



The process and impact of change in the school food policy on food and nutrient intake of children aged 4-7 and 11-12 years both in and out of school; a mixed methods approach

- School meal provision was introduced in the mid-19th Century as a public health response to under-nutrition of children. In the late 20th Century, the focus for public health shifted as the obesity epidemic in children emerged, and a number of nutrition-related public health initiatives were introduced. One such initiative was the introduction of the school food policy in England in 2006; primary and middle schools were to be fully compliant by September 2009.
- A mixed methods approach was used to collect data at both school and individual level from two age-groups in Newcastle and Northumberland, North East England. Dietary, anthropometric and socio-economic data were collected using identical quantitative methods pre, mid and post-implementation of the school food policy. Data on food eaten at school (school lunch or packed lunch) and throughout the day were collected. A qualitative approach was used to examine the process of implementation of the policy.
- There were significant improvements in the nutrient content of both school and packed lunches in children aged 4-7yrs; the extent of change was greatest in school lunches. There was less evidence of such changes for children aged 11-12yrs.
- The effect of lunch type choice (school or packed lunch) on total dietary intake changed from pre to post-implementation of the school food policy in that those having school lunch had intakes more in line with recommendations. For some nutrients, this was a reversal of intakes prior to the school food policy and demonstrates the impact of the school food policy not only on lunch time intake but also on the total dietary intake of 4-7 yr olds.
- In contrast to our findings in 4-7yr olds there was limited evidence of the effect of school lunch type on the total diet of 11-12yr olds; the exception was in % energy from fat. Mean daily intakes from iron and folate fell from 1999-00 to 2009-10; it is important to note these were both below the Reference Nutrient Intake (RNI) in 1999-00 and remained so in 2009-10.
- The process evaluation suggested that schools coped well with challenges involved in implementing the school food policy. The knowledge and skills of catering staff, their ability to adapt to new processes and ways of working were important factors as was the level of commitment from senior managers. It was evident for both age groups that the food choice available was only one factor in the decision to have school lunch or packed lunch; the dining room experience and encouragement offered to children is part of this choice.
- Our findings, particularly for 4-7yr olds, have demonstrated the potential for school lunch to have a positive impact on the total diet. To maximise this impact there is a need for a concerted effort to ensure full compliance with the policy for all age groups and to encourage and facilitate children to take advantage of school lunch.

Background

School meal provision was introduced in the mid-19th Century as a public health response to widespread under-nutrition evident in children. By the late 20th Century, the focus for public health shifted as the obesity epidemic in children emerged; and as part of this, the need to improve children's diets was identified. Central to 'improving children's diets' is the need for a reduction in % energy from fat, saturated fat, non-milk extrinsic sugars 'added sugars' and intakes of sodium, while maintaining and increasing intakes of protein, non-starch polysaccharides (NSP 'fibre') and micronutrients such as calcium and iron.

Following a period from 1980 to 2000 when there was no regulation of school food and a plethora of evidence pertaining to the poor state of children's diets, the last ten years have seen a major acceleration in public health initiatives. One such initiative was in 2006 when the Government announced new standards for school food in England. These standards are both food and nutrient-based, crucially, they state what should be served but also what *cannot* be served (for example, confectionery and crisps), and limit the number of times that certain foods can be served (for example, meat products, starchy foods cooked in fat or oil and deep-fried foods). Such a change in school food has potential to impact on the diet of children from across the socio-economic spectrum and so impact on inequalities in health.

The primary aim of the study was to measure the process and effect of change in national school food regulations on food and nutrient intake of children aged 4-7yrs (primary school) and 11-12yrs (middle school) both at school and throughout the day.

Full details of this project can be seen on the PHRC website (<http://phrc.lshtm.ac.uk>).

Methods

Dietary intake

A cross-sectional study was undertaken in two areas of North East England. Dietary, anthropometric and socio-economic data were collected from children aged 4-7yrs and 11-12yrs who consented to take part. These data were collected at three different time points (pre, mid and post-

implementation of the school food policy) in both primary (n=12) and middle schools (n=5) at two levels; school and individual. Data were collected from 4-7yr olds (n=1,662) by direct observation during the school day and parental completion at home. Four-day food intakes included three weekdays and one weekend. The 11-12 yr olds (n=883) recorded their own dietary intake in two 3-day food diaries approximately six months apart; this included four weekdays and two weekend days. On the day following, or at most two days (to minimise memory lapse) after completion of each food diary, each child was interviewed by the study nutritionist. Interviews took place on an individual basis and were used to review the diary with the child to ensure all foods eaten over the three days had been recorded, to clarify the information recorded in the diary and to ascertain portion size of foods consumed.

Anthropometry

Anthropometric measurements including height, weight and waist-circumference were obtained from children who had consented.

Socio-economic indicators

All schools taking part provided anonymous postcodes for all eligible children and were collected from parents of all consenting children. SES was assessed using the Index of Multiple Deprivation (IMD).

Process evaluation

Implementation was examined at two levels, first across all schools taking part and secondly in more depth in a smaller sub-sample of schools.

The first level of data collection assessed progress towards implementation across all participating schools by contacting the policy lead in each school prior to, and following, the implementation deadline. At the second level of data collection, a case study approach was used to provide more detailed insights into the implementation process within selected individual schools, and the main factors hindering and facilitating implementation. In the selected case study schools, further interviews were conducted with key implementers, including catering staff, teachers and teaching assistants, dining supervisory staff, administrators and governors. Focus groups were conducted with parents in selected primary and middle schools, and

also with children in the case study middle schools.

Key findings

Change in dietary intake of 4-7yr olds 2003-04 to 2008-09

There were significant improvements in the nutrient content (% energy from total fat and saturated fat and sugars) of both school lunches and packed lunches; however the extent of change was greatest in school lunch. School lunches were higher in NSP and micronutrients (iron, calcium and vitamin C) and lower in % energy from fat, saturated fat and absolute intakes of fat, saturated fat and sodium than packed lunches. There was evidence of a widening gap between school and packed lunches, with school lunch offering the healthier option post-implementation of the school food policy.

There were also significant improvements in total dietary intake. In 2008-09 children had diets lower in fat, saturated fat, sugars and sodium but also higher in protein, NSP and micronutrients than in 2003-04. Clearly children's food choice is influenced by many factors other than school lunch type. Despite this, we found that there was a significant interaction between year and lunch type for 10 out of 17 nutrients examined in this study. That is, not only were school lunches, on average, of higher nutrient quality than packed lunches, but those children having school lunch rather than packed lunch had the more favourable total dietary intake.

Change in dietary intake of 11-12yr olds 1999-00 to 2009-10

In these older children, there were significant improvements in the content of some nutrients in both school and packed lunch. There was a fall in the mean % energy from fat, saturated fat and in the amount of sodium (mg) in school lunches consumed by these older children. These improvements were not observed in packed lunches. Conversely, there were increases in the average content of NSP, calcium, vitamin C and vitamin A in packed lunches which were not observed in school lunches. There was also a fall in iron and folate in school lunch.

With respect to total diet, there were significant improvements in % energy from fat but no change in saturated fat or sugars which both remained above

recommendations. There was a favourable reduction in sodium, and an increase in calcium and vitamin C, but also and importantly, there was a significant reduction in intakes of iron and folate; the fall in intakes of these micronutrients, particularly in girls, is a cause for concern. In contrast to our findings in 4-7yr olds, there was limited evidence of the effect of school lunch type on the total diet of 11-12yr olds. The exception was in % energy from fat; in 1999-00 children having school lunch had a higher total fat intake than those having packed lunch; by 2009-10 this difference was no longer apparent.

Extent and process of implementation

The process evaluation suggested that schools included in this study had coped well with the challenges involved in implementing the school food policy. In Local Authority provision schools, school lunch menus were developed and nutritionally analysed centrally, meaning that the main challenges for schools were adjusting to the increased amount of preparation involved and promoting the new meals to parents and children. The knowledge and skills of catering staff themselves and their ability to adapt to new processes and ways of working were also important implementation factors.

Another factor which influenced implementation of the standards was the amount of commitment at senior management level. Senior managers who were strongly committed to school food issues tended to see school meals not simply as a functional service provided by the school but as integral to children's education.

Children's reactions to school meals were not based solely on the food but were strongly coloured by negative aspects of the whole dining experience, such as queuing, being rushed, and the perception that children on packed lunches had more choice and preferential treatment. The strength of feeling around these issues and their potential to deter children from having meals, particularly as they become older and more concerned with the social aspects of food, underline the importance of reducing the competing appeal of packed lunches and of addressing the whole dining experience.

Implications for policy, practice and future research

The study found evidence of many encouraging changes in the diet of children aged 4-7yrs and 11-12yrs. School food is just one of many factors influencing children's diet but our findings clearly show the effect that school lunch can have on children's total diet and thus the beneficial effect of the school food policy. The extent of this change was different in primary schools (4-7yr olds) than for older children (11-12yr olds). This reflects our finding that, while primary schools were compliant with the policy, middle schools were still working towards this and demonstrates the greater challenge of influencing food choice as children become older and more autonomous in their food choice.

For both age groups, it was evident that the food on offer was only one factor in the decision to have school lunch or packed lunch; the dining room experience and encouragement offered to children is part of this choice. This is supported by the findings from the process evaluation where interviewees from several schools cited the importance of providing face-to-face guidance and encouragement to children at the point of choosing their meal and while eating. Similarly, issues around queuing for lunch and the general ambience of the dining room discouraged some children from choosing a school lunch.

Our findings for 4-7yr olds have demonstrated the potential for school lunch to have a positive impact on the total diet. To realise the full potential of this impact, school meals should continue to be promoted to both children and parents. This calls for continued and concerted effort to change perceptions of school lunch; this is a particular challenge in children aged 11yrs and older.

While every effort should be made to ensure children can benefit from a healthy school lunch, there will always be some children who choose a packed lunch. Whether comparable policies can be applied to packed lunch remains a subject of debate. This study found evidence of some individual school led policies already in place and also of improvements in packed lunches in both age groups.

The ultimate aim is to ensure that all children have a nutritional intake in line with dietary recommendations and to ensure that they achieve their full potential of health and well-being to be able to gain the most from the educational and other opportunities offered to them. Food in schools is about more than provision of nutrients but also offers a social opportunity and an opportunity for learning across the wider curriculum.

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