

## Contribution of meals and snacks to dietary intakes by Irish preschool children (1–4 years)

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Guidance as part of the food based dietary guidelines on the role of snacks and snacking is varied yet population studies reveal food and/or drinks are regularly eaten between meals<sup>(1,2)</sup>. The aim of this analysis was to characterise dietary intakes at meals and snacks in a representative sample of 1–4 year old children. The Irish National Preschool Nutrition Survey (NPNS) (2010–2011) used a 4-d weighed food diary to collect detailed food and beverage intake data ([www.iuna.net](http://www.iuna.net)). Dietary intake data was analysed using WISP<sup>®</sup> (Tinuviel Software, Anglesey, UK), which is based on *McCance and Widdowson's The Composition of Foods, Sixth Edition*<sup>(2)</sup>. For the present analysis, all eating occasions (EO) of less than 0KJ and supplements were excluded with meal-types defined in the food diary by the recorder. Each EO was initially grouped into one of 10 categories based on whether they were recorded as breakfast, light or main lunch or dinner, beverages or morning (before 12pm), afternoon (12–6pm), evening (6–10pm) or night time (after 10pm) snacks. Subsequently, all meal types were aggregated as 'breakfast', 'lunch', 'dinner', 'snacks' and 'beverages'. Included in 'beverages' were milks, formulae, juices and other juice drinks consumed as drinks. PASW<sup>®</sup> v20 was used to calculate mean daily intake (MDI) of nutrients and the percentage at each EO.

	Breakfast (n499)		Lunch (n500)		Dinner (n496)		Snacks (n494)		Beverages (n293)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Energy (MJ/d)	1.06 <sup>a</sup>	0.36	1.12 <sup>ab</sup>	0.48	1.13 <sup>b</sup>	0.45	1.23 <sup>b</sup>	0.70	0.53 <sup>c</sup>	0.49
Energy (MJ/100 g)	0.48 <sup>a</sup>	0.12	0.55 <sup>b</sup>	0.17	0.52 <sup>b</sup>	0.14	0.55 <sup>b</sup>	0.30	0.25 <sup>c</sup>	0.07
Protein (%TE)	13.8 <sup>a</sup>	2.8	17.8 <sup>b</sup>	5.3	19.5 <sup>c</sup>	5.8	10.0 <sup>d</sup>	3.3	15.2 <sup>e</sup>	7.3
Fat (%TE)	26.5 <sup>a</sup>	10.3	34.2 <sup>b</sup>	9.8	35.3 <sup>b</sup>	9.5	29.6 <sup>c</sup>	10	36.7 <sup>b</sup>	22.1
Saturated fat (%TE)	13.7 <sup>a</sup>	7.4	14.8 <sup>b</sup>	5.6	14.2 <sup>ab</sup>	5.2	14.1 <sup>ab</sup>	5.7	20.1 <sup>c</sup>	15.5
Carbohydrate (%TE)	55.2 <sup>a</sup>	9.3	45.8 <sup>b</sup>	10.5	43.6 <sup>c</sup>	10.5	58.0 <sup>d</sup>	10.8	42.4 <sup>c</sup>	19.7
Sugars (%TE)	25.6 <sup>a</sup>	9.4	19.2 <sup>b</sup>	9.9	16.4 <sup>c</sup>	9.1	38.7 <sup>d</sup>	13.7	39.3 <sup>d</sup>	19.0
NMES (%TE)	14.0 <sup>a</sup>	9.7	13.4 <sup>a</sup>	8.1	11.3 <sup>a</sup>	7.3	23.5 <sup>b</sup>	12.1	16.0 <sup>a</sup>	27.7
Lactose (%TE)	8.9 <sup>a</sup>	4.7	2.7 <sup>b</sup>	2.8	3.1 <sup>b</sup>	3.4	5.0 <sup>c</sup>	4.7	23.1 <sup>d</sup>	12.1
Fibre (g/10MJ)	26.2 <sup>a</sup>	11.5	26.4 <sup>a</sup>	15.1	27.1 <sup>a</sup>	12.6	27.0 <sup>a</sup>	17.1	12.1 <sup>b</sup>	22.5
Sodium (mg/10MJ)	1893 <sup>a</sup>	811	3373 <sup>b</sup>	1516	3121 <sup>b</sup>	1445	1820 <sup>a</sup>	939	2326 <sup>c</sup>	4419

%TE: percentage contribution to total energy; intake values are compared between the meal types using one way ANOVA, controlled for age and gender, with Bonferroni post hoc tests; <sup>abc</sup>different superscripts denote significance between meal types at P < 0.05. NMES non milk extrinsic sugars

Most (99–100%) Irish preschoolers consumed meals and snacks with breakfast contributing 22%, lunch 23%, dinner 24% and snacks 25% of total energy intakes. More children consumed afternoon (94%) and morning snacks (86%) than evening (68%) or night time (4%) snacks, with afternoon snacks making the single greatest contribution to energy intakes (11.7%). Beverages were consumed by 78% of 1 year olds and contributed 14% to energy intakes, reducing to 0.8% of energy in 4 year olds (26% consumers). Overall, there were some differences in macronutrient, fibre and sodium intakes by EO type with lower fat and saturated fat intakes recorded at breakfast and higher non milk extrinsic sugar intakes at snacks. All EO types made significant contributions to energy and nutrient intake by Irish preschool children. Future work should consider micronutrient density, contributing food sources and how snacking patterns may change with age into older childhood and beyond.

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