

---

## Children's lunchtime choices following the introduction of food-based standards for school lunch; observations from six primary schools in Sheffield

---

### Summary

- Lunchtime makes an important contribution to the nutrition of primary school children in England. There has been significant investment to improve school food. This is to ensure the food provided in schools supports children's growth and development and assists with establishing healthy eating habits.
  - The findings presented here are based on the observation of lunchtime choices of 136 8-10 year olds in six primary schools in Sheffield, February and March 2007.
  - The lunchtime choices for children taking a school lunch compared to a packed lunch were more favourable in terms of being more likely to contain vegetables, fruit, extra bread, healthier drinks and no confectionery and snacks.
  - Sixty-five percent of children taking a packed lunch from home chose a food item from the confectionery and snacks categories, with 28% of children eating both a confectionery and savoury snack item from their packed lunch. Thirty-one percent of packed lunches contained a drink that did not meet the healthier drinks food-based standard for school food.
  - A greater proportion of children taking a school lunch compared to a packed lunch met the 2008 nutrient standards for carbohydrate, non-milk extrinsic sugars, total fat, fibre, sodium, vitamin A and vitamin C. More children taking a packed lunch met the nutrient standard for calcium.
  - Schools are encouraged to continue to transform food provided in schools. This needs to involve working towards achieving menus that meet the 2008 food-based and nutrient standards for school food. Equally important is the need to promote healthy eating across the school community to ensure all children benefit from quality school food, including children consuming a school lunch and those bringing in a packed lunch from home.
  - The adoption of a school food policy that encompasses promotion of packed lunches that are consistent with the standards for school food is likely to support adoption of school food standards, assist with increasing school lunch take up and ensure that all children benefit from eating quality food during the school day.
-

## **Background**

Primary school children in England consume 22-33% of their daily nutritional intake at lunchtime<sup>1</sup>. For school days, lunch can be taken as a school lunch (42.3% of primary children in 2006<sup>2</sup>), a packed lunch from home or home lunch.

Over the last two decades a decline in the nutritional quality of school lunches has been documented.<sup>3</sup> School lunches have been found to be high in total and saturated fat, sugar and salt and relatively low in micronutrients such as calcium and iron.<sup>4 5</sup> Over the last few years, there has been significant government investment in school food and the reintroduction of nutritional standards for school lunches.<sup>6 7</sup> Schools are currently in the process of phasing in these standards; Interim food-based standards for lunch were introduced in September 2006;<sup>8</sup> food-based standards for non-lunch food in September 2007; and primary schools are currently working towards the introduction of food-based and nutrient standards for September 2008. The impact of this critical public health nutrition initiative will require evaluation, both during the process of transformation and on the impact on children's nutrition and health in future years.

At present, about 50% of primary school children bring their lunch from home.<sup>2</sup> However, relatively few studies have examined the nutritional quality of packed lunches. There is the perception that packed lunches are nutritionally sound, cheaper and more familiar or acceptable to children than school lunches. However, studies looking at the nutritional quality of packed lunches, either alone<sup>9</sup> or in comparison with school lunches,<sup>4</sup> conclude that while the need to improve school food is acknowledged, the nutritional quality of packed lunches tends to be inferior compared with school lunches.

The aim of this report is to describe the energy and nutrient content of lunchtime choices of a population of primary-school children following the introduction of the 2006 interim food-based standards for school lunches.<sup>8</sup> The nutritional profile and proportion of lunch choices meeting the standards for school food for children taking a school lunch or packed lunch from home are also compared.

## **Methods**

### ***Study design and participants***

Cross-sectional analysis of data collected between February and March 2007 as part of a school food and dining experience study (details to be reported elsewhere). Participants were 136 8-10 year olds (years 4 and 5) from 6 primary schools in Sheffield, taking either a school lunch (n=71) or a packed lunch (n=65) at lunchtime.

### ***Data collection & preparation***

Children's lunchtime food and drink choices were observed on 2 occasions in the same week by a trained nutritionist. Portion weights for all food and drink items were recorded, pupil leftovers weighed to the nearest gram and energy and nutrient intake calculated by subtracting leftover weights from portion weights chosen. Food group, energy and nutrient data were estimated using the Food Standards Agency nutrient databank, modified to include the 124 composite study school lunch recipes. All food coding was double-checked, with 10% of data entry checked and quality assurance measures employed to identify extreme values.

## Data analysis

Data analysis was undertaken using SPSS v 15.0 (SPSS Inc, Chicago). Based on the data distribution and evaluation of potential confounders, results are reported using mean $\pm$ SD and analyses performed using parametric statistics (Independent t-test, 1-way ANOVA or Chi Square test as appropriate). Comparisons by type of lunch were based on recorded type of lunch on the two observation occasions. Children were categorised into two groups 'school lunch' (if on  $\geq 1$  occasion a children consumed a school lunch) or 'packed lunch' (all other). Comparisons by type of lunch were undertaken for actual energy and nutrient intake, and as a proportion of children meeting the food-based and nutrient-based standards for school lunches.

## Results

### *Foods eaten by the food-based standards for school food*

Children taking a school lunch compared to a packed lunch were more likely to choose foods from the following categories; **vegetables** (72% children taking a school lunch versus 6% taking a packed lunch chose item from this category), extra **bread** (37% versus 9%) and starchy food cooked in oil (33% versus 0%). Children taking a school meal did not choose any food items from the **confectionery** or **snacks** categories and drinks were only from the **healthier drinks** choices.

Sixty-five percent of children taking a packed lunch from home chose a food item from the **confectionery and snacks** categories, with 28% of children eating both a confectionery and snack item from their packed lunch. Thirty-one percent of packed lunches contained a drink that did not meet the **healthier drinks** food-based standard for school food. Children taking a packed lunch were more likely to choose foods from the **fruit** category (31% versus 23%). This was based on criteria of a fruit-based dessert to be 50% fruit content as a percent of raw ingredients. However if all fruit-based desserts were included (ie desserts contained  $\geq 30\%$  fruit content), the percent of children taking a school lunch who had an item from the fruit category was 45%.

In both groups, 10% of lunches contained a choice from the **meat product** categories at lunchtime and the number of children choosing foods from the oily fish, snacks without fat/sugar/salt or condiments categories were low. The lunch choice patterns described above were also reflected in differences in the grams of foods chosen and eaten by each of the food-based standard categories.

### *Energy and nutrient intake*

Mean content of energy, carbohydrate, non-milk extrinsic sugars, total fat, saturated fat and sodium were lower and fibre content was significantly higher for school lunches compared to packed lunches (Table 1). Mean calcium content was significantly higher in the packed lunches. These nutrient patterns were also observed when looking at nutrients derived from food eaten.

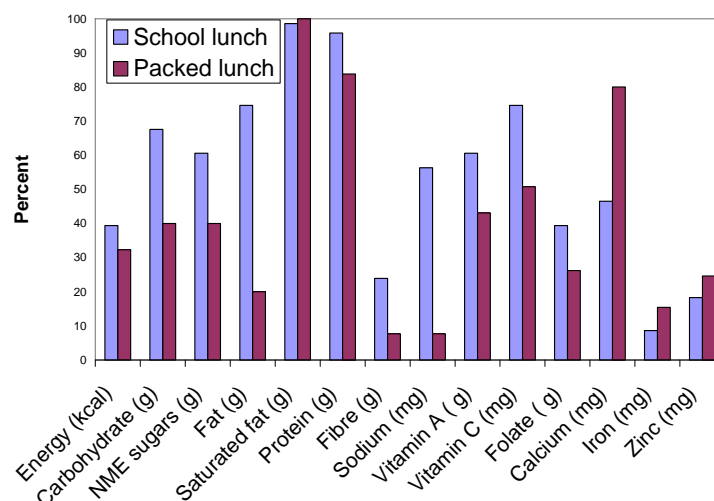
**Table 1. Mean and standard deviation for energy and nutrient content of items provided at lunchtime for energy and nutrients covered by the 2008 standards for school food**

	School lunch	Packed lunch	P value*
N	71	65	
Energy (kcal)	449.3±146.7	647.9±162.2	0.000
Carbohydrate (g)	63.3±17.8	84.0±24.4	0.000
Non-milk extrinsic sugars (g)	12.3±8.0	26.4±18.9	0.000
Fat (g)	15.8±9.2	29.7±10.0	0.000
Saturated fat (g)	6.0±4.4	11.4±5.1	0.000
Protein (g)	17.5±5.7	16.4±5.2	0.248
Fibre (g)	4.7±1.6	3.1±1.2	0.000
Sodium (mg)	561.5±241.9	576.7±232.6	0.000
Vitamin A (µg)	266.8±244.5	183.2±118.2	0.014
Vitamin C (mg)	18.4±15.5	26.5±32.6	0.059
Folate (µg)	50.8±14.2	44.8±17.6	0.030
Calcium (mg)	198.3±109.1	301.9±147.8	0.000
Iron (mg)	2.3±0.3	2.4±0.7	0.448
Zinc (mg)	2.0±1.0	1.9±0.8	0.250

\* Independent t-test with Bonferroni correction for multiple testing. Significance level  $p < 0.004$ .

### Nutrient intake compared to nutrient-based standards

A greater proportion of children taking a school lunch compared to a packed lunch met the 2008 nutrient standards for school food for carbohydrate, non-milk extrinsic sugars, total fat, fibre, sodium, vitamin A and vitamin C (Figure 1,  $p < 0.004$ ). The number of children meeting the nutrient-based standards derived from foods consumed was also higher in the school lunch group for carbohydrate, total fat, fibre and sodium. However, for food eaten, more children taking a packed lunch met the nutrient standard for energy (38% versus 15%) and calcium (43% versus 23%).

**Figure 1. Percent of lunchtime choices meeting the 2008 nutrient standards for school lunches**

### Summary

Previous studies have highlighted that school lunches and packed lunches were not making a positive contribution to children's nutritional intake.<sup>4,5</sup> However, the nutritional profile of school lunches tended to be more positive in terms of lower levels of key nutrients such as total fat, saturated fat, sugar, salt and higher in fibre and micronutrients compared to packed lunches.<sup>4</sup> The findings presented here are consistent with these previous observations. However, they also provide some evidence that the re-introduction of standards for school food may be having a positive impact on both the food choices and nutritional profile of school lunches.

Compared with a study of children's lunch intake earlier this decade,<sup>4</sup> levels of total and saturated fat, sodium observed here were lower and intake of micronutrients higher. However, while the introduction of food-based standards may be shaping the foods chosen at lunchtime, and the nutrient profile for some nutrients (e.g. fat, sodium, NME sugars), the introduction of nutrient standards remains warranted, particularly in relation to micronutrients such as iron and calcium.

The differences in food choices and nutrient profile between school lunches and packed lunch, as reflected in the proportion of children whose choices met the 2008 nutrient standards for school food, appears to be widening following the re-introduction of standards for school food provision. The nutrient differences are not unexpected based on the differences in food choices, in particular the high presence of confectionery and snack foods in packed lunches.

## Implications and next steps

School lunches are an easy and economical option available to parents to support them in their crucial role of providing their children with nutritious food during the school day. The findings presented here highlight the need to continue to promote the adoption of the interim food-based standards and work toward achieving the 2008 food and nutrient standards for school food. This needs to be in terms of optimising school food provision (e.g. finding ways to increase the fruit content of dessert choices) as well as supporting menu changes with nutrition promotion strategies to ensure children benefit from quality school food provided (eg to ensure changes in the energy and nutrient content of food provided translates to changes in children's intake patterns).

Strategies to assist schools to adopt the school food standards and increase take up of school meals would also help to address the gap between the nutritional content of packed lunches compared with school lunches. A school food policy to achieve consistent provision across all food consumed at school, including food brought from home, would help to ensure all children benefit from good food at school and support a whole school approach to healthy eating.

---

A full version of the report for the 'School lunch and behaviour study' containing further details of these findings will be available on the School Food Trust website by October 2007. Resources are available to assist schools and catering provides with the ongoing process of transforming school food.

- Revised guide to standards for school lunches  
[www.schoolfoodtrust.org.uk/2007b](http://www.schoolfoodtrust.org.uk/2007b)
- Guide to the new food-based standards for food other than lunches  
[www.schoolfoodtrust.org.uk/2007a](http://www.schoolfoodtrust.org.uk/2007a)
- A fresh look at vending in schools  
[www.schoolfoodtrust.org.uk/vending](http://www.schoolfoodtrust.org.uk/vending)
- A fresh look at the school meal experience  
[www.schoolfoodtrust.org.uk/doc\\_item.asp?DocId=45&DocCatId=9](http://www.schoolfoodtrust.org.uk/doc_item.asp?DocId=45&DocCatId=9)
- Eat Better Do Better - The Movies  
[www.schoolfoodtrust.org.uk/doc\\_item.asp?DocId=18&DocCatId=9](http://www.schoolfoodtrust.org.uk/doc_item.asp?DocId=18&DocCatId=9)
- A short booklet for parents and carers: changing for the better  
[www.schoolfoodtrust.org.uk/doc\\_item.asp?DocId=16&DocCatId=9](http://www.schoolfoodtrust.org.uk/doc_item.asp?DocId=16&DocCatId=9)
- Celebrity posters for secondary schools  
[www.schoolfoodtrust.org.uk/doc\\_item.asp?DocId=39&DocCatId=9](http://www.schoolfoodtrust.org.uk/doc_item.asp?DocId=39&DocCatId=9)
- Celebrity posters for primary schools  
[www.schoolfoodtrust.org.uk/doc\\_item.asp?DocId=38&DocCatId=9](http://www.schoolfoodtrust.org.uk/doc_item.asp?DocId=38&DocCatId=9)

---

## References

- <sup>1</sup> Gregory et al (2000). *National Diet and Nutrition Survey of Young People aged 4 to 18 years*. London: The Stationary Office.
- <sup>2</sup> Nelson and Nicholas. (2006). First annual survey of take up of school meals in England. [http://www.schoolfoodtrust.org.uk/UploadDocs/Library/Documents/sft\\_baseline\\_survey.pdf](http://www.schoolfoodtrust.org.uk/UploadDocs/Library/Documents/sft_baseline_survey.pdf)
- <sup>3</sup> School Meals Review Panel (2005). Turning the Tables – Transforming School Food: The Development and implementation of nutritional standards for school lunches. [http://www.schoolfoodtrust.org.uk/UploadDocs/Library/Documents/SMRP\\_Report\\_FINAL.pdf](http://www.schoolfoodtrust.org.uk/UploadDocs/Library/Documents/SMRP_Report_FINAL.pdf)
- <sup>4</sup> Rogers, Ness, Hebditch, Jones, Emmett (2007). *Quality of food eaten in English primary schools: school dinners vs packed lunches*. *European Journal of Clinical Nutrition*, 61, 856–864.
- <sup>5</sup> Nelson, Nicholas, Suleiman, Davies, Prior, Hall, Wreford, Poulter (2006). *School meals in Primary Schools in England. Research Report RR753*. London: Department for Education and Skills.
- <sup>6</sup> Statutory Instrument 2000 No. 1777. *Education (nutritional standards for School Lunches) (England) Regulations 2000*. London: TSO.
- <sup>7</sup> Statutory Instrument 2007 No. 2359. *The Education (Nutritional Standards and Requirements for School Food) (England) Regulations 2007*. London: TSO.
- <sup>8</sup> Statutory Instrument 2006 No. 2381. *The Education (Nutritional Standards for School Lunches) (England) Regulations 2006*. London: TSO.
- <sup>9</sup> Jefferson and Cowbrough (2004). School lunch box survey. Community Nutrition Group, British Dietetic Association/ Food Standards Agency.
-