Primary school food survey 2009
2. School lunches versus packed lunches

Overview
By September 2008, all primary schools in England were required by law to meet new food-based and nutrient-based standards for school food provision. The School Food Trust has carried out a survey in a nationally representative sample of 139 primary schools in England to assess the impact of the standards on catering provision and pupil food selection and consumption by pupils taking a school lunch. In addition, the food consumption of pupils bringing a packed lunch was evaluated.

Healthier food and drink items were chosen and eaten more frequently by pupils taking a school lunch than those bringing a packed lunch, and packed lunches often included items now restricted in school lunches. Average nutrient intakes from school lunches as eaten were more often in line with healthy eating recommendations than intakes from packed lunches. These findings are consistent with previous research on packed lunches, suggesting that while school lunches have improved following introduction of the new standards, packed lunches have not. These findings support the ongoing work of the Trust to promote the take-up of school meals.

Background
Primary school pupils may either take a meal provided by the school or bring in their own packed lunch from home. Take-up of school meals in primary schools during 2008-2009 was 39.3% with the vast majority of the remainder bringing a packed lunch.1

Since the 1980s, parents have increasingly viewed packed lunches as more nutritious than school meals,2 although some parents hold the opposite view.3 4 5 Studies conducted before and after the introduction of the 2006 food-based standards found that packed lunches typically contained fewer fruits and vegetables and more sources of sugar, saturated fat and sodium than school lunches,3 3 although they often provided more calcium and iron.6 Packed lunches eaten by children from low income households were typically of poorer nutritional quality.7

With the introduction of the mandatory food-based and nutrient-based standards8 in September 2008, primary school food at lunchtime has improved compared with 2005.9 These standards do not apply to packed lunches brought from home, although a good number of primary schools have introduced packed lunch policies to support
healthier eating and offer clear guidance and an opportunity to improve food consumed by all pupils. Research carried out in 2006 assessed the quality of school lunches in 1294 8-9 year-old pupils across the UK and reported that packed lunches were still generally of poor nutritional quality; only 1% of packed lunches met all of the final food-based standards for England.

The present study is the first national survey in England to compare school lunches and packed lunches following the introduction of compulsory nutritional standards for school lunches in primary schools in September 2008. Based on direct measures of lunchtime consumption in a nationally representative sample of 139 state-maintained primary schools in England, the findings highlight the key differences between 6,690 school lunches and 3,481 packed lunches.

Aims of the overall survey
The survey was undertaken to:
- observe and record the provision of all food and drink in a sample of school dining rooms
- observe and record the food and drink choices of a random sample of pupils having a school lunch
- determine the consumption and wastage of all food and drink served
- measure the consumption of food and drink from packed lunches
- assess the nutrient content of school lunches and packed lunches
- assess compliance of provision with the food-based and nutrient-based standards for school food

How the data were collected
The study was carried out by a consortium of workers from the School Food Trust, TNS-BMRB and Nutrition Works!

A nationally representative sample of 139 primary schools in England was selected. The food choices and nutrient intake of 3,481 pupils bringing a packed lunch (1,610 boys; 1,818 girls; 53 sex not recorded) in 138 schools and 6,690 pupils (3247 boys; 3339 girls; 104 sex not recorded) taking a school lunch in 136 schools were recorded. Fieldwork was conducted over the lunchtime period on five consecutive days at each school between February and April 2009. Each day, trained fieldworkers randomly selected five packed lunch pupils and ten school lunch pupils and observed, weighed and recorded all their lunch items and leftovers.

Further details on the collection methods of school lunch data along with findings about school lunches can be found in the Primary School Lunch Food Survey 2009: 1. School lunch: provision, selection and consumption.

Food and drink eaten by pupils at lunchtime
Based on direct observations of what pupils’ ate, Figure 1 compares the percentage of pupils who ate specific types of food and drink, by food group, according to whether they took a school lunch or brought a packed lunch. A greater proportion of pupils taking school lunches ate more of ‘healthier’ items and fewer ‘less healthy’ items. For example, 66% of pupils taking school lunches took servings of vegetables

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*a Findings on food and drink provision, choices of pupils having a school lunch, consumption and wastage, and assessment of compliance of provision with the food-based and nutrient-based standards for school food have been presented in a previous research summary.

*b One school in the final recruited sample served only school meals, no packed lunches were permitted.

*c Three schools in the final recruited sample did not have a school meals service.*
and salad compared with only 8% of pupils bringing packed lunches. Similar trends were seen for water. Far fewer pupils taking school lunches ate confectionery, non-permitted drinks and snacks.

Of the 84% of pupils bringing packed lunches that had sandwiches, 51% had savoury fillings without salad, 13% with salad, and a further 20% had sandwiches with a sweet filling (jam, chocolate spread, etc.), whereas 35% of pupils taking school lunches had vegetables in mixed dishes. In contrast, more packed lunch pupils ate dairy products (e.g. cheese, yogurt, milk, milky drinks), and a higher percentage ate fruit or fruit-based desserts.

Figure 1. Percentage of pupils eating food and drink items, by food group, by type of lunch,* Primary schools in England, 2009
Base: 3481 pupils bringing packed lunches; 6690 pupils taking school lunches.
Fruit included fruit-based desserts provided at school lunches (containing an average of 40% fruit)
*All differences were statistically significant at p<0.001.

Fruits and vegetables
Table 1 shows the average number of portions of vegetables and fruit† eaten by pupils taking school lunches compared to pupils bringing packed lunches.

Over 90% of pupils taking a school lunch ate food and drink items containing vegetables, salad, pulses or fruit (including fruit juice) compared with only 58% of pupils bringing packed lunches.

Amongst ‘consumers’ (those pupils who ate an item), an average of 1.7 portions of fruit and vegetables were eaten by pupils bringing packed lunches and pupils taking school lunches. When all sources of fruit and vegetables were taken into account (including fruit juice, pulses, and baked beans), both groups ate an average of 1.8 portions. When average across all pupils and all sources of fruit and vegetables,

† One portion of vegetable=40g; one portion of fruit =40g.
One portion of fruit juice=150ml; one portions of beans and pulses=40g. Fruit juice, and baked beans and pulses count as maximum of one portion per day.
Composite dishes contained an average of 28% vegetables; fruit based desserts contained an average of 40% fruit; sandwiches contained an average of 9% salad.
Proportion of baked beans to pulses as served=0.97.
however, those taking school lunches ate more portions (1.6) compared with pupils eating packed lunches (1.0 portion). Thus, pupils having school lunches appear to be closer to the goal of the legislation which ensures that every pupil has access to two portions of fruit and vegetables each day at lunchtime.

Compared with pupils taking school lunches, a greater proportion of pupils bringing packed lunches consumed fruit or fruit-based dessert (41% vs. 36%). Amongst ‘consumers’, pupils eating packed lunches who had fruit in their lunchbox had more (1.8 portions of fruit) compared with pupils taking school lunches (1.2 portions). This was mainly in the form of fruit portions.

<table>
<thead>
<tr>
<th>Food or drink</th>
<th>School lunch</th>
<th>Packed lunch</th>
</tr>
</thead>
<tbody>
<tr>
<td>% eating consumers only</td>
<td>School lunch</td>
<td>Packed lunch</td>
</tr>
<tr>
<td>% eating all pupils</td>
<td>School lunch</td>
<td>Packed lunch</td>
</tr>
<tr>
<td>% eating consumers only</td>
<td>School lunch</td>
<td>Packed lunch</td>
</tr>
<tr>
<td>% eating all pupils</td>
<td>School lunch</td>
<td>Packed lunch</td>
</tr>
<tr>
<td>Vegetables, salad or dishes with vegetables</td>
<td>70.4</td>
<td>1.2</td>
</tr>
<tr>
<td>Baked beans and pulses</td>
<td>30.6</td>
<td>0.8</td>
</tr>
<tr>
<td>Fruit or fruit-based desserts</td>
<td>36.1</td>
<td>1.2</td>
</tr>
<tr>
<td>All foods containing vegetables, salad, baked beans, pulses or fruit (excluding fruit juice)</td>
<td>89.2</td>
<td>1.7</td>
</tr>
<tr>
<td>Fruit juice</td>
<td>14.5</td>
<td>0.7</td>
</tr>
<tr>
<td>All food and drink containing vegetables, baked beans, pulses or fruit (including fruit juice)</td>
<td>91.0</td>
<td>1.8</td>
</tr>
</tbody>
</table>

Base: 3,481 packed lunch pupils; 6,690 school lunch pupils
*All differences in % eating between groups were found to be statistically significantly at p ≤ 0.008
**Differences in consumers between the groups were found to be statistically significantly at p ≤ 0.03

Mean energy and nutrient intakes

Table 2 shows the mean energy and nutrient intakes of pupils eating a school lunch or a packed lunch.

The average meal consumed by pupils eating school lunches and packed lunches met the standards for protein, fat and vitamin C (shown in bold). Neither group of pupils met the standard for iron, zinc, fibre and folate. Only the packed lunch group met the standard for calcium.

The average packed meal eaten by pupils contained a higher percentage of energy from NMES and saturated fat than expected from the standards, but these standards were met in the average school lunch eaten by pupils.

The nutrient content of an average packed lunch contained more carbohydrate, NMES, fat, saturated fat, vitamin C, sodium, calcium, and less protein, fibre and zinc, than a school meal. The higher mean carbohydrate consumption found in the packed lunch group can be attributable, at least in part, to the higher intake of NMES (mainly from fruit juice). The difference in the amount of these nutrients between pupils eating a packed lunch and those consuming a school lunch increased with age, suggesting that as pupils get older, the difference in the amount of these nutrients consumed increases between the two groups (table not shown).

The energy content of an average meal eaten was below the standard in both groups. This is based on school lunch contributing around one third of a pupil’s daily calorific intake, but may not be inappropriate considering the increased prevalence of childhood obesity.
Table 2. Mean energy and nutrient intake, by type of lunch, Primary schools in England, 2009

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Nutrient-based standard mean</th>
<th>School lunch (n=6690) mean</th>
<th>School lunch (n=6690) sd</th>
<th>Packed lunch (n=3481) mean</th>
<th>Packed lunch (n=3481) sd</th>
<th>Difference mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy (kcal)</td>
<td>530</td>
<td>396</td>
<td>179</td>
<td>453</td>
<td>179</td>
<td>-57</td>
</tr>
<tr>
<td>Protein (g)</td>
<td>7.5</td>
<td>15.2</td>
<td>7.1</td>
<td>13.5</td>
<td>6.4</td>
<td>1.7</td>
</tr>
<tr>
<td>Carbohydrate (g)</td>
<td>70.6</td>
<td>57.0</td>
<td>26.5</td>
<td>64.6</td>
<td>25.9</td>
<td>-7.5</td>
</tr>
<tr>
<td>NMES (g)</td>
<td>15.5</td>
<td>11.9</td>
<td>10.6</td>
<td>18.2</td>
<td>13.6</td>
<td>-6.2</td>
</tr>
<tr>
<td>Fat (g)</td>
<td>20.6</td>
<td>13.3</td>
<td>8.6</td>
<td>17.4</td>
<td>9.4</td>
<td>-4.2</td>
</tr>
<tr>
<td>SFA (g)</td>
<td>6.5</td>
<td>5.0</td>
<td>3.7</td>
<td>6.6</td>
<td>4.1</td>
<td>-1.5</td>
</tr>
<tr>
<td>Fibre (g)</td>
<td>4.2</td>
<td>4.0</td>
<td>2.2</td>
<td>2.8</td>
<td>1.6</td>
<td>1.3</td>
</tr>
<tr>
<td>Sodium (mg)</td>
<td>499</td>
<td>444</td>
<td>283</td>
<td>629</td>
<td>309</td>
<td>-185</td>
</tr>
<tr>
<td>Vitamin A (µg)</td>
<td>175</td>
<td>243</td>
<td>330</td>
<td>117</td>
<td>187</td>
<td>126</td>
</tr>
<tr>
<td>Vitamin C (mg)</td>
<td>10.5</td>
<td>17.3</td>
<td>16.9</td>
<td>25.9</td>
<td>30.3</td>
<td>-8.5</td>
</tr>
<tr>
<td>Folate (µg)</td>
<td>53</td>
<td>50.1</td>
<td>26.4</td>
<td>38.3</td>
<td>28.9</td>
<td>11.8</td>
</tr>
<tr>
<td>Calcium (mg)</td>
<td>193</td>
<td>168</td>
<td>122</td>
<td>213</td>
<td>121</td>
<td>-44</td>
</tr>
<tr>
<td>Iron (mg)</td>
<td>3.0</td>
<td>1.9</td>
<td>0.9</td>
<td>2.0</td>
<td>1.0</td>
<td>-0.1</td>
</tr>
<tr>
<td>Zinc (mg)</td>
<td>2.5</td>
<td>1.7</td>
<td>1.0</td>
<td>1.5</td>
<td>0.8</td>
<td>0.2</td>
</tr>
</tbody>
</table>

**Percent energy from:**

- Protein ≥ 50 % 54.8 10.7 54.1 9.8 0.7
- NMES ≤11% 10.7 8.4 15.0 10.3 -4.3
- Fat ≤ 35 % 28.7 10.4 33.9 9.7 -5.2
- SFA ≤ 11 % 10.8 5.4 12.7 5.4 -1.9

Base: 6,690 pupils taking a school lunch (from all 136 schools); 3,481 pupils taking a packed lunch (from 135 of the schools)

sd – standard deviation

Difference=school lunch-packed lunch

All differences between school lunch and packed lunch were found to be statistically significant at p ≤0.001

**Conclusions**

The findings in this report provide clear evidence that on balance, lunches provided by schools are more healthy than lunches brought from home.

Because the contents of packed lunches is not regulated (except in a small number of primary schools which strictly enforce packed lunch policies), pupils who eat packed lunches on average consume more meat products (e.g. sausages, meat pies, pasties) and non-permitted food and drink items (e.g. drinks high in sugar, and snacks high in sugar and salt), all items which schools either restrict or ban at lunchtime under the new mandatory standards for school meals. As a result, pupils who eat packed lunches typically have higher average intakes of sugar (NMES), fat, saturated fat and salt than those taking a school lunch. Our findings are consistent with previous research undertaken in primary schools assessing the quality and nutritional content of packed lunches. Findings repeatedly show that the quality and nutrient content of packed lunches is inferior to those from school lunches, again containing food and drink items which are high in fat, sugar and salt. Conversely, pupils who bring a packed lunch have more fruit, fruit juice and dairy items (such as cheese, yogurt and fromage frais), resulting in higher average intakes at lunchtime of vitamin C and calcium compared with pupils taking school lunches. However, the popularity of such items in packed lunches is also contributing to the
greater amounts of sodium, fat, saturated fat and NMES present compared with school lunches.

Our findings support the ongoing work of the School Food Trust (the Trust) to promote the take up of school meals, particularly through efforts to increase knowledge surrounding free school meal eligibility for low-income families.

Challenges
The introduction of legislation to change the balance of provision of school lunches toward healthier options, together with the Trust's continued efforts to support the development of skills and to change attitudes across a wide range of stakeholders, has resulted in a positive shift in the nutritional profile and quality of school food and drink available compared with 2005.13 Food and drink items provided in packed lunches are not covered by the food-based or nutrient-based standards, and in consequence packed lunches often contain foods high in fat, salt and sugar. This contradicts the messages on healthy eating at school (in both the classroom and the dining room), and makes the job of encouraging more pupils to have school lunches more difficult.

In a bid to improve the eating habits of pupils in school and the profile of packed lunch items (to bring them in line with the nutritional standards for all school food), it is recommended that schools:
- Introduce a whole school food policy to promote consistent provision across all food consumed at school, including food brought from home
- Enforce packed lunch policies which promote healthier eating
- Promote school meals as the simplest way to achieve healthy eating at lunchtime and to increase take up.

Developing a school food or packed lunch policy would help to achieve consistent provision across all food and drink consumed at school (including items brought from home) and would enable all children to benefit by addressing the gap between the nutritional content of packed lunches and school lunches. The Trust has produced a Packed Lunch Policy Toolkit which outlines six steps to develop and implement a healthy packed lunch policy within schools. It provides information, advice and guidance on how to develop a healthy packed lunch policy; engage pupils in the development process; marketing; reviewing and monitoring the success of the policy; and includes examples of compliant menus and recipes. Adoption of such a policy should encourage more pupils to choose healthier alternatives, by having more salad, vegetables and fruit at lunchtime and reducing the number of drinks, snacks and confectionery high in fat, sugar and salt.

Ideally, children should be encouraged to take school lunches rather than opting for packed lunches. This would ensure that they have access to a range of healthy food and drink items, thus helping them to choose and consume energy appropriate and nutrient dense meals at lunchtime. However, as long as pupils continue to bring packed lunches, it is important that schools are helped to develop appropriate policies consistent with wider Government strategies for healthy living14 and to support the Change4Life15 initiative which aims to reduce the prevalence of childhood overweight and obesity.
Research and reporting

The research was designed and carried out by Michael Nelson, Dalia Haroun, Clare Harper, Lesley Wood, Jo Nicholas and Lesley Stevens, with additional help from Laura Sharp of the School Food Trust, members of the TNS research team (Gillian Prior, Louise Hall, Susie Smyth, Camilla Huckle), TNS research nutritionists (Laura Scruby, Cara Monahan) and Jenny Poulter of Nutrition Works! This Research Report was prepared by Clare Harper, Jo Pearce, Dalia Haroun, Lesley Wood and Michael Nelson. Copies are available from the School Food Trust website: www.schoolfoodtrust.org.uk

References