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A cluster randomised controlled trial of a smart lunch box designed to improve the contents of children's packed lunches

Charlotte Evans, James Thomas, Cristina Cleghorn, Meaghan Kitchen, Darren Greenwood and Janet Cade

University of Leeds, Leeds, UK

Approximately half school pupils take a packed lunch from home⁽¹⁾. With concerns over the nutritional content of school meals currently high on the political agenda, packed lunches are viewed by many parents as a healthier alternative. However, previous studies have shown that packed lunches are deficient in foods encouraged by the 'eatwell plate'⁽²⁾. The present report summarises the results a cluster randomised controlled trial designed to improve the contents of children's packed lunches.

In June 2006 baseline data were collected on the packed lunches of 1294 children, aged 8–9 years, in eighty-nine schools across the UK. The results revealed that packed lunches are poor in terms of food choice and nutrients, dominated by snack foods high in Na and non-milk extrinsic sugars (NMES) and low in foods high in starch and fibre. Only 1% met all the school meal food-based standards⁽³⁾. A smart lunch box package was developed to improve the contents of children's packed lunches and distributed through schools. The schools were randomised into two groups and for England only were stratified according to percentage free school meals eligibility and key stage 2 standard aptitude test results, an intervention group receiving the smart lunch box intervention and a control group receiving a simple healthy eating leaflet. The intervention comprised a lunch bag, two plastic food containers and supporting materials for parents and children that were posted to schools and distributed by the teachers. The intervention was introduced over 5 months between November 2006 and March 2007 in three phases. Follow-up data were collected in June 2007 from 971 children aged 9–10 years in eighty-four schools. The contents of children's packed lunches, provided and eaten, were weighed and analysed for food and nutrient provision at baseline and follow up using *McCance & Widdowson's The Composition of Foods Sixth Summary Edition*⁽⁴⁾. Multilevel modelling was applied to take account of the clustering of children within schools.

The smart lunch box significantly increased the provision and consumption of fruit, vegetables and dairy food compared with the control group and reduced the weight of savoury snacks. Children in the intervention group were provided with packed lunches significantly higher in some nutrients (see Table). Although higher levels of some nutrients were provided, not all the food was consumed by children and the higher nutrient levels consumed by the intervention group were not large enough to be significant.

Food type or nutrient provided	Mean weight		P
	Control	Intervention	
Fruit (g)	70.2	87.1	0.03
Vegetables (g)	4.1	14.9	<0.01
Dairy (cheese and milk-based desserts; g)	41.6	51.3	0.01
Savoury snacks (g)	16.6	14.0	0.04
Vitamin A (µg)	63.6	88.1	0.02
Folate (mg)	45.1	50.7	0.04

The intervention had little impact on foods rich in starch and protein such as sandwiches and did not significantly reduce the weight of confectionery. No differences were seen between the two groups in terms of the energy, percentage fat, saturated fat or NMES. The smart lunch box significantly increased the percentage of children meeting all the school meal food-based standards (3.8% compared with 0.5% in the control group). Children in the intervention group were also more likely to be provided with the five healthy food groups, starch, protein, dairy, fruit and vegetables (12% compared with 5%). The smart lunch box increased the percentage of children having none or one restricted food or drink by 10% (to 45% from 35%). The mean number of nutrient standards met was 6.4 of fourteen nutrients compared with 6.1 of fourteen nutrients for the control group. The smart lunch box improved some aspects of the contents of children's packed lunches, both in terms of foods provided and foods consumed.

1. Smithers G, Gregory JR, Bates CJ, Prentice A, Jackson LV & Wenlock R (2000) *The National Diet and Nutrition Survey: Young People Aged 4 to 18 Years*. London: The Stationery Office.
2. Department of Health (2007) The eatwell plate. <http://www.eatwell.gov.uk/healthydiet/eatwellplate/>
3. Food Standards Agency (2002) *McCance and Widdowson's The Composition of Foods Sixth Summary Edition*. Cambridge: Royal Society of Chemistry.
4. School Food Trust (2007) A guide to the Government's new food-based standards for school lunches (Revised). <http://www.schoolfoodtrust.org.uk/UploadDocs/Library/Documents/School-food-trust.pdf> (accessed April 2008).