt n 39910)
ED kJ/100 g	Mean	741	731	726	715	705	723
	95% CI	729, 753	720, 742	713, 739	704, 726	694, 716	717, 729
						P-value for linear association	<0.001

*SIMD Quintiles: 1 = most deprived; 5 = least deprived n refers to the number of households and weighted (wt) n refers to the weighted number of people in the sample.

Overall the mean combined ED of the Scottish diet was 723 kJ (172 kcal)/100 g. Analysis by SIMD found that those living in the most deprived areas were consuming diets with significantly higher ED than the most affluent. The mean ED of households achieving the Scottish Dietary Targets for fat ($\leq 35\%$ food energy) and fruit and vegetables (≥ 400 g/d) was significantly lower than for non-achieving households (574 kJ/100 g (95% CI 564, 584), n 309, compared with 734 kJ/100 g (95% CI 728, 740), n 4168), $P < 0.001$.

Food purchase data from the EFS have successfully provided a means of estimating the ED for the Scottish diet. The results show that the average ED of the Scottish diet is considerably higher than the public health goal recommended by the WCRF. ED was not uniform across the population. The average ED was highest in the most deprived fifth of the population by residential area and much nearer to the WCRF public health goal in those who meet dietary guidelines for fat and fruit and vegetables. Overall the analysis suggests that only a small fraction of the population were able to achieve an ED commensurate with the WCRF public health goal.

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1. World Cancer Research Fund/American Institute of Cancer (2007) *Food, Nutrition, Physical Activity, and the Prevention of Cancer: A Global Perspective*. Washington, DC: AICR.
2. The Scottish Government (2010) *Preventing Overweight and Obesity in Scotland: A Route Map Towards Healthy Weight*. Edinburgh: The Scottish Government.
3. Department of Environment, Food and Rural Affairs/Office for National Statistics (2008) *Family Food. A Report on the 2007 Expenditure and Food Survey*. London: The Stationery Office.
4. Waste and Resource Action Programme (2007) *The Food We Waste*. Oxon: WRAP.