Letters to the Editors

Dietary assessment methods

Dr Bingham and her colleagues are to be congratulated for their detailed and comprehensive comparison of various dietary assessment methods 'Comparison of dietary assessment methods in nutritional epidemiology: weighed records *v.* 24 h recalls, food-frequency questionnaires and estimated-diet records' (Bingham *et al.* 1994). As individuals are generally unable to alter substantially their total energy intake on a long-term basis unless major changes in body weight or physical activity are made, most alterations in dietary intake must be made by changing the composition of the diet. As absolute nutrient intakes represent both differences in dietary composition and differences in total energy intake, it is of greater interest to know the correlations between methods for energy-adjusted nutrients rather than just absolute intakes. It would thus be of great value if the authors could provide the same data as in Table 8, but for energy-adjusted nutrient intakes.

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Bingham, S. A., Gill, C., Welch, A., Day, K., Cassidy, A., Khaw, K. T., Sneyd, M. J., Key, T. J. A., Roe, L. & Day, N. E. (1994). Comparison of dietary assessment methods in nutritional epidemiology: weighed records *v.* 24 h recalls, food-frequency questionnaires and estimated-diet records. *British Journal of Nutrition* **72**, 619–643.

Energy-adjusted nutrient intakes

We thank Dr Willett for his kind remarks concerning our paper recently published in the *British Journal of Nutrition* (Bingham *et al.* 1994) which found that, when compared with weighed records of food intake, individual values of nutrient intakes were most closely associated with those obtained from 7 d estimated food records (food diaries), with no significant differences in mean food or nutrient intakes. Values obtained from 24 h recalls and food-frequency questionnaires compared less favourably, due to attenuation from daily variation in the 24 h recall and errors in the estimation of frequency of food consumption.

In response to Dr Willett's suggestion, we have reanalysed our data. The term 'energy adjustment' admits a number of statistical interpretations, and we have chosen the nutrient density method because of its simplicity. We recognize the shortcomings of this method but the alternative analysis by partial correlations is even more problematic in the presence of measurement error. Table 1 shows correlation coefficients which correspond with Table 8 of our paper. Table 2 shows the same data but with the absolute values from each method divided by total energy obtained from each method to obtain a measure of energy density.

The effect of expressing values as energy densities is generally to increase the magnitude of the correlation coefficients between results from all methods, especially the energy-yielding nutrients. Correlation coefficients using the Oxford food-frequency questionnaire

Table 1. *Correlation coefficients for absolute values*

	Oxford FFQ Season 3	Cambridge FFQ Season 1	24 h recall (unstructured) Season 1	24 h recall (structured) Season 2	7-day structured checklist Season 1	7-day structured checklist Season 4	7-day diet record Season 3
Energy	0·52	0·32	0·42	0·47	0·61	0·53	0·59
Fat	0·56	0·35	0·40	0·40	0·61	0·56	0·63
Protein	0·43	0·13	0·22	0·34	0·52	0·47	0·66
Carbohydrate	0·55	0·42	0·60	0·60	0·67	0·63	0·71
Sugar	0·51	0·44	0·63	0·65	0·69	0·71	0·77
Starch	0·53	0·39	0·56	0·38	0·55	0·52	0·70
NSP	0·57	0·36	0·61	0·49	0·70	0·66	0·74
Fibre	0·55	0·33	0·59	0·46	0·73	0·67	0·77
Potassium	0·39	0·24	0·56	0·47	0·54	0·49	0·77
Calcium	0·51	0·32	0·28	0·57	0·61	0·59	0·67
Iron	0·43	0·28	0·53	0·35	0·46	0·49	0·83
Carotene	0·45	0·37	0·28	0·21	0·49	0·47	0·66
Retinol	0·55	0·29	0·54	0·33	0·51	0·32	0·35
Vitamin C	0·54	0·41	0·55	0·35	0·70	0·66	0·68
Alcohol	0·90	0·89	0·61	0·54	0·91	0·87	0·88

Table 2. *Correlation coefficients for nutrient densities*

	Oxford FFQ Season 3	Cambridge FFQ Season 1	24 h recall (unstructured) Season 1	24 h recall (structured) Season 2	7-day structured checklist Season 1	7-day structured checklist Season 4	7-day diet record Season 3
Fat	0·63	0·46	0·44	0·40	0·62	0·56	0·73
Protein	0·66	0·43	0·38	0·44	0·61	0·66	0·77
Carbohydrate	0·68	0·65	0·53	0·48	0·74	0·67	0·79
Sugar	0·60	0·58	0·54	0·63	0·71	0·73	0·83
Starch	0·53	0·43	0·60	0·38	0·57	0·48	0·64
NSP	0·75	0·59	0·73	0·56	0·84	0·83	0·76
Fibre	0·72	0·53	0·70	0·51	0·83	0·82	0·78
Potassium	0·71	0·47	0·61	0·51	0·73	0·71	0·84
Calcium	0·49	0·48	0·42	0·50	0·59	0·56	0·70
Iron	0·66	0·47	0·59	0·48	0·66	0·70	0·76
Carotene	0·55	0·46	0·35	0·26	0·53	0·50	0·72
Retinol	0·56	0·27	0·49	0·29	0·52	0·29	0·29
Vitamin C	0·67	0·48	0·50	0·47	0·72	0·68	0·68
Alcohol	0·90	0·91	0·64	0·53	0·92	0·86	0·88

data for example increase from a range of 0·43 to 0·56, to a range of 0·53 to 0·66 for energy-yielding nutrients excluding alcohol. The correlations for other nutrients are variably increased or decreased; for example those for retinol and calcium are generally decreased whereas those for NSP are generally increased.

The ranking of methods in their ability to yield individual results that are most closely associated with those obtained from weighed records remains the same however, even when results are expressed as nutrient densities. Correlations between weighed record results and

results obtained from the 7 d diet record for energy-yielding nutrients excluding alcohol for example ranged from 0·64 to 0·83, which were rather greater than those obtained using the food-frequency questionnaire and 24 h recall methods.

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