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ORIGINAL ARTICLE

Consumption of 'extra' foods by Australian adults: types, quantities and contribution to energy and nutrient intakes

AM Rangan[1], S Schindeler[2], DJ Hector[1], TP Gill[1] and KL Webb[1]

[1]*New South Wales Centre for Public Health Nutrition, Department of Molecular and Microbial Biosciences, University of Sydney, Camperdown, NSW, Australia and* [2]*New South Wales Department of Health, North Sydney, NSW, Australia*

Objectives: To identify the types and quantities of 'extra' foods, or energy-dense, nutrient-poor foods, consumed by Australian adults, and assess their contribution to total energy and nutrient intakes.
Subject/Methods: We used 24-h recall data from 10 851 adults, aged 19 years and over, who participated in the nationally representative 1995 National Nutrition Survey. 'Extra' foods were defined using principles outlined in the Australian Guide to Healthy Eating and by applying cut points for maximum amounts of fat and sugar within each food category.
Results: 'Extra' foods contributed to 36% of daily energy intake with the highest contributors being fried potatoes (2.8%), margarine (2.6%), cakes and muffins (2.5%), beer (2.4%), sugar-sweetened soft drinks (2.4%), and meat pies (2.2%). Both age and sex were important determinants of 'extra' foods intake; younger adults were more likely to consume sugar-sweetened soft drinks, fried potatoes, meat pies and savoury pastries, pizza, crisps, lollies and chocolate; whereas older adults were more likely to consume sweet and savoury biscuits, cakes and muffins, margarine and butter. In all age groups, 'extra' foods contributed more to energy intake for men than women. Overall, 'extra' foods contributed 16% protein, 41% total fat, 41% saturated fat, 47% sugar and approximately 20% of selected micronutrients to the diet.
Conclusions: 'Extra' foods contribute excessively to the energy, fat and sugar intakes of Australian adults, while providing relatively few micronutrients. This is of concern for the increasing risk of overweight and chronic disease and poor micronutrient status.
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Introduction

A diet high in energy-dense, nutrient-poor (EDNP) foods has been associated with excessive energy intakes and obesity. The WHO report *Diet, Nutrition and the Prevention of Chronic Disease* indicated that the strength of evidence for the increased risk of weight gain and obesity due to a high intake of EDNP foods was 'convincing' (WHO, 2003). A more recent WHO European report also highlighted the importance of tackling the over-consumption of EDNP foods as paramount in the fight against obesity (WHO, 2007). In addition to its effect on weight status, EDNP foods can replace more nutritious foods in the diet, leading to marginal intakes of some micronutrients (Kant, 2003; Webb *et al.*, 2006).

In Australia, EDNP foods are broadly referred to as 'extra' foods in the Australian Guide to Healthy Eating (Smith *et al.*, 1998). Acceptable limits for consumption have been calculated for various age groups per day; 0–3 serves for men aged 19–60 years, 0–2.5 serves for women aged 19–60 years and men aged 60+ years and 0–2 serves for women aged 60+ years. A serve has been defined as the amount of food containing 600 kJ. This allowance is estimated to provide a maximum of 20% of daily energy intake.

Correspondence: Dr AM Rangan, NSW Centre for Public Health Nutrition, University of Sydney, Level 2, Medical Foundation Building K25, Sydney, NSW 2006, Australia.
E-mail: a.rangan@usyd.edu.au
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Information about the types and amounts of 'extra' foods consumed, and their contribution to nutrient intake, would contribute to the development of policies and programs that target obesity prevention. Internationally, there have been many studies of the intakes of selected foods that are energy-dense and nutrient poor, but few studies have investigated the cumulative intake of these foods and their contribution to the total intake of energy and nutrients. We recently reported on the intake of 'extra' foods among 2- to 18-year-old Australian children, based on data from the 1995 National Nutrition Survey (NNS), and found energy intake from total 'extra' foods to be high at 41% (Rangan *et al*., 2008).

In this paper, we report detailed information on the consumption of 'extra' foods among Australian adults. Using data from the 1995 NNS, we describe the types and quantities of the most commonly consumed 'extra' foods, and their contribution to total energy and nutrient intakes. Although the NNS was undertaken over 10 years ago, it provides the latest nationally representative dietary data in Australia. Data from this survey give an indication of the role of 'extra' foods relative to core foods and will serve as a useful comparison for future surveys.

Subjects and methods

1995 National Nutrition Survey

The details of the sampling frame, data collection methods and response rates for the NNS have been reported previously (McLennan and Podger, 1998). In brief, the NNS was conducted on a systematic sub-sample of those selected for the 1995 National Health Survey. The sample frame for the National Health Survey was a multi-stage probability sample of private and non-private dwellings and for the NNS, a sub-sample of households were selected from private dwellings, in which individuals aged two years and older were selected for the nutrition survey. The response rate for the NNS was 61.4% of eligible participants, with a total of 10 851 respondents aged 19 years and over.

Detailed food consumption data were collected using a structured 24-h recall interview to identify foods and beverages consumed by participants on the day prior to the interview (McLennan and Podger, 1998). The interviews were conducted in three phases by qualified nutritionists: (i) the completion of a quick list of foods and beverages consumed during the 24 h period; (ii) collection of detailed information about types, brands, preparation methods and quantities for each food and drink item listed in the quick list; and (iii) a recall-review to allow respondents to report any foods or details that may have been forgotten. Respondents were asked to estimate their portion sizes using standardized measuring guides including cups, spoons, rulers, grids and photos of varying amounts of selected foods and beverages.

Nutrient intakes for each respondent were calculated using AUSNUT 1997, a food composition database compiled specifically for the NNS, containing information about the energy and nutrient content of over 4000 Australian foods.

Classification of 'extra' foods

As there is currently no consensus about the criteria to define EDNP foods (Drewnowski, 2005; Rangan *et al*., 2007), we used The Australian Guide to Healthy Eating (AGHE) as a guide for classifying foods as core or 'extra' (Smith *et al*., 1998). The Australian Guide to Healthy Eating provides a limited range of examples of 'extra' foods, such as biscuits, cakes, soft drinks, ice cream, pies, hot chips and high fat take-away items. We classified additional foods as 'extra' if they had a similar or higher fat and/or sugar content to the example 'extra' food and belonged to the same food category. This process is described in more detail in our previous paper (Rangan *et al*., 2008). In brief, 'extra' foods included sweet biscuits, cakes, high fat savoury biscuits, garlic bread, pastries, pies, quiche, salami, hamburgers, pizza, fried potatoes, crisps, fat spreads, oils, confectionery, soft drinks, fruit drinks (sweetened beverages of diluted fruit juice), cordials and alcohol. A detailed list of 'extra' foods can be found on our website: www.cphn.mmb.usyd.edu.au.

To determine the commonly consumed food items, we grouped like items such as hot chips, fries, wedges, hash browns, potato scallops, potato gems and potato patties and classified these as 'fried potatoes'. 'Margarine' included all types of margarine and margarine spreads, ranging in fat content from 40–80%. 'Sugar-sweetened soft drinks' included cola and non-cola soft drinks and flavoured mineral waters but not artificially sweetened soft drinks.

Statistical analysis

Secondary analyses were conducted on the adults' subset of the NNS database, obtained from the Confidentialized Unit Record Files supplied by the Australian Bureau of Statistics. Subgroups based on sex and age, similar to those reported in the NNS, were created (19–24, 25–44, 45–64, 65+ years). Analyses were performed using SPSS Version 15.0 (SPSS Inc., 2006) and SAS Version 9 (SAS Institute Inc., 1999–2001).

The percent consuming, mean intake per-capita, mean intake per consumer and average percent contribution to daily intake of the more commonly consumed 'extra' foods were derived, and were weighted to the population to allow for under-enumeration and non-participation. Two-sided Cochran–Armitage tests for trend were conducted to determine if there were trends across age groups in the percent consuming specific 'extra' foods (Table 1). Analysis of variance was used to compare the mean intake per-consumer per day across the age groups and by sex (Table 2). Per-consumer data were used instead of per-capita data because the percentage consuming a particular food item was generally small, which resulted in very skewed per-capita

Table 1 Commonly consumed 'extra' foods among 10851 Australian adults aged 19 years and over; percent consuming, mean intake per capita and per consumer, and percentage energy contribution, 1995 National Nutrition Survey

'Extra' food type	*Percent consuming*	*Test for trend by age group[a] (P-value)*	*Difference[b] % consuming male:female*	*Mean intake per capita (g/day)*	*Mean intake per consumer (g/day)*	*Rank (% energy contribution)*
Margarine	53.1	↑<0.0001	54.7:51.4	7.8	14.7	2 (2.6)
Sugar	52.4	0.23	59.8:45.3	9.7	18.6	8 (1.8)
Sweet biscuits	25.4	↑<0.0001		9.0	35.3	7 (2.0)
Sugar-sweetened soft drinks	24.0	↓<0.0001	29.6:18.5	136.2	568.8	5 (2.4)
Butter and dairy fats	22.8	↑0.0008		3.5	15.3	13 (1.1)
Cakes and muffins	18.9	↑<0.0001	17.3:20.5	17.8	94.0	3 (2.5)
Jam and conserves	18.2	↑<0.0001		2.9	16.1	
Fried potatoes	17.3	↓<0.0001	19.3:15.3	25.0	144.7	1 (2.8)
Beer	16.6	0.16	28.5:5.1	188.8	1136.7	4 (2.4)
Salad dressings	16.2	↑0.014		3.2	19.7	
Ice cream/ice confection	15.3	0.49	16.9:13.6	17.1	112.1	10 (1.3)
Wine	15.2	↑<0.0001		52.5	344.1	9 (1.7)
Tomato and BBQ sauce	15.1	↓<0.0001	16.6:13.6	5.2	34.6	
Chocolate/chocolate bars	13.9	↓<0.0001		5.9	42.4	11 (1.2)
Meat pies and savoury pastries	10.5	↓<0.0001	12.4:8.7	21.3	202.9	6 (2.2)
Gravies	10.4	↑<0.0001		8.3	80.2	
Savoury biscuits—high fat	10.2	↑<0.0001		2.8	27.2	
Cordials	10.1	↓<0.0001	11.5:8.8	32.2	318.4	
Beverage flavourings	8.0	↓0.0012		0.5	6.6	
Cream	7.7	↑0.0011		2.9	37.4	
Sweet pies and pastries	7.7	0.37		10.7	139.2	12 (1.2)
Artificially sweetened soft drinks	7.4	↓<0.0001		40.2	542.2	
Artificial sweeteners	7.1	↑<0.0001	5.8:8.3	0.0	0.7	
Lollies and confectionery	6.5	↓0.0023		1.8	28.3	
Fruit drinks	6.2	↓<0.0001		24.2	390.1	
Spirits	4.7	↑<0.0001		3.5	75.5	
Pizza	4.7	↓<0.0001	5.6:3.8	10.4	221.1	14 (1.0)
Potato crisps	4.7	↓<0.0001		2.0	42.8	
All 'extra' foods (including those less commonly consumed)	99.1	0.12		700.1		35.9

[a]Arrow indicates a significant increase or decrease in trend by age group.
[b]Significant difference <0.05%.

Table 2 Mean amounts (gram per consumer per day) of the 14 'extra' foods that contribute most to energy intake among Australian adults, by age and sex; 1995 National Nutrition Survey

'Extra' food type	*Per consumer (g/day)*								*Significance of ANOVA (P-value)*	
	19-24 years		*25-44 years*		*45-64 years*		*65+ years*			
	Males	*Females*	*Males*	*Females*	*Males*	*Females*	*Males*	*Females*	*Age*	*Sex*
Fried potatoes	183.6	137.5	159.2	128.3	156.1	117.7	131.5	105.3	0.0002	<0.0001
Margarine	19.4	12.3	17.4	10.9	17.3	11.0	18.0	12.8	0.044	<0.0001
Cakes and muffins	159.8	111.0	117.4	89.4	94.1	78.8	70.9	74.8	<0.0001	<0.0001
Beer	1263.9	960.2	1333.5	744.5	1124.1	719.7	946.4	501.6	<0.0001	<0.0001
Sugar-sweetened soft drinks	802.2	562.3	642.6	465.0	503.7	382.7	379.3	286.1	<0.0001	<0.0001
Meat pies/savoury pastries	206.0	168.7	219.1	183.8	234.8	193.4	200.6	166.5	0.14	<0.0001
Sweet biscuits	48.0	31.9	46.5	30.8	40.7	29.9	31.0	26.1	<0.0001	<0.0001
Sugar	15.8	14.4	20.6	15.0	23.4	15.7	23.4	14.6	<0.0001	<0.0001
Wine	455.8	298.6	361.7	372.1	385.0	324.2	310.3	214.6	<0.0001	0.0073
Ice cream/ice confection	172.4	104.4	140.9	101.5	117.7	78.9	82.1	72.7	<0.0001	<0.0001
Chocolate/chocolate bars	54.4	43.2	48.3	42.3	39.9	34.4	29.6	32.3	0.0001	0.0091
Sweet pies/pastries	141.0	139.6	163.5	122.7	135.3	128.9	163.6	128.1	0.58	0.0087
Butter and dairy fats	15.1	11.2	18.0	11.1	19.2	12.9	19.2	16.2	0.0079	<0.0001
Pizza	355.3	121.0	261.7	159.8	200.9	153.3	161.6	114.5	0.0003	<0.0001
All 'extra' foods									<0.0001	<0.0001

intake data and a zero median value. Analysis of variance was also used to compare the average percent contribution of all 'extra' foods to the daily intake of various nutrients by age group (Table 3). The analysis of variance models took into account the effect of clustering on the error around the estimates. Ninety-five percent confidence limits around

Table 3 Contribution of 'extra' foods to total intakes of energy and selected nutrients among Australian adults aged 19 years and over; Mean intake from total diet and percent of daily intake from 'extra' foods, 1995 National Nutrition Survey

Energy or nutrient	*Males*		*Females*		*All*	
	Mean total intake	*% from extra foods*	*Mean total intake*	*% from extra foods*	*Mean total intake*	*% from extra foods*
Energy, MJ	11.05	38.1	7.48	33.8	9.24	35.9
Protein, *g*	109	16.3	73.9	14.8	91.2	15.5
Total fat, *g*	98.5	41.5	67.6	41.4	82.8	41.4
Saturated, *g*	39.0	41.4	26.7	41.7	32.7	41.5
Monounsaturated, *g*	36.2	41.7	24.3	41.3	30.2	41.5
Polyunsaturated, *g*	14.7	43.6	10.4	42.1	12.5	42.8
Cholesterol, mg	358	23.2	240	23.5	298	23.3
Carbohydrates, *g*	301	38.1	211	32.3	255	35.2
Sugars, *g*	134	50.9	97.0	42.6	115	46.7
Starch, *g*	165	27.0	112	22.9	138	25.0
Fibre, *g*	25.9	19.8	20.3	17.3	23.1	18.5
Calcium, mg	946	22.5	749	20.9	846	21.7
Phosphorus, mg	1776	22.2	1272	20.1	1520	21.1
Magnesium, mg	381	29.7	283	26.9	331	28.3
Potassium, mg	3725	25.4	2805	21.9	3258	23.6
Iron, mg	16.4	24.6	11.9	26.4	14.1	25.5
Zinc, mg	14.4	16.8	9.7	16.8	12.1	16.8
Retinol μg equivalents	1312	29.8	1047	27.1	1177	28.5
Thiamine, mg	1.9	13.1	1.4	11.7	1.6	12.4
Riboflavin, mg	2.3	18.3	1.8	18.3	2.1	18.3
Niacin, mg equivalents	50.7	22.5	34.1	20.7	42.3	21.6
Folate, μg	307	23.0	233	19.1	269	21.0
Vitamin C, mg	136	21.9	113	14.5	124	18.1

percentage and mean estimates, calculated accounting for clustering, were used to judge whether specific differences between men and women within age groups were significant.

Results

Of a total of 4089 food items consumed by survey participants in the 24 h prior to the survey, 1288 were classified as 'extra' foods. The most commonly consumed 'extra' food items, that is, those consumed by more than 4% of adults, are listed in Table 1 together with the quantities consumed. Nearly all participants (99.1%) consumed at least one 'extra' food. Margarine, sugar and sweet biscuits were the most commonly consumed energy containing 'extra' foods, consumed by over one quarter of participants in the 24-h recall.

The percent of participants consuming individual 'extra' food items varied with age. For example, the proportion of Australian adults consuming soft drinks (sugar-sweetened and artificially sweetened), fried potatoes, meat pies, chocolate and lollies, decreased significantly with age; whereas the proportion consuming margarine, butter, sweet biscuits, cakes and muffins and savoury biscuits increased with age (Table 1).

The types of 'extra' foods consumed were similar for men and women, although there were significant differences between the percentages of men and women consuming these foods. For example, more women than men consumed cakes and muffins, but a higher proportion of men consumed sugar-sweetened soft drinks, beer, fried potatoes, meat pies and pizza (Table 1).

Several 'extra' foods were consumed in relatively large amounts and made a substantial contribution to energy intake. Foods that contributed most to energy intake (that is, more than 1% of daily energy intake) were ranked in terms of their contribution to energy intake, as shown in Table 1. These include fried potatoes (2.8%), margarine (2.6%), cakes and muffins (2.5%), beers (2.4%), sugar-sweetened soft drinks (2.4%) and meat pies (2.2%). Overall, 'extra' foods and beverages contributed 35.9% of energy to the diets of Australian adults—26.9% from foods and 9.0% from beverages.

The 'extra' foods that contributed most to energy intake, that is, more than 1%, are listed in Table 2, together with the average quantities consumed among different age groups and by sex. There were significant differences in the amounts of 'extra' foods consumed by each age and sex group for nearly all food types. Men, generally, consumed higher amounts of 'extra' foods than women within the same age group; except for wine consumption in the 25–44 years age group, and cakes/muffins and chocolate in the 65+ years age group, for which there were no significant differences.

Younger adults consumed higher quantities of fried potatoes, margarine, cakes and muffins, beer, sugar-sweetened soft drinks, sweet biscuits, wine, ice cream, chocolate and pizza than older adults (Table 2). In particular, the intake of sugar-sweetened soft drinks in the youngest age group was double that of the oldest age group (men: 802 vs

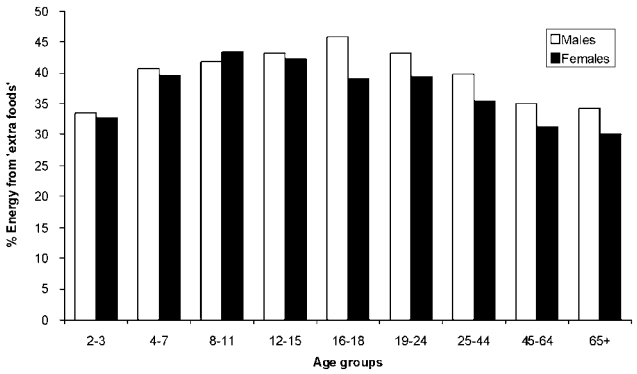

Figure 1 Energy contribution of 'extra' foods by age.

379 g; women: 562 vs 286 g). Conversely, older adults consumed higher quantities of sugar, and butter/dairy fats.

The mean daily energy intakes for adults were 11.05 and 7.48 MJ for men and women, with 'extra' foods contributing 38.1 and 33.8%, respectively (Table 3). For all adults, 'extra' foods contributed 15.5% protein, 41.4% total fat, 41.5% saturated fat, 46.7% sugar, 18.5% dietary fibre and approximately 20% of selected micronutrients, ranging from 12.4% for thiamine to 28.5% for retinol equivalents. Thus, 'extra' foods provided a high proportion of energy, total fat, saturated fat and sugar relative to micronutrient content.

Combining data from our previously published paper on children's intakes of 'extra' foods (Rangan *et al*., 2008) with the 'extra' foods intake data from adults showed that men derived a higher proportion of their energy intake from 'extra' foods than women, in all age groups except 8–11 years (Figure 1). The percentage of energy obtained from 'extra' foods increased from 33% for 2- to 3-year-olds to 43% for 16 to 18-year-olds and then decreased with age to 33% for those aged 45 years and over.

Discussion

This analysis of nationally representative survey data shows that the diets of Australian adults in 1995 included substantial amounts of 'extra' foods. These 'extra' foods contributed 36% to daily energy intake, nearly double the maximum recommended limit of 20%. These results, combined with those from the 1995 children's survey, show that over-consumption of 'extra' foods occurs among Australians of all ages.

Population studies in the USA have also shown higher than recommended intakes of EDNP or 'extra' foods among adults. Direct comparisons with our study are hampered by differences in dietary assessment methods, food coding and analysis procedures and food classification criteria. For example in a secondary analysis of data from the third US National Health and Nutrition Examination Survey, 1988–1994, EDNP foods were limited to visible fat, sweeteners, desserts, salty snacks and miscellaneous foods but excluded high fat fast foods such as fried potatoes, hamburgers and pizza (Kant, 2000). These mixed dishes were disaggregated into their individual components and assigned to their relevant food group (Cleveland *et al*., 1997). Nevertheless, EDNP foods contributed to 27% of energy intake in adults, with alcoholic beverages contributing an extra 4%. Nearly 20% of total energy intake came from desserts and sweeteners such as cakes, biscuits, ice cream, pies, pastries, sweetened beverages and sugar. The 1995 NNS data show that 'extra' foods contributing most to energy intakes for Australian adults were fried potatoes (2.8%), margarine (2.6%), cakes and muffins (2.5%), beer (2.4%), sugar-sweetened soft drinks (2.4%) and meat pies (2.2%).

Our analysis showed that age and sex were important determinants of the types and overall quantities of 'extra' foods consumed, and affected the proportional contribution to energy intake. The highest consumers of 'extra' foods were young adult males whereas the lowest consumers were women aged over 65 years. Men of all ages reported consuming higher quantities of 'extra' foods than women reflecting, in part, the higher overall food intake of men compared with women. Young adults were more likely to consume soft drinks, fried potatoes, meat pies, chocolate and lollies than older adults. In contrast, older adults were more likely to consume cakes and muffins, sweet and savoury biscuits, margarine and butter than younger adults. The quantities of 'extra' foods consumed and the proportion to energy intake generally decreased with age, as was also observed by Kant, (2000) in the USA. These findings concur with studies showing that healthy dietary behaviours are more frequent in elderly populations (>65 years) than in younger age groups (Drewnowski and Shultz, 2001; Schröder *et al*., 2004). Nevertheless, 'extra' foods were contributing above the recommended amount of energy to the diets of older Australians.

A high intake of 'extra' foods has many health implications including an increased risk of weight gain, obesity and diet-related chronic disease, as well as compromised micronutrient status. Fast foods and sugar-sweetened drinks, in particular, have been linked to weight gain and obesity in a number of prospective studies. For example, the consumption of foods such as fried potatoes, meat pies and pizza, which were eaten in large amounts by adult Australians in 1995, has been associated with increased body weight and weight gain in adults (Bes-Rastrollo *et al*., 2006). A consistent association between the frequency of fast food consumption and weight gain has also been reported (French *et al*., 2000; Ball *et al*., 2002; Pereira *et al*., 2005; Duffey *et al*., 2007). The 1995 NNS data showed that consumption of sugar-sweetened soft drinks was high in Australia, particularly among young male consumers, who consumed an average of over 800 ml per day. The role of sugar-sweetened drinks as a causative factor for weight gain in children and adults has been extensively reviewed and the evidence for an

association is generally considered to be 'substantial and consistent' (Bachman *et al.*, 2006; Gill *et al.*, 2006; Malik *et al.*, 2006; Vartanian *et al.*, 2007).

High consumption of 'extra' foods has also been linked to an increased risk of chronic disease in longitudinal studies. Insulin resistance and type 2 diabetes have been positively associated with frequency of fast food consumption (Pereira *et al.*, 2005), consumption of French fries (Halton *et al.*, 2006), processed meat (Fung *et al.*, 2004) and sugar-sweetened soft drinks (Schulze *et al.*, 2004). High soft drink consumption has also been implicated in the development of metabolic syndrome, high blood pressure, hypertriglyceridemia and low high density lipoprotein cholesterol (Yoo *et al.*, 2004; Dhingra *et al.*, 2007).

Alcoholic beverages such as beer, wine and spirits were commonly consumed among all adult subgroups in Australia in 1995. Beer consumption was especially high in men, with 28% of men reporting drinking beer during the recall period with an average intake of more than 1 l. Wine was consumed by one in six adults, with an average intake of approximately 2 glasses (344 ml) per consumer. The association between alcohol consumption and weight status is not clearly defined although some studies have found positive or J-shaped relationships between alcohol intake and obesity, irrespective of the type of alcoholic beverage consumed (Lukasiewicz *et al.*, 2005; Wannamethee *et al.*, 2005).

'Extra' foods can displace more nutrient-dense core foods in the diet which leads to poorer overall diet quality. Particularly, consumption of EDNP foods is associated with higher intakes of energy, total fat, saturated fat and added sugars, combined with lower intakes of dietary fibre and micronutrients such as vitamins A, B6, B12 and C, folate, iron and calcium (Kant, 2000; Bowman and Vinyard, 2004; Schröder *et al.*, 2007). Data from the Australian NNS showed that 'extra' foods provided between one-third and a half of the day's energy, total fat, saturated fat and sugar intakes but provided less than a quarter of most micronutrients. Although intakes of most micronutrients were adequate among Australian adults, calcium and zinc were potentially at risk for women (McLennan and Podger, 1997).

Although the data presented in this paper are from 1995, they provide an indication of the likely magnitude of the problem of over-consumption of 'extra' foods in Australia. Indeed, they are likely to be an under-estimate of current consumption as availability and access of these foods has increased substantially since the time of this survey (Walker *et al.*, 2008). Furthermore, the dietary intake determined from the 1995 NNS may have been under-estimates of actual consumption. Measurement error associated with the 24-h recall method arises particularly from difficulties in estimation of portion sizes, recall of precisely what was consumed, or deliberate misreporting. In the 1995 NNS adult database, 12% of men and 21% of women were classified as under-reporters (Mackerras and Rutishauser, 2005). Under-reporting would introduce bias if 'extra' foods such as cakes, soft drinks, confectionery and fats were selectively under-reported because of the widely held perception that such foods are 'unhealthy'. Evidence of selective under-reporting among men (Goris *et al.*, 2000) and women (Scagliusi *et al.*, 2003), and particularly among obese women (Macdiarmid *et al.*, 1998), has been observed. If selective under-reporting occurred in the 1995 survey, then our findings represent a conservative estimate of the over-consumption of 'extra' foods among Australian adults.

Conclusion

In 1995, 'extra' foods contributed nearly two times the recommended limit for energy from such foods to the diets of Australian adults. 'Extra' foods also contributed large amounts of fat and sugar to the diet, while providing relatively few micronutrients. The types of 'extra' foods contributing most to total energy intake were fried potatoes, margarine, cakes and muffins, beer, sugar-sweetened soft drinks and meat pies. As over-consumption of 'extra' foods increases the likelihood of excess weight gain, diet-related chronic disease and compromised micronutrient status, more effective efforts are required to encourage and support the entire Australian population to limit their consumption of 'extra' foods.

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